



# PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: Full-sized Project

TYPE OF TRUST FUND: LDCF

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

## PART I: PROJECT INFORMATION

Project Title:	Strengthening the resilience of the energy sector in Benin to the impacts of climate change		
Country(ies):	Benin	GEF Project ID: <sup>1</sup>	5431
GEF Agency(ies):	UNDP (select) (select)	GEF Agency Project ID:	4979
Other Executing Partner(s):	General Directorate for Energy	Submission Date:	May 6, 2013
		Re-submission Date:	June 28, 2013
GEF Focal Area (s):	Climate Change	Project Duration (Months)	60 months
Name of parent program (if applicable):	n/a	Agency Fee (\$):	760,000
<ul style="list-style-type: none"> <li>• For SFM/REDD+ <input type="checkbox"/></li> <li>• For SGP <input type="checkbox"/></li> </ul>			

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

Focal Area Objectives	Trust Fund	Indicative Grant Amount (\$)	Indicative Co-financing (\$)
CCA-2	LDCF	900,000	4,000,000
CCA-1	LDCF	2,400,000	10,500,000
CCA-3	LDCF	4,700,000	15,500,000
(select) (select)	(select)		
(select) (select)	(select)		
(select) (select)	(select)		
(select) (select)	(select)		
(select) (select)	(select)		
(select) (select)	(select)		
Total Project Cost		8,000,000	30,000,000

### B. INDICATIVE PROJECT FRAMEWORK

Project Objective: To reduce the impacts of climate change and variability on Benin's energy sector						
Project Component	Grant Type <sup>3</sup>	Expected Outcomes	Expected Outputs	Trust Fund	Indicative Grant Amount (\$)	Indicative Cofinancing (\$)
<b>Mainstreaming adaptation to climate change into energy policies and management and planning strategies and tools</b>	TA	1. Key energy policies, strategies and management and planning tools for the energy sector have integrated climate risks and adaptation measures	1.1 A national CC-Adaptation multi-stakeholder platform is set up to facilitate dialogue and coordination among relevant decision makers about cross-cutting climate change related risks that affect the resilience of the energy sector in Benin  1.2 A system for monitoring the risks and vulnerability of the energy sector related to the increase of intensity and frequency of droughts and climate related disasters and	LDCF	820,000	3,900,000

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

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

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

			<p>the effectiveness of adaptation measures is put in place including:</p> <ul style="list-style-type: none"> <li>- parameters and indicators for energy sector risks to climate change</li> <li>- methodologies and tools for evaluating and prioritizing the adaptation options for advancing a climate resilient energy sector</li> <li>- strategy to disseminate timely information on risks to key stakeholders in the energy sector (managers, producers, consumers)</li> </ul> <p>1.3 The wood energy supply master plans (SMPs) of 8 Benin cities, the Information System for a Permanent Evaluation (SIEP) of domestic fuels, the Ecological and Forest Information System (SIEF) and rural electrification planning tool GEOSIM are updated to integrate climate vulnerabilities of Benin and the region in planning and management of energy supply and demand</p> <p>1.4. Climate resilient Integrated Land Use Management Plans (ILUMPs) developed for the wood energy supplying areas and their surrounding agricultural landscape</p> <p>1.5 Relevant policy and legal framework for the, forest, land, and energy sectors are developed / revised and made operational to support the integration of climate change in the management of the energy sector</p>			
<b>Sustainable land and forest management practices for strengthening the climate resilience of the zones supplying wood for energy</b>	INV	2. The climate resilience of the most vulnerable wood supply zones (for energy) is strengthened in response to climate	2.1. Climate resilient integrated sustainable forest and agricultural landscape management practices implemented in at least 30 communities around the most vulnerable wood-	LDCF	2,200,000	9,500,000

		change impacts including variability	supplying areas for energy  2.2. 100,000 ha of the wood-supplying zones the most vulnerable are managed against climate-induced bush fires through the development and demonstration of a bushfire risks management protocol			
<b>Energy use and production Technology transfers to strengthen the resilience of livelihoods and living conditions of the vulnerable communities</b>	INV	3. Livelihood options and living conditions of the most vulnerable communities are made more resilient to the impact of climate change in the energy sector	3.1. 10,000 improved cooking stoves and 1,000 pressure cookers are diffused in the most vulnerable rural and peri-urban communities  3.2. 5 multifunctional energy platforms using agricultural waste digester and supplying energy to the IGAs and other community services (adult literacy, health products conservation, communication) are developed in the 5 most vulnerable villages of the municipality of Banikoara  3.3. 3,000 households livestock waste digester for the production of biogas for cooking and lighting are diffused in the most vulnerable communities to the impacts of climate change in the energy sector  3.4. 1,500 members of the most vulnerable communities are trained on climate-resilient, alternative IGAs to increase the resilience of vulnerable households to the impacts of climate change in the energy sector  3.5. 3 Innovative financial products to finance the required investment for the production of stoves and waste digester, the access to the user equipment and the alternative IGAs are developed by the MFIs such as Vital Service, PADME, ASF, CREP and CAVECA.		4,600,000	15,100,000

			3.6. A set of policy and regulation recommendation, aiming at addressing the main barriers to the adoption of energy efficient and alternative technologies by households and the private sector, are developed and submitted to the energy sector decision makers			
Subtotal					7,620,000	28,500,000
Project Management Cost (PMC) <sup>4</sup>				LDCF	380,000	1,500,000
Total Project Cost					8,000,000	30,000,000

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

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount (\$)
Bilateral Aid Agency	GIZ through the PDDC	Grant	5,000,000
Multilateral Agencies	FFEM, AfDB, WB, GIZ through the SMBCF	Grant	10,000,000
National Government	DGE through the PEMESD	Grant	8,000,000
GEF Agency	UNDP through the MVP	Grant	6,500,000
GEF Agency	UNDP	Grant	500,000
(select)		(select)	
<b>Total Cofinancing</b>			<b>30,000,000</b>

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

GEF Agency	Type of Trust Fund	Focal Area	Country Name/Global	Grant Amount (\$) (a)	Agency Fee (\$) (b) <sup>2</sup>	Total (\$) c=a+b
UNDP (select)	LDCF	Climate Change	Benin	8,000,000	760,000	8,760,000
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
<b>Total Grant Resources</b>				<b>0</b>	<b>0</b>	<b>0</b>

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

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

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

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

- |   |                       |                                 |
|---|-----------------------|---------------------------------|
|   | <u>Amount</u>         | <u>Agency Fee</u>               |
|   | <u>Requested (\$)</u> | <u>for PPG (\$)<sup>6</sup></u> |
| <ul style="list-style-type: none"> <li>• No PPG required.</li> <li>• (upto) \$50k for projects up to &amp; including \$1 million</li> </ul> | _____                 | _____                           |

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

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

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

- (upto)\$100k for projects up to & including \$3 million \_\_\_\_\_
- (upto)\$150k for projects up to & including \$6 million \_\_\_\_\_
- (upto)\$200k for projects up to & including \$10 million 200,000 19,000
- (upto)\$300k for projects above \$10 million \_\_\_\_\_

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

Trust Fund	GEF Agency	Focal Area	Country Name/ Global	(in \$)		
				PPG (a)	Agency Fee (b)	Total c = a + b
LDCF	UNDP	Climate change	Benin	200,000	19,000	219,000
(select)	(select)	(select)				0
(select)	(select)	(select)				0
<b>Total PPG Amount</b>				<b>200,000</b>	<b>19,000</b>	<b>219,000</b>

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

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

### **Project Overview**

#### **A.1. Project Description.**

##### **The climate change related problem**

1. The energy mix in Benin is comprised of biomass energy (59.4 %), petroleum products (38.4%) and electricity (2.2%). 82% of electricity is imported from Ghana, Ivory Coast and Nigeria<sup>8</sup>. This is complemented by the production of hydroelectricity from the Nagbeto plant in Togolese territory and the Yeripao plant in Benin (approximately 0.05 %) and small thermal power plants owned by the Company for Electricity of Benin (CEB)<sup>9</sup>. This LDCF project aims at addressing climate change risks on 60% of Benin's energy mix produced internally.

2. Climate change is expected to adversely affect the energy sector in Benin. Forecasts performed on MAGICC SCENGEN indicate a temperature increase range of +1°C to +2.5°C, a sensitive alteration of annual rainfall levels including an increase of one to two months' time of the dry season length by 2100 (INC). Forecasts indicate an increase between 6 and 19.5% of water losses through increased evaporation and an increase of the intensity and occurrence of droughts and floods.

3. These climate induced changes are expected to affect availability of biomass for energy in Benin. Indeed, the forecasted climate change could subject forest resources to hydric and thermic stresses (according to the Second National Communication), thereby worsening the health of forests especially their regenerating capacities (NAPA and INC). This is an additional threat to Benin's energy security, already under pressure by the increase in wood energy demand and clearing of forests for agriculture. According to the CENATEL (National Remote Sensing Center), the main woody resources have decreased of 3 million ha from 1978 to 1998 corresponding to a loss of 160,000 ha per year<sup>10</sup>. Also, agricultural landscape degradation induced by water deficits is expected to lead to an accentuation of forest clearing for farming purposes which is estimated at more than 50,000 ha per year in the Northern Benin (FAO FRA 2010)<sup>11</sup>. Pressures will particularly be high in the forest zones of the Central and the North-Eastern regions, specifically with the development of yam and

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

<sup>8</sup> <http://www.reegle.info/countries/benin-energy-profile/BJ>

<sup>9</sup> République du Bénin Direction générale de l'Énergie (2009) : Plan stratégique de développement du secteur de l'énergie

<sup>10</sup> Stratégie nationale et plan d'action pour la conservation de la diversité biologique au Bénin.

<sup>11</sup> TCP/RAF/3306 Project : « Assistance in the Preparation of Convergence Plan in Sustainable Management and Utilization of Forest Ecosystems in West Africa » 2011

cotton farming which, with rapid increase in farming population and adverse climate induced-impacts on agricultural lands, will lead to an increase of forest clearing for more fertile and humid lands. All of this will contribute to a worsening of forests degradation and result in a deficit wood supply for energy.

**Table:** Tenable wood energy supply compared to wood energy demand

	1995	1998	2000	2005	2010	2015
Covered forest surface area (in 10 <sup>3</sup> ha)	6,573	6,342	6,197	5,845	5,514	5,201
Tenable wood energy supply (10 <sup>3</sup> tons)	5,323	5,137	5,018	4,734	4,465	4,212
Demand in wood energy	3,496	3,848	4,114	5,189	6,222	7,493

Sources: FAO and CENATEL (National Remote Sensing Centre)

4. Climate change is also expected to affect hydropower generation. Indeed, forecasts performed on the BenHydro (IMPETUS) model has shown that forecasted increase of dry season's length and frequency, and the reduction of rainfall forecasted in the Oueme watershed could have negative impacts on the availability of surface and ground water resources in the watershed (Second National Communication). This is expected to result in an increase of rivers drying-up and thereby affecting hydropower generation for many poor communities. Recent drought episodes across the West-African region have already led to a reduction of river flows that no longer enable the regular operation of hydro-electric facilities namely the Yeripao Hydroelectric Power Plant in Benin (NAPA). This could be worsened by the rivers silting as a result of climate induced land erosion in watershed and river banks. Furthermore, climate change could also manifest in the disruption of seasonal availability and variability of water resources, making seasonal planning and management of hydropower systems challenging.

5. The net effect of these changes is that Benin will be highly vulnerable to energy supply interruptions including energy price increases that will affect the capacity of poor communities to satisfy their energy need for achieving the MDGs. Indeed, the MDG achievement in Benin requires at least the efficient access to three types of energy services: i) energy for cooking; ii) electricity for lighting, ICT, households and commercial equipment, and the provision of social services like health care, public lighting, iii) and mechanical energy to operate the agricultural and food processing equipment, set up an irrigation system and transport goods and people<sup>12</sup>.

6. Supply interruptions will be in the form of:

- Domestic interruptions: Recently, more than 1,000 un-programmed electricity supply interruptions per year with an accumulation of 37, 242 mn in 2006 have been observed by the SBEE affecting economic activities in Benin. In 2005, 63% of firms reported that power was a major constraint to doing business, and around 68% of firms reported losses due to limited power supply. In 2009, firms indicated that around 7.5% of value was lost because of power outages that totaled, on average, 24 days per year<sup>13</sup>. From the wood energy supply side, the pressure on the supply channel could lead to the deepening of the extension of the supply areas as it is the case currently for Cotonou and Porto Novo (the biggest consumers cities) from the south towards the central and western forests and the increase of the wood energy import from Nigeria (the city of Ilara) which nowadays supply more than 21% of charcoal needs of Cotonou, the capital city.
- Import interruptions: Analyses showed that the frequent production problems in importing countries (technical problems, hydrological deficits in Ghana and Togo dams, and other supply difficulties in power stations of Ivory Coast) result often in the decrease of electricity available for imports increasing the imbalance of the electricity sector in Benin<sup>14</sup>.

7. Vulnerable households will be affected most given reliance on, and elevated prices of biomass and hydropower supply. For the majority of Beninese, the biomass is the sole source for cooking energy. Lack of

<sup>12</sup> PNUD (2006): stratégie pour la fourniture d'énergie nécessaire pour l'atteinte des objectifs du millénaire pour le développement au Benin

<sup>13</sup> <http://www.reegle.info/countries/benin-energy-profile/BJ>

<sup>14</sup> <http://www.reegle.info/countries/benin-energy-profile/BJ>

adequate and reliable supply of electricity has forced more than 60% of the population to rely on biomass as their primary energy source<sup>15</sup>.

8. The effects of the climate induced shortages in energy supply will be reinforced by the impacts of climate change on the demand of electricity. The accentuation of the temperature rise already observed in Benin<sup>16</sup> will lead to an increase in electricity demand resulting from a more intensive and longer use of air conditioning, ventilation and refrigeration equipment during the year. In addition, currently energy consumption in Benin is highly inefficient making more critical the climate induced imbalance of the energy sector. Some improved cooking stoves dissemination programmes have been delivered but have not succeeded in developing a permanent and regular availability of improved cooking stoves after completion of such programmes. Poor rural dwellers and low and middle-income households of urban centres do not have the purchasing power that would enable them to buy improved cooking stoves. Besides, the lack of an efficient inclusive financial system does not allow the cook stoves producers, whom are poorly trained on finance, to make the necessary investment for a large-scale, cost-effective and profitable production of improved cook stoves necessary for a sustainable availability of the cook stoves. On the electricity consumption side, the second hand and inefficient household equipments (fridges, TV, AC, fans) and non-efficient lighting of buildings and houses are the main causes of inefficiency in electricity consumption. The combination of increase electricity needs due to climate change and low efficiency in energy uses will mean higher percentage of household incomes will need to be paid for energy, leaving less for other needs. This will affect the capacity of the population to achieve MDGs.

---

<sup>15</sup> <http://www.reegle.info/countries/benin-energy-profile/BJ>

<sup>16</sup> The PANA and the INC state that daily temperatures data indicate that regular occurrence of warm days and nights has significantly increased by 39 days (10.7%) and by 73 days (20%) respectively between 1960 and 2003<sup>16</sup>.

### **Ideal solution and barriers to the implementation of the ideal solution**

9. The preferred (normative) solution to the vulnerability of the energy sector in Benin to climate change is to strengthen the resilience of key energy sources, infrastructure and livelihoods. The solution is to ensure that domestic sources of supply of energy (biomass/hydro) are made more resilient. Improved demand management practices, that incorporate climate change risks and concerns will also be necessary. It will also require that measures be taken to manage better the importation of energy from neighbouring countries with better understanding of the implications of climate change on their energy production processes.

10. However, Benin is currently facing several barriers likely to prevent the country from applying this ideal solution. Among these barriers, the following are critical:

- Poor technical and institutional capacity of authorities and technical staff of line ministries, especially responsible for energy and forest resources, and regional and local authorities, to integrate climate risks and adaptation measures into the policy, institutional and regulatory frameworks as well as the strategies for planning and managing energy supply and demand from both domestic and external sources.
- The limited access of energy sector decision-makers and technician to relevant climate information does not allow for a planning of energy supply and demand with due consideration to climate hazards. Even if climate-resilient energy planning capacities were available in the country, the climate-related information that Benin can currently access would not enable such a planning to be implemented. Benin is presently developing a project to be submitted to GEF for setting up an early warning system (EWS). Thus, the EWS could contribute to supply the energy sector with raw climate-related information that will enable it to develop specific information needed for a successful planning of energy supply and demand with reference to climate risks.
- Benin has elaborated wood energy supply master plans (SMPs) for the eight main cities of the country that have defined the prospective delimitation of woody fuels supply basins. The SMPs have assessed the prospective evolution of wood fuel demand and the evolution of maintainable woody fuels supply of the main wood supply areas. However, these SMPs did not integrate the climate and weather factors likely to influence the evolution of wood energy production and demand for a better planning and sustainability of wood energy supply.
- Coordination issues related to the decision making related to the concurrent exploitation of the energy sources and of the use of energy between the different stakeholders.
- The limited access of charcoal producers' to efficient carbonisation technologies does not allow a reduction of the pressures exerted on wood resources of the country and thus, contributes to the increase of vulnerability of the wood energy sub-sector to climate change and variability.
- The difficult access of households to efficient wood energy equipment (improved cooking stoves, pressure cookers) does not favour a reduction of pressures kept on forest and as a result, contributes to the increase in vulnerability of the sector. Poor rural dwellers and low and middle-income households of urban centres do not have the purchasing power that would enable them to buy improved cooking stoves. Besides, the lack of an efficient inclusive financial system do not allow the cook stoves producers to make the necessary investment for a large-scale diffusion of cost-effective and profitable production of improved cook stoves necessary for a sustainability of the coke stoves production.
- The limited knowledge of the evolution of renewable energies potentials according to the various climate variability and climate change scenarios for Benin does not allow an efficient exploiting of such potentials.

### **Baseline scenario and baseline projects**

11. With a view to improving the energy supply system (infrastructure), the quantity and the quality of energy sources and enhance the efficiency of energy supply and demand, the Government of Benin has



developed and adopted in 2009 a national development strategy for the energy sector. The main axis of this strategy is to: i) enhance the human, institutional and regulatory capacity for a better planning and management of the energy resources; ii) increase the production, transport and distribution of the different forms of energy; iii) improve poor rural access to energy. To achieve this objective, the government of Benin, with the technical and financial support of its partners, including UNDP, has initiated several programs and projects. Among baseline projects, we can identify the following as relevant for the proposed LDCF project:

**1) Programme in support to decentralisation and communal development (PDDC) (expected co-financing \$5 million):**

12. This program financed by the GIZ has a « rural area electrification » component of which \$6.6 million is used to improve the electricity supply planning capacities. This is to be done via a capacity building program for national and local authorities in the use of the rural energy and electrification planning tool GEOSIM. GEOSIM is a decision support tool assisting in all the energy planning stages, from territorial planning to definition of supply options through the energy demand forecast and supply options analysis. However, the GEOSIM tool as it is currently used in Benin, does not include climate parameters like the increase of heat intensity, length and frequency, droughts and floods increase, rainfall disturbances that could likely influence the energy demand forecast and the assessments of the evolution of the energy potentials and in turn disturb the planning processes of energy supply. Furthermore, if this project is meant to build the capacities of the key stakeholders for the management of the energy sector and a better planning of the energy supply and demand, it doesn't plan to build the capacities that will allow to take into account climate risks, to identify the appropriate adaptation measures and integrate them in the planning and management of the energy sector. Building on this project, the LDCF will complement the capacity building activities. The LDCF will support the development and integration of appropriate climate change modules in the capacity building activities of this project in order to create within the country the required capacity for the integration of climate risks and adaptation options in the management and planning processes of the energy sector and the required capacity for identifying and designing adequate adaptation options.

**2) Support for the sustainable management of Benin Communal Forests (Expected co-financing: \$10 million)**

13. This project funded by the French Global Environmental Facility (FFEM), the African Development Bank (AfDB), World Bank, and GIZ, aims at fighting against forest degradation, while ensuring the sustainability of Benin' cities supply in charcoal and contributing to poverty reduction in Beninese forestry communities. To achieve this objective, the project will support: i) the establishment of a regulatory framework favourable to communal forests development; ii) capacities building of communal forest associations in developing and managing communal forests; iii) elaboration and implementation of sustainable forest management plans of 600,000 ha of communal forest lands; iv) creation and reforestation of 3,000 ha and improving of 1,000 ha of gazetted communal forests and promote their conservation and sustainable exploiting; v) sustainable management of communal forests by establishing rural wood markets supplied by managed forests areas (100 markets covering 300,000 ha); vi) promoting local development and supporting measures to prevent forest degradation. Nevertheless, as concluded by the NAPA, current climate variability and projected climate change could have adverse impacts on the regeneration capacities of forest surfaces and equally lead to a worsening of clearings of forests for farming purposes. This baseline project did not take into account these risks that could likely hinder the achievement of its objectives and there is a need to integrate in its implementation adequate adaptation measures to help beneficiary communities and ecosystems to face these risks. The LDCF will build on this project to advance the integration of the climate risks in the management of the community forests to strengthen the climate resilience of the wood energy supply chain for the 8 Benin cities and the communities of which the livelihoods depend on these supply chain. In this perspective the LDCF will support the revision of the regulatory frameworks related to the development and management of the communal forests, the capacity building of communal forests associations and local authorities for the integration of the climate risks and appropriate adaptation measures in the sustainable forest management plans of the Oueme Forest and the management of the rural wood

energy markets. The LDCF will also finance local development supporting measures alternatives to the livelihood sources contributing to the forest degradation.

### **3) Program for the enhancement of the management of the Energy supply and demand - 2013-2015 (co-financing \$ 8 million)**

14. Benin Government has developed a number of tools aiming at improving planning and management of energy supply and demand. The development of such tools and strategies is financed by the national budget to the tune of \$8.2 million. The first tool is the Information System for a Permanent Evaluation (SIEP) of domestic fuels which aims at equipping the General Directorate of Energy (GDE) with a tool to monitor, plan and manage domestic fuels sub-sector including bio-mass energy. The second one is the Ecological and Forest Information System (SIEF) aiming at equipping the National Remote Sensing Centre (NRSC), of a Middle Oueme region forests monitoring plan based on an inventory of 600,000 ha of forest in the region. In the framework of this program, the DGFRN (General Directorate of Forests and Natural Resources) has also elaborated wood energy supply master plans (SMPs) for the Benin urban centres. Based on regional and national inventories of Benin forests resources, the SMPs are guiding, planning and monitoring tools for the prospective delimitations of cities wood energy supply basins, the sustainable management of woody resources of the supply basins and if necessary the reorganization of the wood energy supply chain from the woods extraction to the commercialization within the city including the transport and distribution. Furthermore, this programme is currently supporting the implementation of sustainable forests management plans covering 600,000 ha in the Middle Oueme zone for an ecologically sustainable wood energy production. With regards to electric energy, the supply scheme aims at shifting from a 15% autonomy rate in 2005 to 30.4% in 2010 to reach 59.4% in 2015 and 67.3% in 2025<sup>17</sup> through a diversification of electric power energy supply sources. This supply plan was developed based on a forecast analysis of needs in electric power making use of two scenarios : i) status quo scenario based on historical development of electric power demand with a consumption growth rate that moves along the trends over the past 5 years and an almost unchanged progress and GDP status; ii) a scenario of an emerging Benin with an accelerated growth, a more considerable participation of the industrial sector in the GDP and a diversification of the agricultural sector; this scenario being expressed through a more considerable electric demand. The electricity supply schemes, the wood energy SMPs, the SIEP and the SIEF did not take in account the climatic risks that could distort their projections, while energy supply and demand are sensitive to projected climate change impacts for Benin such as temperature rise, river flows, evapotranspiration, rainfall pattern, sunshine, cyclones and flooding. The LDCF will support the integration of the climate risks and appropriate adaptation measures in these planning tools. It will support the capacity building of the officers in charge of the SIEF, SIEP and the NRSC staff on how to take into account the climate and weather information in monitoring, managing and planning the biomass energy subsector including the production and supply of wood energy from the Oueme forest and in the electricity supply and demand for securing most vulnerable Beninese population livelihoods against the climate risks for the energy sector.

### **4) Support to the implementation of Millennium Villages in Benin (Expected co-financing: \$6.5 M)**

15. This four-year project (2011-2014) funded to the tune of US\$ 9,732,702 by the -Government of Japan, is a contribution to the eradication of extreme poverty in the municipality of Banikoara (in the North of Benin) identified as one of the poorest municipality in Benin. The project's objective is to sustainably reduce poverty through the increase of income and improvement of household living conditions. The priority domains of intervention are among other : i) the financing, intensification and diversification of agriculture in high-potential zones; ii) job creation and promotion of income generating activities; iii) promotion of private and individual initiatives through the granting of small-sized credits and support service to the private sector, and the iv) improvement of energy access. Banikoara has a surface area of 444,247 ha of forest that position it as the seventh fuel wood producing commune out of 77 with an annual production of 80,000 m<sup>3</sup> of wood

---

<sup>17</sup> Republic of Benin, Ministry of Mining, Energy and Water. Electric power policy and strategy paper of Benin (2008)

energy and the seventh consumer commune with a consumption of 60,000 m<sup>3</sup><sup>18</sup>. According to NAPA, Banikoara also is among the most vulnerable communes in terms of energy and the prevailing poverty might be one of the causes.

16. However, several MVP measures to fight against poverty are potentially vulnerable to the impacts of climate change to the energy sector. The success of income generating activities supported by the MVP project such as the processing of agricultural, forestry and fishing products relies on an affordable quantitative and qualitative access to energy. However, the current rural areas access to electricity is too weak. Only 2% of rural populations have access to electricity. While the government of Benin has initiated a certain number of program to improve the access to electricity in rural areas, the projected rises of temperature will probably result to a more intensive and longer use of air conditioning, ventilation and refrigeration equipment during the year and the medium and long-term projected temperature contributing to the increase of electricity outages in the rural areas. This could negatively impact the productivity of these activities. Additionally several other income generating activities such as road catering, art crafting and others use wood energy as main source of energy. The projected climate change that could potentially lead to a reduction of the accessibility of wood energy for rural dwellers and an increase of the wood energy prices could also negatively affect the productivity of these activities.

17. In another hand, the wood energy market pressures and prices increases that could result from the climate induced woody resources degradation could hinder the expected results of the MVP project of improving livelihoods and living conditions of the poor Banikoara communities. Indeed, the reduction of wood energy availability will result for women and girls in more time and efforts dedicated to collect wood energy and less time and energy for other activities such as income generating activities, food production, education, that contribute to improve household livelihoods. Also, the prices increase that could result from the climate induced pressures of the wood energy markets will mean higher percentage of household incomes will need to be paid for satisfying household's energy needs. Surveys carried out in 2008 by the project Bois de Feu reveal that Banikoara households spend more than 10 dollars per month for cooking energy, what is considerable compared to the per capita income of \$540. These climate vulnerabilities related to the energy sector need to be reduced for the MVP project to achieve its objective of improving Banikoara communities 'livelihoods.

18. This LDCF will support the development of multifunctional energy platforms using agricultural wastes digester and providing a more secure source of energy of the IGAs supported by the MVP. The agricultural activities supported by the MVP constitute a secured source of agricultural wastes. The LDCF will also support the most vulnerable households of Banikoara to access alternative sources of energy more resilient to projected climate change impacts and wood and charcoal improved stoves and other efficient energy equipment such as pressure cookers.

### **Alternative solution and additionality**

19. The government of Benin has undertaken an ambitious program for improving energy access based mainly, as explained above, on improving the management capacity of the energy sector, developing new tools and strategies for managing the energy demand and supply and increasing energy production. However, the climate variability and change are likely to worsen Benin's energy deficit if appropriate adaptation measures are not adopted. The proposed LDCF financed project will contribute in overcoming the political, institutional, financial barriers and those relating to individual capacities and to knowledge impeding to prevent and reduce the impacts in vulnerable communities of climate-related risks on the energy sector of Benin. This will involve the development of a strategy for strengthening resilience of the key energy sources, the integration of climate risks in the planning and budgeting processes of the energy sector and the promotion of behavioural change on the part of both consumers and producers of energy. Both climate

---

<sup>18</sup> Republic of Benin : Ministry of Environment and Wildlife Protection : (2007) : Fuel wood supply basins of Cotonou, Porto Novo, Lokossa, Abomey, Bohicon, Djougou, Natitingou and Parakou : Fire wood project phase II – national forest inventory

resilient energy use and the development of alternative energy sources (portfolio approach) will be necessary to reduce vulnerability. Given the importance of biomass in the context of Benin's current energy supply, these measures will also need to be backed up by the practice of sustainable land management options especially in areas that are more vulnerable and the promotion of income-generating activities, alternatives to non-sustainable forest and land uses practices in riparian communities of wood energy supplying landscapes and the adoption and implementation by Benin, of institutional, political and regulatory measures aiming at removing any obstacles to such adoption of adaptation measures.

20. The project will, therefore, support the achievement of the following key results: (a) Mainstreaming climate change into energy policies and management and planning strategies and tools (Outcome 1), (b) introducing sustainable land and forest management practices for strengthening the climate resilience of wood energy supplying areas (Outcome 2), and (c) promoting the transfer of efficient technologies of production and use of wood energy and alternative forms of energy (Outcome 3).

### **Component 1 : Mainstreaming climate change into energy policies and management and planning strategies and tools**

#### **Outcome 1: Key energy policies, strategies and management and planning tools for the energy sector have integrated climate risks and adaptation measures**

21. The Government of Benin through the program for the enhancement of the management and planning of the energy supply and demand has developed efficient tools and strategies aiming at improving the planning and the management of energy supply and demand. These tools are the Information System for a Permanent Evaluation (SIEP), the Ecological and Forest Information System (SIEF), the woods energy supply master plans (SMPs). Furthermore, this program has set up an electricity supply plan aiming at shifting from a 15% autonomy rate in 2005 to a rate of 67,3% in 2025. Additionally, the PDDC has developed the rural electrification planning instrument the GEOSIM. Also, the project for the sustainable management of Benin Communal Forests has developed a sustainable forest management plan for 300,000 ha of wood energy parks aiming at supplying 100 wood energy markets. These tools are very relevant to manage and plan the energy supply and demand. However to advance the management of the energy sector in a context of climate change and variability, it is necessary to mainstream the climate changes concerns into these tools and develop related policies to support the integration of climate change in the management of the energy sector.

22. Based on these outputs, this outcome, in coordination with the GEF/LDCF – UNDP EWS project under development, will set up an operational system for monitoring the risks and vulnerability of the energy sector and the adaptation measures to support decision making for the management of the climate risks in this sector. This system will include: i) parameters and indicators for energy sector risks to climate change; ii) methodologies and tools for evaluating and prioritizing the adaptation options for advancing a climate resilient energy sector, iii) strategy to disseminate timely information on risks to key stakeholders in the energy sector (managers, producers, consumers). The parameters and indicators for assessing the climate influence on the energy sector will be developed based on the combination of the relevant climate and weather forecast information (temperature variations, evapotranspiration, rainfall, river flows, sunny conditions, droughts recurrence and intensity...) and climate related risks (flooding, hurricane, cyclone, bush fires recurrence and intensity, rivers drying-up and siltation ...) for Benin and the energy sector of the countries from which Benin imports energy, and the scenarios of GDP evolution and composition, industrial development, evolution of the agricultural population, land and crop and livestock, and other socio-economic parameters. This will allow identifying and factoring the main climate risks in the existing tools and strategies for monitoring and management of the wood energy subsector: i) the SIEP (domestic fuels permanent evaluation information system); ii) the SIEF (Ecological and Forest Information System); iii) the sustainable forest management plans of the community forest supplying Benin urban city centres with woods energy, iv) the wood energy supply master plans (SMPs) of the eight urban centres. This will enable the General Directorate of Energy (GDE), the Direction of Forest and Natural resources and the National Remote Sensing Centre (NRSC) to respectively integrate above-identified climate risks into the monitoring, planning

and management of the energy biomass sub-sector, including the wood energy supplying areas, and design and implement appropriate adaptation options to prevent and / or reduce the climate induced imbalance of the wood energy sub-sector. Concerning the electricity subsector, the outcome will be supporting the integration of the above-identified climate risks within the GEOSIM energy planning tool, the main scenarios of the evolution of the electricity demand, the prospective analysis of the renewable energy potentials and the electricity supply plan<sup>19</sup>. This outcome will also support the development of climate resilient Integrated Land Use Management Plans (ILUMPs) for the wood energy supplying areas and their surrounding agricultural landscape. These plans will articulate areas that will best suited for accessing woody and other forest resources under conditions of climate change and guide sustainable agricultural land and forest management practices and bushfire control in a manner that takes climate into account as planned under the outcome 2 below. These plans will support the implementation of the climate resilient woody energy supply master plans (SMPs) and will be used to guide the implementation at the communities' level of climate resilient land and forest management practices as well as the policy and legal framework that will be developed by this LDCF proposal. Indeed, this outcome 1 will also support the development/revision of the relevant policy and legal framework of the land and forest resources and energy sector to support the integration of climate change in the management of the energy sector and the implementation of energy related adaptation strategies and measures by the relevant development sectors and communities including those developed within the outcome 2.

23. The ILUMPs will, therefore, provide the legal and organizational frameworks for the climate resilient integrated sustainable forest and agricultural landscape management practices such as agroforestry, energy production, soil fertility, moisture and humidity management practices, conservation farming and livestock practices, in 30 communities around the most vulnerable wood energy supplying zones planned under the outcome 2. In this perspective, the ILUMPs will include community-based agreements and rules to support their enforcement and will be therefore the mechanisms by which the communities themselves are guided to ensure that their use of the forest and other natural resources for any purposes (agriculture, NTFE, livestock and satisfaction of energy needs) and the improvement in livelihoods will not have the undesired effect of undermining the additional benefits particularly in forest management when taking climate change risks and uncertainties into account. These plans will also include the development of capacity within the forest and land resources sectors in implementing ILUMPs.

24. To achieve these results, it will be necessary to improve climate change capacity of the decision makers and technical staffs in charge of the energy and forests resources sectors. Through the Programme to support decentralisation and communal development (PDCC), the government of Benin is implementing capacity building program for national and local authorities for the management of the energy sector. Also, the project for the sustainable management of Benin Communal Forests is carrying out capacity development for communal forest association members in the development and management of wood energy communal forests. Through this outcome, the LDCF resources will support the design and implementation by the Energy Directorate of a training program to create within the country capacity able to support the integration of climate change concerns (climate risks, including the ones for the energy sector in the importing countries and adaptation options) in the planning tools and processes of the energy sector, the management of hydroelectric and thermal power plants, the policy, strategies, and development programmes of the sector. This capacity building program will include the strengthening of the capacities of the communal forest association members, the land and forest managers to develop and implement climate resilient sustainable land and forest management strategies and measures for preventing and managing bushfires and other climate resilient strategies (under the outcomes 2 et 3).

25. Additionally, this outcome will support the creation and the functioning of a multi-stakeholders climate change and energy platform (from energy, forest, land and water resources, agriculture, private sector, ...) to

---

<sup>19</sup> This supply plan was developed basing on a forecast analysis of needs in electricity making using two scenarios: i) status quo scenario and ii) a scenario of an emerging Benin with an accelerated growth. The plan decided to meet this energy demand, after analysis of possible combinations of various supply sources by applying the safety principle is based on: i) short-term liquid fuel-based thermal production, imports and hiring of generator plants; ii) mid-term new thermal sources using natural gas and development of renewable energies (hydro-electricity, solar, biomass, biogas). To this end, a prospective analysis of renewable energy potentials was done to identify the sources of energy to prioritize in each zone to be provided with energy.

facilitate dialogue and coordination of the decision-making processes about the cross-cutting climate changes related issues of the energy sector including the energy production, the access, the efficiency and the competing use of energy sources.

**Component 2: Sustainable land and forest management practices for strengthening the climate resilience of the zones supplying wood for energy**

**Outcome 2: The climate resilience of the most vulnerable wood supply zones (for energy) is strengthened in response to climate change and variability impacts**

26. To ensure a sustainable supply of Benin cities in charcoal without affecting the forest regeneration capacity, the project for the sustainable management of Benin communal forests will implement sustainable management forest for at least 300,000 ha of community wood energy forests for the supplying of 100 rural wood energy markets. Furthermore, the Benin communal forest project will support the creation and reforestation of 3,000 ha and the improvement of 1,000 ha of gazetted communal forests and promote their conservation and sustainable exploiting. These activities are meant to reinforce the woody resources supply potential and to address the dendro-energetic deficit of the Benin cities. However the efficiency of these activities could be undermined by the impacts of climate change such as land and forest drying up, forest encroachment to compensate climate induced agricultural and pasture land degradations, pest outbreaks, and climate induced bushfires on the woody resources and the agricultural landscape surrounding these communal forests. This will result to the dwindling of wood resources for energy production and worsen the imbalance and pressures of the wood energy market leading to increase of wood energy prices. This will considerably impact the living conditions of the poor in rural and urban areas which currently struggle to face to the continuous increase of wood energy prices.

27. This outcome will support these baseline initiatives through the introduction of climate resilient integrated sustainable forest and agricultural landscape management practices such as agroforestry, soil fertility, moisture and humidity management practices, conservation farming and livestock practices, in 30 communities around the most vulnerable wood energy supplying zones. Furthermore, this outcome will support the protection of 100,000 ha of the wood energy supplying areas, including the communal forests, against bush fires induced or aggravated by climate change and variability phenomena through: i) the development of protocols to manage risks of increase of intensity and frequency of climate-related bush fires (e-g removal of excessive vegetation and dead fuels through thinning, prescribed fire, and other methods) and ii) demonstration of the protocol on 100,000 ha of the areas of the community wood energy supplying forests most prone to bushfires. The introduction of these climate resilient woody resource management technologies will be done through the training of 3,000 members of the targeted communities and the provision of required technical and material support.

28. On top of strengthening the woody resource capacity to face to the above-mentioned climate related risks and preventing the market pressures and subsequent increase of wood energy price induced by the climate changes, these measures will contribute to increase vulnerable communities capacity to face to the prices increases and other wood energy market pressures that could result from the climate induced wood energy resource degradation. Indeed, the soil fertility and moisture management practices of agricultural landscapes and the introduction of agroforestry practices will contribute to increase the productivity of agricultural activities which are the main sources of income. In contributing to increase poor rural incomes, these initiatives could also allow them to access the wood energy rural markets and thus to dedicate the time and efforts women and girls use to collect wood energy to other activities such as education, income generation, leisure time contributing to improve households livelihoods and living conditions. These initiatives will also contribute to prevent the increase of time and effort women and girls would dedicate to wood energy collect as a result of climate induced degradation of woody resources.

### **Component 3: Technology transfers to strengthen the resilience of livelihoods and living conditions of the vulnerable communities**

#### **Outcome 3: Livelihood options and living conditions of the most vulnerable communities are made more resilient to the impact of climate change in the energy sector**

29. To contribute to the reduction of the wood energy forest degradation, the project for the sustainable management of Benin communal forests is supporting local development activities and income generating activities turning around the exploiting of non-timber forest products and the agro-sylvo-pastoral sector. Also the project support to the implementation of Millennium Villages in Benin contribute to fight against poverty in the municipality of Banikoara (in the north of Benin) through: i) the financing, intensification and diversification of agriculture in high-potential zones; ii) job creation and promotion of income generating activities; iii) promotion of private and individual initiatives through the granting of small-sized credits and support service to the private sector. These 2 projects by contributing to enhance the generation of incomes of the poorest contribute to address one of the causes of the household's vulnerability to the impacts of climate change in the energy sector which is poverty. Indeed, the weak purchasing power of the households is one of the main factors of their vulnerability to the impacts of climate change in wood energy markets such as prices increases. They therefore constitute a relevant baseline for addressing climate vulnerability of the households. However, as explained above, the impacts of climate change in the energy sector could negatively impact the productivity of the IGAs supported by these 2 projects and dependant on quantitative, qualitative and affordable energy access. Furthermore, the climate change impacts could hinder the expected results of these projects of improving household livelihoods and living conditions.

30. This outcome will reinforce these activities by supporting the dissemination of improved wood and charcoal stoves, the introduction of affordable energy alternatives for the most vulnerable and climate resilient income generating activities that will contribute to further increase households' purchasing powers. At this end, this outcome will support: the dissemination of 10,000 improved charcoal and wood cooking stoves and 1,000 pressure cookers in the rural communities and the urban centres supplied by the most vulnerable areas of the community forests. This outcome will address the main barriers of the wide adoption of the improved stoves already identified by several assessments and which are among others the lack of technical capacity, the weak purchasing power of the household, the weak financial capacity of the stove producers to make required investments for a qualitative and productive production of the improved stoves. It will also support the installation of energy multifunctional platform using agricultural wastes digester and supplying energy to the IGAs supported by the UNDP millennium village project (MVP) and other community services requiring electricity such as adult literacy, health products conservation, communication, etc... Furthermore, this outcome will support the introduction of household livestock waste digester for the production of biogas for cooking and lighting purposes within 3,000 households the most vulnerable to the impacts of climate change in the energy sector. The project Bois de Feu (or wood energy in English) has identified the main causes of the failure of past biogas project and have positively assessed the feasibility of the promotion of biogas as alternative source of energy in rural areas. This outcome will contribute to address these constraints to the successful diffusion of the biogas by addressing the sociological barriers to the manipulation of wastes, increasing the technical capacity and knowledge for the production and the manipulation of the biogas and user equipment, and developing strategies for the reduction of the production costs and an easy access of households to the biogas technology. These latter include the development of innovative inclusive finance mechanism to finance the investment for an efficient production of the improved stoves and biogas digesters and to provide households credits for accessing this technology (digester and livestock acquisition).

31. To contribute to increase the household purchasing power and allow them to access to efficient energy user equipment and alternative forms of energy, this outcome will also support the introduction of climate resilient alternative income generating activities through the training of 1,500 beneficiaries (among which 50% will be women) on climate-resilient income-generating activities (IGAs) alternative to unsustainable charcoal production, forest clearing for farming purposes, overexploitation of forest resources and other current practices contributing to increasing the climate vulnerability of these wood energy supplying areas.

These IGAs will concern the production, commercialisation and maintenance of the cook stoves, livestock wastes digester, the carbonisation of agricultural residues. They will also concern market-gardening, agricultural, forest and fishing products processing for women. Besides the fact that these IGAs will contribute to reduce the pressure on the woody resources and therefore their climate vulnerability, they will contribute to improve the capacity of the vulnerable households to access to efficient energy forms and equipment and to face to an increase of energy prices induced by the climate change.

32. This outcome will also support the development of at least 3 innovative financial products to finance the required investments for the production of stoves and waste digesters, the access by the households to the efficient and alternative energy user equipment and the alternative IGAs by the main Microfinance Institutions (MFIs) operating in Benin rural areas such as Vital Service, PADME, ASF, CREP, CAVECA. One of the barriers to the diffusion of improved cook stoves and renewable energy user equipment is the lack of financial resources of the households and private actors and their weak access to the financing institution. Indeed, these MFIs finance generally income generating activities with immediate profitability and the conditions of access to these MFIs are drastic (guaranty, prohibitive interest rate, necessity to have a mortgage ...). This outcome will therefore support these MFIs to develop new financial products and adapted to the cycle of revenues of the poor rural by sensitizing and training the MFIs in project finance and risk management instruments for renewable energy projects, providing loan guaranty for the poor households and cofinancing the IGAs turning around the energy activities. By the end of the project, this outcome, based on the experiences and lessons learnt from the introduction of the energy efficiency and alternative technologies supported by this project, will develop and put at the disposal of the authorities a set of policies and regulations recommendation aiming at sustainably addressing the main barriers for the successful adoption of these technologies by the Beninese private sector and households. This LDCF will coordinate in this sense with the Benin Climate Change Mitigation project submitted to the GEF for financing and aiming at removing the barriers to the development of renewable energy in Benin.

33. On top of contributing to reduce the pressure on the wood energy sources, the initiatives supported by this project are expected to have 2 additional adaptation benefits: i) to reduce the impacts on households energy budget of the price increase that could stem from the reduction of the wood energy availability induced by the projected impacts of climate changes in the ligneous resources, and ii) prevent the increase of time and effort dedicated for collecting wood energy in rural communities, above all, for women and girls, due to the climate induced degradation of wood resources. This will allow Beninese households of which 80% depends on wood energy for cooking, to dedicate more resource, time and energy to the other households activities such as IGAs, education, health, participation in communities affairs, necessary for increasing their livelihoods and life conditions. On top of these 2 adaptation benefits, the improved cook stoves will also contribute to reduce the indoor pollution and related health problems from the use of traditional wood stoves.

**Table: Baseline situation, additionality and socioeconomic and adaptation benefits**

Baseline situation	Additionality	Expected Socioeconomic and adaptation Benefits
<b>Component 1: Mainstreaming climate change into energy policies and management and planning strategies and tools</b>		
-The Government of Benin has created energy management and planning tools for a better management of the energy sector: SIEP, SIEF, Wood energy master plans, electricity supply plan based on 2 scenarios of Benin economic development through the PEMESD and is supporting the use of GEOSIM	Development of the parameters and indicators for the assessment of the climate vulnerability of energy policies, strategies and tools -Creation of a CC-Energy multistakeholders to discuss and coordinate the decision making related to the exploitation of the different sources of energy and	creation of the enabling framework (policies, strategies, tools) that will allow to better manage the climate change risks and impacts in the energy sector contributing thus to strengthen the climate resilience of the economic and livelihood activities related to the energy sector. This enabling framework will include community agreements (bylaws) that will make sure that the access and use of natural resources (NTFE, energy production,



<p>for the electricity supply planning through the PDDC project</p> <p>-For a better management of wood energy resources, the government has developed sustainable forest management plans for the forest supplying the main Benin cities in wood energy through the SMBCF project</p> <p>- creation of regulatory and policy framework favourable to communal forest through the SMBCF project</p>	<p>the concurrent use of energy</p> <p>-Mainstreaming climate risks and adaptation options in GEOSIM, SIEP, SIEF, Wood Energy SMPs, electricity supply plan</p> <p>Mainstreaming climate risks and adaptation options, communal wood energy forest management plans,</p> <p>Mainstreaming climate risks in the management plan of Ketou-Dogo and Vossa hydroelectric and the coal-fired power stations management</p> <p>-Development / revision of relevant policies and legal framework</p>	<p>agriculture, livestock) will not result in a degradation of woody resources and an increase of their climate vulnerability.</p>
<p><b>Component 2: Sustainable land and forest management practices for strengthening the climate resilience of the zones supplying wood for energy</b></p>		
<p>The Benin communal forests project will support SFM of 300,000 ha, the creation of 3,000 ha and the improvement of the management of 1,000 ha of gazette communal forests.</p>	<p>Introduction of climate resilient integrated sustainable forest and agricultural landscape management practices and investments such as agroforestry, soil fertility, moisture and humidity management</p> <p>Protection of wood energy communal forests against bushfires induced or aggravated by climate changes.</p>	<p>Strengthening the woody resources capacity to cope with the climate risks</p> <p>Prevent the wood energy market pressures and price increase that could result from the climate change</p> <p>Contribute to increase productivity of agricultural activities and income of 1,500 poor rural (among which 750 women) and, thus the capacity to face to the wood energy market pressures and prices increases induced by climate changes</p> <p>Reduction of women and girl time and effort dedicated to wood energy collect and increase of time and energy for education, health, income generation, leisure time contributing to improve households' livelihoods and living conditions.</p> <p>-Securing wood energy access for 80% of Benin population (more than 7 million people) depending on wood energy for cooking</p>
<p><b>Component 3: Technology transfers to strengthen the resilience of livelihoods and living conditions of the vulnerable communities</b></p>		
<p>the Benin communal forest project is promoting IGAs turning around the exploiting of NTFP and the agro-sylvo-pastoral sector</p> <p>The MVP project is supporting poverty reduction initiatives in the municipality of Banikoara</p>	<p>Dissemination of 10,000 improved charcoal and wood cooking stoves</p> <p>installation of 5 energy multifunctional platforms, using agricultural wastes digesters in the 5 most vulnerable villages of Banikoara</p> <p>- Introduction of livestock wastes digester for the production of biogas for cooking and lighting purposes within 3,000 farmers</p>	<p>reduce the pressures on the wood energy sources and increase the climate resilience of the wood energy supplying areas</p> <p>reduce the impacts on households energy budget of wood energy prices increase for at least 10,000 households</p> <p>Reduction of women and girl time and effort dedicated to wood energy collect and increase of time and energy for education, health, income generation, leisure time contributing to improve households' livelihoods and living conditions for women form 10,000 households.</p> <p>-Securing and improving women IGAs supported by the MVP project in the</p>

		<p>municipality of Banikoara:          Securing energy for cooking and lighting access for 3,000 households          Creating new and resilient sources of incomes for at least 1,500 (among which 750 women) people in riparian communities of the community wood energy supplying forests          - Improving the energy contribution to the MDGs: MDG 1( conservation, cooking, IGAs dependant on energy), MDG 2 (lighting for education, sanitation, school attendance), MDG 3 (women spending less time and energy for collecting wood energy, giving them more time for other activities, improvement of IGAs depending on electricity for women in urban and rural areas), MDG 4,5 and 6 (improving health care services) MDG 7 (reduction of GHG emissions, protection of 300,000 ha of forests, agriculture landscapes)</p>
--	--	---

**A.2. Stakeholders. Identify key stakeholders (including civil society organizations, indigenous people, gender groups, and others as relevant) and describe how they will be engaged in project preparation:**

Stakeholders	Expected role
Ministry of Energy	<p>General Directorate for Energy (DGE): ensuring the validation of major articulations in the implementation of the project in conjunction with the Ministry responsible for environment and other key stakeholders; coordination and monitoring of the project via participation in project piloting meetings            - ABERME (Beninese Agency for Rural Electrification and Prime Contracting): Government policy implementation is entrusted to it in the areas of rural electrification and energy control; in this respect, it participates in project monitoring.</p>
Ministry in charge of Environment	- Ensuring the chairmanship of the Project Steering Committee ; participates in project monitoring
General Forests and Natural Resources Directorate (GFNRD)	- Holding membership of the Project Steering Committee ; participates in project monitoring
Ministry of Finances	- Assisting in mobilizing Benin counterparts around the Government general budget for each fiscal year; participates in project monitoring
Private sector (SOLARIS)	- Participating in project monitoring ; may contribute if indicated to the implementation of project part
Municipalities	- Holding membership of the Project Steering Committee ; participates in project monitoring
University of Benin: Ecole Polytechnique d'Abomey-Calavi (EPAC), Department of Agronomic Sciences (Calavi, Parakou, Kétou, Professional Training and Development Center (CFPP) of the CEB and SBEE <sup>20</sup> ), Centre de Perfectionnement des Eaux et Forêts de Toffo.	<p>Participating in project monitoring; holding membership of the Project Steering Committee            - Implementing the capacity building programs</p>
NGOs (OFEDI, CIPCRE, IDID, JSF, JVE, BONERGIE)	- Facilitating, if need be, in in-country activities; contribute in mobilizing local stakeholders

<sup>20</sup> The CEB (Beninese Electricity Company) and SBEE (Beninese Society for Electric Energy) are the 2 electricity supplying companies of Benin

**A.3 Risk. Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the project design (table format acceptable):**

<b>Risk</b>	<b>Level of Risk</b>	<b>Risk mitigation</b>
Excessive politicization of local development activities for the exclusive benefit of a group	High	Participatory definition of management systems and an independent framework to implement the agreed measures
Psychological barriers of handling wastes could hinder the development of waste digester	low	The project Bois-de Feu has made analysis of the social acceptability of the biogas produced from wastes and more than 90% of the population interviewed have no longer reluctance to use waste for energy production. Additionally, the project will carry out raising awareness activities that will allow to definitely address this social barrier.
Risk that farmers prefer to use livestock waste for soil fertilization instead of energy production	Moderate	The project will support the implementation of fertility management measures and in this framework the project will develop capacity of farmers to do composting. These training will contribute to mitigate this risk by the fact that they will allow farmers to access to alternative technologies for soil fertility management
Weakness in agro-meteorological and hydrological extreme events forecast	Moderate	Realization of synergy between this project and the Early Warning System project
Delay in the taking of measures following the warning	low	Realization of synergy between this project and the Early Warning System project
<b>Overall project risk</b>	Moderate	

**A.4. Coordination. Outline the coordination with other relevant GEF financed and other initiatives:**

<b>Initiative</b>	<b>Expected role</b>
UNDP GEF Integrated Adaptation Programme to Combat the Effects of Climate Change on Agricultural Production and Food Security	This project will explore the linkages between the 2 projects in particular the activities to increase the resilience of agriculture in the wood energy supplying areas and the banks of the rivers hosting the hydroelectric power plants. The Direction of Energy will coordinate with the Direction of Agriculture who is coordinating this agriculture adaptation project.
UNDP GEF LDCF project for "Strengthening climate information and early warning systems in Benin for climate resilient development and adaptation to climate change"	The EWS project will support the implementation of the Output 2.1 in the development of the criteria and parameters for assessing the climate vulnerabilities of the energy sector by providing the necessary raw climate and weather data (temperature increase, rainfall, evapotranspiration, river flow.). The National Meteorological Service who is the executing agency of this project will play a key role in the output 2.1
Programme in support to decentralisation and communal development (PDDC)	The Ministry of Decentralisation, Local Governance, Administration and Territorial Development (MDGLAAT) leading the implementation of this program will play a key role in the implementation of the outcome 1 notably the activity related to the CC capacity building concerning the local authorities
Sustainable management of Benin Communal Forests	This project provides an entry point for the mainstreaming of the outcome 2 mainly the mainstreaming of CC in the wood energy management and planning tools. The General Forests and Natural Resources Directorate (GFNRD) who is the lead agency of this project will play a key role in the implementation of the outcome 2 (mainly the outputs 2.1, 2.2 and

	2.3) and the outcome 3.2
Program for the enhancement of the management of the Energy supply and demand	This program is a key entry point for the outcome 2 aiming at mainstreaming CC in the energy sector policies, strategies and tools. The General Directorate of Energy (GDE) and the General Directorate of Forests and Natural Resources (GDFNR) the executing agency of this program will be the key executing agency of the outcome 2.
Project of construction of the hydroelectric power plant of Vossa and Ketou-Dogo	The General Directorate of Energy (GDE) who is the implementing agency of this project will be the executing agency for the outcome 3.1

## **B. Description of the consistency of the project with:**

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

34. Benin's NAPA was finalised in 2008. The NAPA has identified and ranked five (5) priority sectors of which education and capacity building and surface water management related priorities, which this project will deal with, are ranked second and third respectively:

- Education and capacity building: the project will contribute to the strengthening of resilience to climate change in the energy sector in Benin via the increase of adaptive capacity of institutions and individuals involved in the energy sector management including the sub-national authorities. Furthermore, it will support the development, demonstration and transfer to authorities and communities, of climate resilient methodologies for the management of energy demand and supply and for the production and use of wood energy.
- Surface water: the LDCF also aims at contributing in enhancing climate resilience of rivers identified to host hydroelectric infrastructure in order to increase climate change resilience of energy services delivered to households in Benin. In this perspective, the LDCF will support the design, the implementation and the maintenance of low-cost sustainable land and forest management measures, to fight against river siltation from soil erosion and landslides.

35. Adaptation options and priority proposed by the Benin's NAPA give due consideration to CCD NAP strategies, particularly those related to land protection in forest zones and slopes of the country's main rivers and to the protection of natural resources. In addition, the adaptation options have been selected in synergy with the United Nations Convention to Fight Desertification (UNCFD) and the Convention on Biological Diversity (CBD). National adaptation objectives are embedded in the National Strategy and plan of action on biological diversity as well as on national plan of action to combat desertification (CCD NAP).

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

36. This PIF was formulated in compliance with LDCF guidelines and aligned with the updated Results-Based Management Framework for the LDCF and SCCF (GEF/LDCF.SCCF.9/Inf.4, October 20, 2010). The project is in line with Objective 1 of LDCF/SCCF focal area aiming at "reducing vulnerability to the adverse impacts of climate change, including variability, at local, national, regional and global levels" and with Objective 2 aiming at "increasing adaptive capacities to respond to the impacts of climate change, including variability at local, national, regional and global levels". The links to related expected outcomes in the LDCF/SCCF Result Based Management Framework include outcome 2.1 "Mainstreamed adaptation in broader development frameworks at country level and in targeted vulnerable areas", outcome 1.2 "reducing vulnerability in development sectors" and outcome 2.2 "Strengthened adaptive capacity to reduce risks to climate-induced economic losses".

### **B.3 The GEF Agency's comparative advantage for implementing this project:**

37. Environment and natural resources management for sustainable access to energy and water of vulnerable populations, climate change and protection of biodiversity, are key dimensions to UNDP's work at the country, regional and global level in their efforts to eradicate poverty. At the country level, UNDP Benin has developed experience and expertise in the domain of improving vulnerable communities' access to energy services. Indeed through the project "Support for the operationalization of the MDGs, the strategy for growth and poverty reduction and the sustainable human development (OMD-SCR/DHD), the UNDP Country Office in Benin has developed strategies and experience in enhancing the access of vulnerable groups, including women, to the energy services they need for improving the productivity of their income generating activities and their other livelihoods. The UNDP "project support to the decentralization and the local economic development" implemented from 2009 to 2012 in the 7 municipalities of the Borgou has promoted local stakeholders capacity building and a system of local development planning that can support the implementation of the economic investments opportunities including, though among other strategies, the improvement of the access to energy services. Additionally, in order to promote the acceleration of the

achievement of the MDGs in Benin, the UNDP “project support to the development of the capacity necessary for the achievement of the MDGs in Benin” UNDP has contributed to improve the capacities for planning, programming, implementing and monitoring the national policies and strategies of the 5 key economic sectors, including the energy sector. In another hand, the UNDP country office, through the projects “Integrating Benin Sacred Forests in the national protected areas network” currently under implementation has also developed strong experience and capacity in sustainable forest management that will be critical for the successful implementation of this LDCF project. The UNDP is supporting the Government of Benin to implement its first LDCF project aiming at strengthening climate resilience of agriculture production and food security in the four most vulnerable agro-ecological zones in Benin. The capacity and tools developed through the first LDCF project will be useful for the introduction of climate resilient integrated sustainable forest and agricultural landscape management practices around the most vulnerable wood energy supplying zones planned under the second component of this second NAPA.

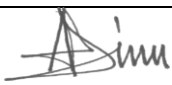
38. Additionally, in Benin, UNDP coordinates the Thematic Group which brings together Technical and Financial Partners working in the field of environment and climate change. The Poverty and Energy unit in the UNDP Country Office in Benin counts on four (4) dedicated senior environment programme officers and an experimented operations and finance unit. UNDP maintains well-developed working relationships with the key stakeholders for this project. This team is supported by the UNDP/GEF Regional Coordination Unit (including French speaking climate change adaptation, climate change mitigation and energy and Biodiversity conservation and SLM Regional Technical Advisors and support staffs assisting with M&E, delivery oversight among other tasks).

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

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

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Delphin Aidji	Secrétaire General Adjoint du Ministère	MINISTÈRE DE L'ENVIRONNEMENT DE L'HABITAT ET DE L'URBANISME	05/02/2013

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

<b>This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for project identification and preparation.</b>					
Agency Coordinator, Agency name	Signature	DATE (MM/dd/yyyy)	Project Contact Person	Telephone	Email Address
Adriana Dinu Officer-in-Charge UNDP/GEF		June 28, 2013	Henry Rene Diouf	+27 12 354 8115	Henry.rene.diouf@undp.org