GEF-6 PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: Full-sized Project
TYPE OF TRUST FUND:GEF Trust Fund

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PART I: Project Information

Project Title:	**Promotion of small hydropower based mini-grids for a better access to modern energy services in Central African Republic**		
Country(ies):	Central African Republic	GEF Project ID:[1]	9291
GEF Agency(ies):	UNDP	GEF Agency Project ID:	5680
Other Executing Partner(s):	Minister of Mines, Energy and Hydraulics	Submission Date: Re-Submission Date: Re-Submission Date:	30 July 2015 24 August 2015 4 September 2015
GEF Focal Area(s):	Climate Change	Project Duration (Months)	60
Integrated Approach Pilot	IAP-Cities ☐ IAP-Commodities ☐ IAP-Food Security ☐		Corporate Program: SGP ☐
Name of parent program:	[if applicable]	Agency Fee ($)	251,275

A. INDICATIVE FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES[2]

Objectives/Programs (Focal Areas, Integrated Approach Pilot, Corporate Programs)	**Trust Fund**	**(in $)**	
		GEF Project Financing	**Co-financing**
CCM-1: Technology Transfer, and Supportive Policies and Strategies **Program 1**: Promote timely development, demonstration and financing of low carbon technologies and mitigation options	GEFTF	1,645,000	5,500,000
CCM-1: Technology Transfer, and Supportive Policies and Strategies **Program 2**: Develop and demonstrate innovative policy packages and market initiatives to foster new range of mitigation actions	GEFTF	1,000,000	3,000,000
Total Project Cost		**2,645,000**	**8,500,000**

B. INDICATIVE PROJECT DESCRIPTION SUMMARY

Project Objective: To promote investment in small hydropower-based mini-grids and develop an appropriate business model for the sustainability of the system

Project Components	**Financing Type[3]**	**Project Outcomes**	**Project Outputs**	**Trust Fund**	**(in $)**	
					GEF Project Financing	**Co-financing**
1. Policy and financial instruments and incentive scheme for small hydropower (SHP[4]) based mini-grids	TA	Institutional and financial viability of SHP mini-grid ensured	1.1 Policy package to operate and develop SHP based mini grids adopted 1.2 Financial viability mechanism of SHP mini-grid operation defined, adopted and enforced 1.3 Tariff criteria for SHP based mini grids and hybrid systems defined	GEFTF	250,000	750,000
2. Capacity Building for SHP based mini-	TA	Capacity to deliver turnkey solutions and	2.1 Published Guidebook on SHP based mini grids	GEFTF	300,000	1,000,000

[1] Project ID number will be assigned by GEFSEC and to be entered by Agency in subsequent document submissions.
[2] When completing Table A, refer to the excerpts on *GEF 6 Results Frameworks for GETF, LDCF and SCCF*.
[3] Financing type can be either investment or technical assistance.
[4] By Small hydropower, unless specifically indicated, it includes all below capacities such as micro and pico hydropower systems

grid system management		quality O&M&M services for SHP developed	development (both solely hydro and hybridized) 2.2 On-the-job capacity building program for SHP plant manufacturers delivered, including on materials, plant design, combination, construction, O&M 2.3 Business and technical advisory services to the power utility and other mini grid plant developers 2.4 Tailored capacity building program delivered to relevant national agencies			
3. SHP-based mini-grids roll-out	Inv	A functioning business model is demonstrated for the technical and financial viability of small hydro based plants	3.1 8 pilot sites for mini-grids[5] identified and assessed, and institutional/investment model defined 3.2 Up to 10 public private partnerships are established for the exploitation of SHP plants and mini-grids 3.3 2 MW of SHP-based power generation capacity 3.4 2 specific and sustainable O&M&M models demonstrated for all mini-grid schemes 3.5 Productive use promoted to increase electricity demand in 8 targeted sites	GEFTF	1,750,000	6,000,000
4. Public relations and promoting investment	TA	Increased awareness about SHP potential and investment climate	4.1 National clearinghouse mechanism for SHP developers set-up 4.2 Public Relation and investment promotion campaign conducted	GEFTF	220,000	400,000
			Subtotal		2,520,000	8,150,000
			Project Management Cost (PMC)[6]	GEFTF	125,000	350,000
			Total Project Cost		**2,645,000**	**8,500,000**

For multi-trust fund projects, provide the total amount of PMC in Table B, and indicate the split of PMC among the different trust funds here: ( )

[5] Based on similar experiences in the region and scientific publications (Example: An overview of technical aspects of mini-grids: Village Electrification through Sustainable use of Renewable Energy, Swiss Agency for Development and Cooperation (2013)), and in the context of Central African Republic (very small and spread villages), it is envisaged that the length of mini-grids in a village will be in a range of 2 to 3 km. The voltage will be a low voltage (DC) of 12 volts. To be assessed during PPG phase.

[6] For GEF Project Financing up to $2 million, PMC could be up to10% of the subtotal; above $2 million, PMC could be up to 5% of the subtotal. PMC should be charged proportionately to focal areas based on focal area project financing amount in Table D below.

C. INDICATIVE SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE, IF AVAILABLE

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount ($)
National Government	ACER/MMEH	In-kind	500,000
GEF Agency	UNDP	Grant	500,000
Other Multilateral Agency (ies)	World Bank/AfDB	Soft Loan	4,000,000
Bilateral Aid Agency (ies)	AFD/EU	Grant	3,000,000
Private Sector	Technology suppliers/IPPs	Equity	500,000
Total Co-financing			**8,500,000**

D. INDICATIVE TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES) AND THE PROGRAMMING OF FUNDS [a)]

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Programming of Funds	(in $)		
					GEF Project Financing (a)	Agency Fee (b)[b)]	Total (c)=a+b
UNDP	GEFTF	Central African Republic	Climate Change		2,645,000	251,275	2,896,275
Total GEF Resources					**2,645,000**	**251,275**	**2,896,275**

a) Refer to the Fee Policy for GEF Partner Agencies.

E. PROJECT PREPARATION GRANT (PPG)[7]

Is Project Preparation Grant requested? Yes ☒ No ☐ If no, skip item E.

PPG AMOUNT REQUESTED BY AGENCY(IES), TRUST FUND, COUNTRY(IES) AND THE PROGRAMMING OF FUNDS

Project Preparation Grant amount requested: $85,000					PPG Agency Fee: $8,075		
GEF Agency	Trust Fund	Country/ Regional/Global	Focal Area	Programming of Funds	(in $)		
					PPG (a)	**Agency Fee**[8] (b)	**Total** c = a + b
UNDP	GEFTF	Central African Republic	Climate Change		85,000	8,075	93,075
Total PPG Amount					**85,000**	**8,075**	**93,075**

F. PROJECT'S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS[9]

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
4. Support to transformational shifts towards a low-emission and resilient development path	750 million tons of CO_{2e} mitigated (include both direct and indirect)	*165,240 metric tons*

[7] PPG requested amount is determined by the size of the GEF Project Financing (PF) as follows: Up to $50k for PF up to$2m (for MSP); up to $100k for PF up to $3m; $150k for PF up to $6m; $200k for PF up to $10m; and $300k for PF above $10m. On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

[8] PPG fee percentage follows the percentage of the Agency fee over the GEF Project Financing amount requested.

[9] Provide those indicator values in this table to the extent applicable to your proposed project. Progress in programming against these targets for the projects per the *Corporate Results Framework* in the *GEF-6 Programming Directions*, will be aggregated and reported during mid-term and at the conclusion of the replenishment period. There is no need to complete this table for climate adaptation projects financed solely through LDCF and/or SCCF.

PART II: PROJECT JUSTIFICATION

1. *Project Description.* Briefly describe: 1) the global environmental and/or adaptation problems, root causes and barriers that need to be addressed; 2) the baseline scenario or any associated baseline projects, 3) the proposed alternative scenario, GEF focal area[10] strategies, with a brief description of expected outcomes and components of the project, 4) incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing; 5) global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF); and 6) innovation, sustainability and potential for scaling up.

1) The global environmental and/or adaptation problems, root causes and barriers that need to be addressed

The Central African Republic (CAR) is one of the poorest nations in the world. According to the 2014 UNDP Human Development Report (HDR), CAR is ranked 185th in the Human Development Index, out of 187 assessed countries. CAR is ranked among the Least Development Countries (LDC). The country has faced several civil wars or political instabilities. As of today, the country is ruled by a Transition Government, with general elections to be held by end of 2015.

The total population of the country is estimated at 5 million inhabitants (2014), and its surface at about 623,000 km2. 39% of the population lives in urban areas, against 61% in rural areas.

The main sources of energy are biomass and fossil fuels. Biomass, non-renewable, represents 93% of the energy balance. Biomass is mainly used as firewood or charcoal for cooking. Wood consumption is estimated in CAR at 1.6 million tonnes per year. Petroleum products account for 6% of the energy balance, mainly used for transport and electricity generation. CAR has one of the lowest electricity access rates in the world. Only 2.5% of the population have access to electricity. This is a national average, very diverse between regions. The access rate is 19% in Bangui (the capital), about 1% in other regions/provinces, and virtually zero % in rural areas. With 61% of the population living in the rural areas, rural electrification is almost non-existent in Central African Republic.

In the second national communication (SNC) of Central African Republic (CAR) to the UNFCCC (2013), the energy sector is the third emitting sector after the agriculture and forestry sectors, accounting for 2%. But trends show that under the business as usual, emissions in the energy sector will increasing significantly, representing almost 25% of total GHG emission of the country by 2030. This is mainly the result of (i) increased electricity generation from imported fossil fuel (the population will grow by 5% by that time); and (ii) increased usage of biomass as firewood or charcoal for cooking, leading to reduced CO2 sequestration. Regarding mitigation strategies to change the country's economic growth from intensive carbon mode to low carbon mode, the Second National Communication identified the development of renewable energies (hydro power electricity generation, renewable fuelwood through woodlots to reduce deforestation) as one of the mitigation measure and priority.

Electricity supply is provided by the national power utility named ENERCA (*Central African Energy Public Company*), which produces, transports, distributes and markets electricity throughout the country. Furthermore, the quality of service provided by this Company is low (about 10 hours of electricity per day). The power utility faced and continues to face several problems, including bankruptcy, outdated equipments, high transmission losses and lack of adequate capacity.

ENERCA: key data

- Owner: 100% by the State (public company), created in 1963.
- Installed capacity: 40 MW.
- Electricity generation cost: US$0.19/kWh.
- Average applied electricity tariffs: US$0.15/kWh (e.g. partially subsidized).
- Sales: billing rate 95%; but a recovery rate of only 40%.

[10] For biodiversity projects, in addition to explaining the project's consistency with the biodiversity focal area strategy, objectives and programs, please also describe which Aichi Target(s) the project will directly contribute to achieving.

The Government establishing in 2005 a Code of electricity in CAR. This reform aimed to improve private investment while maintaining the interests of the State, the balance of the electrical system between producers, distributors and consumers, and the establishment of real power price structure. However, the situation has barely changed since then.

The total installed capacity of the country is only 40 MW, of which approximately 34.5 MW come from the hydropower plants of Boali. Despite the very high hydro potential of the country (over 2,000 MW), less than 40 MW is still produced from hydro sources. The existing power generation facilities are made up of[11]:

- The hydroelectric power plants of Boali 1 (8.4 MW) and Boali 2 (10 MW), created respectively in 1954 and 1976. Since then, these plants have undergone some partial revisions. They are today in a state of advanced dilapidation.
- The Bangui thermal power plant designed to complement the Boali plants. Barely 2.5 MW is functioning.
- A flow regulation dam of the hydroelectric power plants downstream Boali 1 and 2 ; and about sixteen (16) provincial centers supplied overall by diesel generators, operating only four hours a day (6 to 10 p.m.).

In the provinces and rural areas, some initiatives are developed. Several private businesses (religious missions, agro based industries, carpentries, growers) are getting individually equipped with gasoline or diesel power gensets. Unit capacity ranges from 2 to 650 KVA. A very few self-generators meet their demand in power through renewable solutions such as solar kits and pico hydro power plants (example of the Swedish missionaries in Gamboula in the West and Bakouma in the East). UNDP has also piloted in the past, solar kits installation in 7 villages through a project named "Solar energy electrification of seven villages in CAR".

Main barriers to accelerated development of small hydro power based mini-grids:

In spite of on-going efforts by the Government and development partners to promote electrification (both rural and provincial) and small hydropower, there has been no significant involvement of private operators in the sector up to now and there is no single commercial small or micro hydropower-based mini grid system in the country. The sector faces numerous problems and barriers, which cumulatively make the risk profile of SHP-based mini grids much higher and less attractive. These barriers are enumerated below:

Legal, regulatory and institutional framework: The current legal framework is a barrier to the development of small hydropower in CAR. The Government established a Code of electricity a decade ago. This aimed to improve private investments while maintaining the interests of the State. But it never functioned properly, due to the lack of proper negotiations and the Government fixing unilaterally prices and other key aspects. There are no specific provisions enabling independent power producers (IPPs) to implement and operate SHP-based mini-grids on their own. There are a number of critical issues which have to be addressed properly, such as land and water use by SHP, tariffs, certification and licensing, procedures for conflict resolution, incentive measures, etc. Institutional and human capacities at all levels (sub-regional, national and local) are also insufficient (if at all existent) to support rural and provincial electrification based on decentralized small hydro power plants. The Autonomous Agency for Rural Electrification (ACER) has not been fully functional.

Technology supply chain: The Technology supply chain for small hydropower in CAR is also in a very nascent stage. There are a few local SMEs capable of assembling simple SHP installations based on imported machinery and turbines, but they lack the technical and engineering capacities to ensure optimal system design, installation and maintenance. In the rural areas there is only very limited local technical expertise available on how to properly administer, operate and maintain SHP systems. The low quality and quantity of skilled and competent workers in the power sector adds additional risks and increases the cost of SHP operation due to the need to rely on expensive imported services even for basic repair and maintenance.

[11] Ministry of Mines, Energy and Hydraulics, Expression of Interest by the CAR to CIF/SREP Program (2013)

Sustainable O&M&M model: The lack of experience with and demonstration of sustainable operation, maintenance and management (O&M&M) of SHP-based mini grids proved to be a key bottleneck and the reason for the failure of past donor-funded projects. The barrier is aggravated by the fact that CAR is a post-conflict society and the conflict is still on-going sporadically. As a result of prolonged civil war, political, technical and managerial capacities are extremely low at the local level, especially in provincial and rural areas: local governance structures have been destroyed and community leaders have been killed or fled during the conflict. The same problem exists with local enterprises: the ranks of experienced managers and trained technicians, already in short supply in provincial and rural areas, have been further depleted due to the effect of conflicts.

Before any large-scale replication can take place, sustainable O&M&M model has to be demonstrated. The key aspects of such a model (which are currently missing), are: local capacities for technical oversight over plant operations, efficient tariff structures which adequately cover both start-up and O&M&M costs, an effective financial management structure, billing and payment collection system, customer relations and conflict resolution procedures, engagement of productive end-users.

Access to capital: significant upfront investment requirements remain a roadblock for implementation of many projects. Small hydropower projects are capital intensive with significant investment requirements that are generally beyond the capacity of local companies or communities. In addition, the local banking sector is not sufficiently capitalized to facilitate financing for SHP projects with longer pay-back and substantial risks.

Investors' awareness and perception of risks: Information about the potential and the benefits of small hydropower for provincial and rural electrification development is scarce in CAR. There is very little data about prospective sites, their hydrological, climatic and other characteristics. Even when such studies exist, they often are not publicly available. Basically, there is no single information point where a potential developer can receive required guidance and data to make an informed investment decision. The Government and its entities are unable to pull it together on its own due to limited budget resources, staff capacities, lack of prior experience and over-all vision of how to promote SHP and private sector investment. Whereas the national energy strategy does acknowledge the importance of SHP development in tackling energy deficit in secondary cities of CAR, the primary focus and efforts of the Government so far have been on addressing the energy deficit in the capital Bangui, and facilitating implementation of large hydro power projects with public and IFI financing. Promotion of SHP requires a different approach, more geared towards private sector and local communities, and the one which implies open and transparent access to information for investors. The scarcity of successful and sustainable SHP projects is limiting opportunities to raise the awareness and to build up the confidence of local communities, project developers and investors, is in itself a big deterrent to market development for the perceived risks of a first-of-its-kind investment are always higher than the risks associated with replication of a successful model.

Very little private sector interest: With the political instability, there are very few private investors and all projects are donor driven and largely non-sustainable. Nearly all private sector investors perceive CAR as too risky for investment in renewable energy projects. Donor driven projects play limited attention to sustainability. In the WB/IFC Doing Business 2015 data, CAR is 135th out of 149 economies on protecting investors and 182th out of 182 (e.g. last) on enforcing contracts.[12]

2) The baseline scenario or any associated baseline projects

The Government of the Central African Republic realizes that lack of energy access in provincial and rural areas is a major detrimental factor for country's economic development, social stability and environmental sustainability. To address the problem, it has created ACER, a national agency responsible for rural electrification, and ARSEL a national agency responsible for regulating the electricity sector, both under the Minister of Mines, Energy and Hydraulics (MMEH).

[12] See http://www.doingbusiness.org/data/exploreeconomies/central-african-republic

ACER and ARSEL were created a decade ago, in 2005, during the big electricity reforms. ACER's main goal was to improve the rural electrification rate from 0% in 2005 to 10% by 2015. It has not reached at all its objective, as the rural electrification rate is still close to 0%. On the other hand, ARSEL's objective was to regulate, monitor and control activities related to electricity supply by ensuring both consumers and investors interests. Up to now, ARSEL's regulation is limited in the capital with ENERCA (e.g. grid based electricity generation) and has not regulated private off-grid or mini-grid electricity generation, as nonexistent.

The Government has also established a national Electricity Fund for the Electricity Sector and embarked on an ambitious program to improve the energy infrastructure in the country. This program includes major investment plans in power generation and transmission lines, including new 180 MW hydro power plant at Dimoli and a 64 MW hydropower facility at Lancreno. These 2 power plants were supposed to start functioning in 2015. But between 2005 (when electricity plans took place) and nowadays, civil wars and political instabilities prevented the above plans to be materialized.

In 2012, IMF and EU approved an $8 million rural electrification project for CAR, through the Energy Facility program. But soon after when the latest civil war started in 2013, the Government requested and was allowed to divert these funds to public finance, especially for social recovery and budget standardization.

The African Development Bank is also financing an interconnection project between Central African Republic and Democratic Republic of Congo, starting from the Boali hydro plants. The overall project budget is $50 million, and its duration is from 2012 to 2017.

Finally, GEF and UNDP previously supported CAR by conducting a comprehensive assessment of small hydropower potential, including field studies of prospective of most promising projects for 4 sites across the country (See Table below). It was done through a regional project named *Regional Project of Capacity-building in small/micro hydroelectric stations and investment for access to electricity in Sub-Saharan Africa rural areas*. The project did not reach implementation stage, but the PDF-B stage helped to have some tangible results.

Site	River	City	Distance of nearest village (km)	Potential capacity (kW)	High (m)	Average flow rate (m^3/s)
Dédé Mokouba	Dédé Mokouba	Lomé	3	20	2	1,6
Dimbi	Dimbi	Mba	4	24	10	2
Gbassem	Boda	Loamé	2	190	16,3	0,8
Magouloumba	n/a	n/a	18	289	2,5	18

Table Summary of Baseline Conditions, Policies, Programs and Targets

Conditions regarding energy access and SHPs	- Rural energy access rate: 0% - Provincial energy access rate: 1% - Installed capacity of SHPs: 0 kW - Installed capacity of large hydro power: 35 MW
National rural access target	- To increase rate of rural electrification from 0% up to 10% by 2015
Baseline policies and institutions	Electricity sector reform was initiated in 2005 with the adoption of a comprehensive legal package which established new institutional and regulatory structure for power sector, put specific emphasis on rural

	electrification, and opened up the power generation sector to Independent Power Producers (IPPs), namely: - New Electricity Code: access to the grid for IPPs - Establishment of the Agency for Rural Electrification - Establishment of the Power Sector Regulatory Agency: independent regulatory body in charge of tariffs - Creation of the Fund for Power Sector Development

3) The proposed alternative scenario, with a brief description of expected outcomes and components of the project

The proposed UNDP-GEF project will be complementary to the baseline initiatives as it addresses barriers that are specifically related to the investment in decentralized small hydropower plants. This project is consistent with the GEF-6 strategy to address climate change (*CCM-1 Technology Transfer, and Supportive Policies and Strategies*), especially Program 1 (*Promote timely development, demonstration and financing of low carbon technologies and mitigation options*) and Program 2 (*Develop and demonstrate innovative policy packages and market initiatives to foster new range of mitigation actions*) because its main objective is to facilitate investment in small hydropower-based mini-grid systems in Central African Republic.

The Program consists of the following four components:

- Strengthening the policy and institutional framework for SHP-based mini-grids;
- Capacity Building for SHP based mini-grid system management;
- Showcasing a viable hybrid mini-grid business model of SHP deployment and management; and
- Raising investors' confidence and awareness in SHP-based mini-grids.

Component 1: Policy and financial instruments and incentive scheme for small hydropower (SHP) based mini-grids

This component envisages the preparation and adoption of a comprehensive policy framework for the promotion of SHP-based electrification. The framework will complement existing policies on power sector development and rural electrification by putting explicit emphasis and providing more favorable conditions for SHPs. Such policy framework will include specific timeframe and targets for development of SHPs. The SHP-policy framework will also establish a cornerstone policy instrument (e.g. financially viable tariff for SHP-based mini-grids) and supporting policies and regulations, including, but not limited to harmonized and simplified concession regimes and licensing rules for SHPs, standardized PPAs, land and water use rights for SHP projects. In order to support the implementation of the proposed policy framework, a capacity building program will be provided to relevant national agencies, ACER, ARSEL and the Fund for Power Sector Development.

Setting financially viable tariffs to obtain the right energy price is one of the most important factors to ensure sustainability of SHP-based mini-grids. Under Component 1, the project will assist the Power Sector Regulatory Agency with developing and introducing new regulation for SHP tariffs. It is proposed that mini-grid tariff system have a graded tariff regime, similar to the one the main grid system has. This will allow the tariffs to be set in better proportion to the customer's ability to pay. In fact, most of these mini-grids will be fairly small, therefore will have a limited number of customers, limiting the degree to which different tariff levels can be introduced. Also, most of the customers will be likely fairly poor, so to compensate for this, it would be envisaged to really up the tariffs for the few higher income ones (or businesses).

As indicated earlier, current tariff paid by grid-connected consumers in CAR is on average 15 cents US$/kWh, while the production cost is 19 cents US$/kWh. This level of tariff, should, in principle, be sufficient to make investment in SHP commercially viable. For example, recent analysis from IRENA and ESMAP have shown that in Africa, the average production cost for SHP is 7.7 cents US$/kWh. However, the PPG phase will help to run financial models to better

determine the financial viability of the tariffs. The project will conduct a comprehensive assessment and prepare a proposal for tariff setting methodologies, which would balance the requirements for minimizing public subsidies, ensuring adequate rates of return for investors and respecting the social electrification objectives set by the government.

There are usually 4 internationally proven business model for rural/off-grid energy development[13]: a utility business model, a private sector business model, a community business model and a hybrid business model, meaning combining two of the previous listed models. Each of these business models has its advantages and disadvantages, so combining two will be more relevant and sustainable. The new business model, which is proposed in this project, will be a combination of the utility and private sector models. This will be done mainly through public private partnerships. For example, the utility can invest in the mini-grids installations, while a local private company is responsible for the overall daily management, maintenance and operating. This kind of arrangement will certainly lower the O&M&M costs. The PPG phase will help to better define the proposed business model.

Component 2: Capacity Building for SHP based mini-grid system management

This component will address technical barriers to the implementation of SHP-based mini-grids. The aim is to help the power utility ENERCA, ACER and potential service providers upgrade their capacity for delivering turnkey solutions for hybrid systems. Technical assistance will be provided to a number of competitively selected local SMEs through an open Call for Expression of Interest. An international technology transfer partner (an experienced SHP manufacturer) will be sub-contracted to deliver such assistance. In addition, the project will provide training courses to system designers and end-users, develop and publish guides on design, installation and maintenance of micro-hydro systems. Also, community organizations in pilot locations (local NGOs and SMEs/productive users) will be provided with assistance and advice on the relevant aspects of SHP operations, such as identification of potential sites, pre-feasibility assessment, business planning.

Component 3: SHP-based mini-grids roll-out

The expected outcome from this component is the improved confidence of communities, developers and potential investors in the technical and economic viability of SHP-based mini-grids for rural electrification and local socio-economic development as an alternative solution to centralized grid-expansion schemes.

Through the implementation of the investment projects, the appropriateness of proposed policy and financing de-risking instruments will be demonstrated (Component 1). The showcase will also be used as a testing ground for developing a domestic technology supply chain (Component 2) and the showcase will demonstrate the financial viability of the proposed business model. Furthermore, this showcase is expected to generate valuable information on the suitability of, and the practical implementation of the operation & maintenance & management (O&M&M) models that will be developed.

The project will build on previous studies already done in the past (during the PDF-B stage of the regional micro hydro project), with the identification of about forty sites suitable for the development of SHP. Pre-feasibility studies are available for some of the sites. Priority will be given to sites where already exist a mini-grid running with either fossil fuel or other sources, to reduce the high upfront investment cost. The PPG phase will help to better define the site selection criteria. An extract of sites (non-exhaustive) is presented below.

[13] Hybrid Mini-Grids for Rural Electrification: Lessons Learned, Alliance for Rural Electrification (ARE), (2011)

N° ordr	Cours d'eau	Localité	Nom du site	Chute H (m)	Débit (m3/s)	Puissance (KW)	Niveau études
1	Loamé	Boda	Gbassem	15	6	720	A.P.D.
2	Toutoubou	Carnot	Toutoubou	60,80	1,5	760	Faisabilité
3	Baïdou	Bambari	Bac	5	14	560	Faisabilité
4	Mbéko	M'baïki	Mbéko	60	1,75	840	Faisabilité
5	Lobaye	Baoro	Pont	6,00	1,5	70	Préliminaire
6	Ouham	Bossangoa	Soumbé	5	10	1600	Préliminaire
7	Nana	Kaga-Bandoro	Nana	18	13,40	1950	Préliminaire
8	Ngou	Bocaranga	Lancreno	150	2,5	30.000	Identification
9	Mambéré	Baboua	Gbassem	Nd	Nd	Nd	Nd
10	Lomé	Dédé-Mokouba	Dédé-Mokouba	2,00	1,5	20	Identification
11	Mbounou	Maloum	Maloum	3	0,36	12	Identification
12	Mba	Dimbi	Dimbi	10	2,00	300	Identification

The project will aim at facilitating the roll-out (preparation and implementation) of staggered batches of commercial SHP-based mini-grid systems for a total of up to 2 MW of SHP-based capacity.

Component 4: PR and promoting investment

This component will address the informational barrier. It will establish a national clearinghouse mechanism for SHP developers within the Autonomous Agency for Rural Electrification (ACER) or other appointed national entity. Assistance will be provided to collect and present all essential information for potential SHP developers, such as a) prospective sites and their characteristics; b) required process for permitting and licensing; c) policies and regulations governing SHP project development; d) information about local technology service providers; e) potential sources of financing and incentive. The information will be presented on-line and published as SHP investor guide. Also support will be provided to assigned national entity to ensure its regular update and wide dissemination. The project will also promote investment opportunities in SHP among local and foreign partners, financial institutions, developers, social impact investors via targeted PR campaigns, conferences and other marketing and communication tools.

4) Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing

The GEF funds will be used for incremental activities designed to remove the identified barriers. In particular, the GEF funds will be used for those incremental activities that expand the scope of, or supplement, the baseline activities in leading to or enhancing global environmental benefits. A component-by-component assessment of the incremental activities and expected GEBs is provided below.

Baseline practices	Alternative to be put in place by the project	Expected Global Benefits
Component 1: Policy and financial instruments and incentive scheme for small hydropower (SHP) based mini-grids		
- No Commercial SHP functioning in the country - Only large hydro dams are functioning (Boali) and if possible, the Government will still continue for large dams Dimoli and Lancreno.	A defined and adopted comprehensive policy framework for the promotion of SHP-based electrification. The policy framework will establish a cornerstone policy instrument (e.g. financially viable tariff for SHP-based mini-grids) and supporting policies and regulations, including, but not limited to harmonized and	The electricity generated from SHP facilitated by the project will result in a reduction of 165,240 t CO_2 over technology 20 years lifetime.

	simplified concession regimes and licensing rules for SHPs, standardized PPAs, land and water use rights for SHP projects. A new business model is will be established, which is a combination of the utility and private sector models.	The establishment of this framework will also apply to all future investments in small hydro and thus can be estimated to indirectly contribute to additional emission reductions post-project (this will be defined at the PPG phase).
Baseline practices	**Alternative to be put in place by the project**	**Expected Global Benefits**
Component 2: Capacity Building for SHP based mini-grid system management		
Institutional and human capacities at all levels (sub-regional, national and local) are also insufficient (if at all existent) to support rural and provincial electrification based on decentralized small hydro power plants.	The GEF funded activities will provide technical assistance to local manufactures and service providers to upgrade their capacity for delivering turnkey solutions for SHPs. International technology transfer partner (an experienced SHP manufacturer) will be sub-contracted to deliver such assistance. In addition, the project will help the power utility ENERCA, ACER and potential service providers upgrade their capacity for delivering turnkey solutions for hybrid systems.	The electricity generated from SHP facilitated by the project will result in a reduction of 165,240 t CO_2 over technology 20 years lifetime. All future small and minihydro projects will benefit from enhanced domesic technological capacities and O&M services and thus can be estimated to indirectly contribute to additional emission reductions post-project (this will be defined at the PPG phase).
Baseline practices	**Alternative to be put in place by the project**	**Expected Global Benefits**
Component 3: SHP-based mini-grids roll-out		
A resource map of the country's small hydropower potential has been conducted but there is still no experience of SHP in the country. All hydropower installations are at large scale. There are a very few off-grid operators/IPPs, which run diesel-based power plants in isolated communities, but none is operating as a mini-grid, but rather as individual kits.	The project will aim at facilitating the roll-out (preparation and implementation) of staggered batches of commercial SHP-based mini-grid systems for a total of up to 2 MW of SHP-based capacity.	The electricity generated from SHP facilitated by the project will result in a reduction of 165,240 t CO_2 over technology 20 years lifetime.
Baseline practices	**Alternative to be put in place by the project**	**Expected Global Benefits**
Component 4: Public relations and promoting investment		
There is very little data about prospective sites, their hydrological, climatic and other characteristics. Basically, there is no single information point where a potential developer can receive required guidance and data to make an informed investment decision.	The GEF funded activities will establish a national clearinghouse mechanism for SHP developers within the relevant national entity. Via clearing house an interested investor can receive all required information about a) prospective sites and their characteristics; b) required process for permitting and licensing; c) advise on technical and economic valuation and local technology service providers; and d) source of financing and incentives for SHP.	The electricity generated from SHP facilitated by the project will result in a reduction of 165,240 t CO_2 over technology 20 years lifetime. PR and investment promotion activities will benefit all future investments in small and mini hydro, as well as other RES and thus can be estimated to indirectly contribute to additional emission reductions post-project (this will be defined at the PPG phase).

5) Global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF)

A very preliminary and conservative estimate indicates that the total direct project CO_2 emissions reduction from the deployment of an additional 2 MW of installed capacity from the SHP facilitated by this project is **165,240 tons** which translates into an abatement ratio of $18.8 of GEF funds per tCO2 reduced. The calculation details are below. PPG phase will help to better define the emission reductions.

Direct: CO2 emission reduction attributed to cumulative 2 MW from SHP

Assumptions: (1) Hydropower system capacity factor = 60%; (2) Useful life of hydro power systems = 20 years; (3) Average emission factor from diesel generators = 0.786 ton CO2/MWh

Calculations:
Annual power generation from SHP systems = 2 x 0.6 x 8760 = 10,512 MWh
Annual CO2 emission reduction = 0.786 x 10,512/1000 = 8,262 tons/year
Lifetime CO2 emission reduction = 8,262 x 20 = 165,240 tons

Direct post-project: The project does not include activities (e.g., a Fund) that would result in direct post-project greenhouse gas emission reductions.

Indirect: Using the GEF bottom-up methodology, indirect emission reductions attributable to the project are 330,480 tonnes of CO2 equivalent. This figure assumes a replication factor of 2.

Using the GEF top-down methodology, with a replication of 10 MW (conservative), we have:

10 MW * 8760h * 60% * 0,786 tCO2/MWh = 41,312 tCO2 eq/y; and during the 20 years of lifetime of the investment, 826,240 tCO2 eq.

As a summary, the estimated Direct and Indirect reduction of CO2 eq emissions is:

Direct: 165,240 tCO2 eq
Indirect post-project (bottom-up): 330,480 tCO2 eq
Indirect post-project (top-down): 826,240 tCO2 eq

6) Innovation, sustainability and potential for scaling up

Innovativeness: The project has several distinctive features, which makes it highly innovative in the context of CAR. First, it will pilot a combination of 2 business models (utility business model and private sector business model), combining the advantages of both models to support SHP-based mini-grid. Second, it will focus on identifying and supporting private sector-led SHP projects (as opposed to traditional pubic/donor-driven approach), thus maximizing long-term financial and operational sustainability of SHP. Finally, as opposed to traditional approach of delivering readily-available turn-key solutions for rural electrification, the project will work with the entire domestic value chain for SHP, starting with design through construction and commission and up to operation, maintenance and management.

Sustainability: From technical and economic points of view, the sustainability of SHP-based mini-grids has been proven in the international market, both in the context of developed and developing countries. By addressing the underlying policy and financing barriers that impede the development of SHP in CAR, the creation of a sustainable niche for SHP systems will be realized. Financial sustainability of SHP will be ensured via the introduction of financially viable tariff structure.

Potential for scaling-up: CAR's large, but unexploited potential for hydro power development (2,000 MW) means there is a substantial scope for replication and scaling-up investment in SHP-based mini-grids, especially for rural

electrification where almost 100% of customers are yet to be served. There are about 10,000 villages in CAR. This constitutes a big potential for replication and scaling up of the proposed GEF funded project. The project will enable large–scale replication by removing underlying policy, technical and financial barriers to investment in SHP-based mini-grids.

2. Stakeholders. Will project design include the participation of relevant stakeholders from civil society and indigenous people? (yes ☒ /no☐) If yes, identify key stakeholders and briefly describe how they will be engaged in project design/preparation.

Stakeholders	Expected role
Autonomous Agency for Rural Electrification (ACER)	• Coordination of the overall project preparation activities • Lead the formulation of SHP policy framework and its integration with the national strategies and plans for rural electrification • Facilitating investment promotion, support for SHP, and issuance of co-financing letters
National Fund for Power Sector Development	• Collaboration on the design and implementation arrangements for financial mechanisms
Power Sector Regulatory Agency (ARSEL)	• Proposal for developing financially viable tariff structure and methodology for SHPs
Ministry of Mines, Energy and Hydraulic	• Ensure consistency of the project and ensure the integration of proposed SHP-related policies in the national policy and institutional framework for power sector reform • Identification of pilot sites • Pan activities related to transfer and development of domestic SHP supply chain and O&M&M models
Ministry of Finance	• Provide guidance on the design of appropriate financial mechanisms
Ministry of Environment	• Resources assessment for pilot projects • Ensure the Monitoring GHG emission reductions • Investment support and promotion for SHP, including from international climate finance
Private sector: mini-grid operators and SME/manufacturers of SHP systems	• Provide equity investment to pilot projects • Technology needs assessment for SHP supply chain • Design of O&M&M models
Local communities organization[14]	• Identification of pilot sites • Organization and conduct of awareness raising campaigns • Ensure good buy-in from direct beneficiaries of the project
Local and international finance institutions	• Providing loan financing models for pilot projects

3. Gender Considerations. Are gender considerations taken into account? (yes ☒ /no☐). If yes, briefly describe how gender considerations will be mainstreamed into project preparation, taken into account the differences, needs, roles and priorities of men and women.

The majority of the beneficiaries of Small hydropower in rural areas are end users. Providing energy access to these most often poor households adds value to agricultural production and to micro, small and medium enterprises. It generates high positive impacts on women as consumers of electricity. While electrification will benefit both women and men by enhancing their engagement in more productive activities, gender gains are derived mainly from reducing the workload of women and girls.

[14] Regarding indigenous people, there are Pygmy minorities in CAR. They are locally called "Aka". There are about 15,000 Pygmies in the country, mainly living in the high forest in the South West of the country. However, this project is not likely to have an impact on them. Most of them live in very remote parts, even far from villages. However, if it occurs during project preparation that a potential site is nearby their habitats, the project will ensure that their interest and participation are fully taken into account.

4 Risks. 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).

Risk	Level of Risk	Mitigation Action
Political risk CAR is in a very unstable part of the world. The country itself faced several civil wars or political instabilities. As of today, the country is ruled by a Transition Government, with general elections to be held by end of 2015. A sudden regime change might cause insecurity, negatively impact on the over-all investment climate and cause delays in project implementation.	P=4 I=4	The project will work as much as possible with decentralized authorities in provinces and rural areas. The political will to support this project in these regions is strong. The impact of political instability at national level is more seen in the capital Bangui. The project will also build a wide coalition of partners and stakeholders whose interest in SHP promotion will likely to sustain, even in case of regime change. They include local businesses and communities, NGOs and international development agencies.
Civil conflict CAR is a post-conflict society, but the conflict and military actions are still going on in parts of the country; this might cause substantial risk to project implementation.	P=3 I=5	UNDP has played and will continue to play a key role to resolve the political crisis. UN Security monitors country and project risk on a rolling basis and adapts strategies accordingly. Evolution of conflict will be closely monitored by UNDP Country Office's security team, which will be regularly consulted in the course of project preparation and implementation; their inputs and advice will be sought on the security situation in the prospective project sites. Also, community involvement and consultation will be an integral part of the project in order to ensure buy-in and minimize the risk of conflict escalation and other potential tensions.
Technology risk Insufficient quality of locally produced equipment leading to early break-down of SHP systems and dwindling consumer confidence in the technology.	P=2 I=2	Given the low literacy rate and the lack of technical capacity among rural communities, maintenance issues represent a significant risk for micro hydropower system operations. Minor turbine repairs jobs have to be done by locally trained staff to prevent micro-hydropower equipment from being idled for long periods. Spare parts have to be standard among sites, locally manufactured if possible, readily available for transport and installation at minimal costs. The building of technical and operational capacities among rural communities will be critical to mitigate these technical risks. This will be done by providing basic technical training jobs in rural areas, sponsoring local institutions that take on maintenance tasks.
Financial risk Widespread poverty and lack of sustainable source of income resulting in low ability to pay for energy supply services	P=2 I=3	The project voluntarily decided to work with already existing mini-grids, running on either diesel or other energy sources. In these areas, there is already a capacity and willingness to pay from end-users. On the other hand, the combination of the power utility business model and private sector business model through PPP (public private partnerships) will reduce the financial risk from both side (utility side and private sector side).
Market risk In CAR, SHP systems will have to compete with subsidized and locally available diesel alternatives. Without additional incentives, small hydro plants may likely remain uncompetitive.	P=3 I=3	Introduction of financial viable tariff for SHP-based mini-grids will be a cornerstone instrument of the proposed policy package, aimed specifically at addressing this market risk by leveling the playing field for SHP against other available alternatives.
Policy risk The success of this project will be determined to a large degree by adoption and effective enforcement of the proposed polices. Lack of political	P=1 I=3	The project's design is fully aligned with the mandate and policy objectives of key national counterparts, which already ensured their buy in and commitment. Their political support will be further secured via close involvement in project preparation and implementation activities.

Risk	Level of Risk	Mitigation Action
support may jeopardize the achievement of immediate results and over-all impact.		
Climate risk Climate change is predicted to cause changes and increase variability of CAR's hydrological regime and precipitation patterns which will pose additional challenges and risk to SHP development.	P=1 I=3	Results of climate models for Congo basin region (which CAR is part of) will be incorporated in the design and selection of pilot sites. The existing and projected climatic data will be used to ensure that the chosen sites are not highly affected by irregular rain trends and are least vulnerable to projected changes in hydrological regime. In addition, policy recommendations for SHP promotion will include regulations to protect watersheds in order to maintain the necessary vegetation forest cover.
Overall Risk Level	High	

5. Coordination. Outline the coordination with other relevant GEF-financed and other initiatives.

During the PPG phase, in-depth consultations will be undertaken to establish partnerships and practical modalities for linking and collaborating with several ongoing and planned modern energy access related projects/programs in CAR. This is not only to avoid unnecessary duplication but also to ensure that GEF resources build on the progress and achievements made to date through such initiatives. A strategy and plan for collaboration with relevant ongoing and planned initiatives such as those stated below will be prepared during the preparatory phase, including defining the roles and responsibilities of critical stakeholders.

The proposed project is one of a series of similar UNDP-GEF initiatives aimed at promoting renewable energy based mini-grids in Africa (such as Small hydro based mini-grids in Congo-Brazzaville and DR Congo; Wind based mini-grids in Mauritania and Solar PV mini-grids in Mali). These projects share the same market transformation approach and model for RE-based rural electrification. The portfolio will be coordinated by UNDP-GEF Regional Coordination in Africa, including analysis and presentation of lessons learnt, organization of regular face-to-face and virtual networking, knowledge sharing and outreach activities and events.

The project will liaise with various GEF funded projects in CAR, such as GEF-AfDB "*Reducing Rural and Urban Vulnerability to Climate Change by the Provision of Water Supply*"; and GEF-UNDP *"Integrated Adaptation Programme to Combat the Effects of Climate Change on Agricultural Production and Food Security in CAR"*.

6. Consistency with National Priorities. Is the project consistent with the National strategies and plans or reports and assessements under relevant conventions? (yes ☒ /no☐). If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, etc.

The proposed project is in line with the following national strategies and plans:

- Peacebuilding: Background Paper on the rule of law and good governance in Central African Republic (National Development Plan) specifically calls for the needs "to improve the electricity coverage rate in rural areas with among key solutions for social stability and environmental sustainability.
- 2nd National Communication (2013) identified the development of hydro power electricity generation as the main mitigation measure and priority.

7. Knowledge Management. Outline the knowledge management approach for the project, including, if any, plans for the project to learn from other relevant projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.

Knowledge management is very important for this project, due to its innovativeness. Component 4 will specifically deal with knowledge management. Through this component, the project will help to collect and present all essential

information for potential hydro sites. The information will be presented on-line and published as investor guide. Also support will be provided to the Autonomous Agency for Rural Electrification (ACER) to ensure its regular update and wide dissemination.

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

A. RECORD OF ENDORSEMENT[15] 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 **SGP OFP endorsement letter**).

NAME	POSITION	MINISTRY	DATE *(MM/dd/yyyy)*
Mr. **Bertrand Blaise Nzanga**	Operational Focal Point of Central African Republic	**MINISTER OF MINES, ENERGY AND HYDRAULICS**	**07/30/2015**

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF policies[16] and procedures and meets the GEF criteria for project identification and preparation under GEF-6.

Agency Coordinator, Agency name	Signature	Date *(MM/dd/yyyy)*	Project Contact Person	Telephone	Email
Adriana Dinu Executive Coordinator, UNDP GEF		4 September 2015	Saliou Toure Technical Advisor EITT	+251 912 503 320	Saliou.toure@undp.org

C. ADDITIONAL GEF PROJECT AGENCY CERTIFICATION (APPLICABLE ONLY TO NEWLY ACCREDITED GEF PROJECT AGENCIES)

For newly accredited GEF Project Agencies, please download and fill up the required **GEF Project Agency Certification of Ceiling Information Template** to be attached as an annex to the PIF.

[15] For regional and/or global projects in which participating countries are identified, OFP endorsement letters from these countries are required even though there may not be a STAR allocation associated with the project.

[16] GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, and SCCF