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 Hydro Power (SHP) for productive use and energy services in Burundi		
Country(ies):	Republic of Burundi	GEF Project ID:[1]	9056
GEF Agency(ies):	UNIDO	GEF Agency Project ID:	140332
Other Executing Partner(s):	1. Ministry of Water, Environment, Land and Urban Planning (MWELUP) 2. Ministry of Commerce, Industry and Tourism (MCIT)	Submission Date: Resubmission Date	03/13/2015 03/26/2015
GEF Focal Area(s):	Climate Change	Project Duration (Months)	48
Integrated Approach Pilot	IAP-Cities ☐ IAP-Commodities ☐ IAP-Food Security ☐	Corporate Program: SGP ☐	
Name of parent program:	Not applicable	Agency Fee ($)	250,615

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 Program 1 Promote Innovation, Technology Transfer and Supportive Policies and Strategies	GEFTF	2,638,060	10,660,000
Total Project Cost		2,638,060	10,660,000

B. INDICATIVE PROJECT DESCRIPTION SUMMARY

Project Objective: To scale up of small hydro power generation for rural electrification and productive uses in small and medium sized industries

Project Components	**Financing Type[3]**	**Project Outcomes**	**Project Outputs**	**Trust Fund**	**(in $)**	
					GEF Project Financing	**Co-financing**
1. Capacity building and strengthening of national policy on SHP	TA	1.1. Improved knowledge base and strengthened national policy on SHP	1.1.1. Trained key policy makers (at least 30) 1.1.2. Trained personnel from other target groups[4] (30 in each group) 1.1.3. Strengthened national policy	GEFTF	420,000	480,000
2. Demonstration and scaling up of SHP plants	INV	2.1. Technical and economic viability of SHP technology established	2.1.1. Detailed plant designs prepared for 6 proposed SHP plants 2.1.2. SHP plants	GEFTF	1,422,440	5,560,000

[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] Interested project developers, national experts, renewable energy (RE)/technical institutions, banks/financial institutions, engineering companies, NGOs/CSOs, etc.

			established for a cumulative capacity of 1.7MW			
3. Sustainable financial scheme	TA	3.1. Improved investment environment	3.1.1. Financial scheme created	GEFTF	100,000	70,000
	INV			GEFTF	500,000	4,000,000
4. Monitoring and evaluation (M&E)	TA	4.1. Effectiveness of the outputs assessed, corrective actions taken and experience documented	4.1.1. Mid-term M&E report prepared 4.1.2. End of project M&E report prepared (independent evaluation)	GEFTF	70,000	50,000
				Subtotal	2,512,440	10,160,000
				Project Management Cost (PMC)[5]	125,620	500,000
				Total Project Cost	**2,638,060**	**10,660,000**

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 ( )

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 ($)
Recipient Government	Ministry of Water, Environment, Land and Urban Planning	Cash / in-kind	1,040,000
Recipient Government	Ministry of Commerce, Industry and Tourism	Cash / in-kind	800,000
Bank/Financial institution	Bank of the Republic of Burundi	Investment	3,100,000
Private sector	Private investors (unknown at this stage)	Investment	5,560,000
GEF Agency	UNIDO	Grant	60,000
GEF Agency	UNIDO	In-kind	100,000
Total Co-financing			**10,660,000**

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
UNIDO	GEFTF	Republic of Burundi	Climate Change	N/A	2,638,060	250,615	2,888,675
Total GEF Resources					**2,638,060**	**250,615**	**2,888,675**

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

[5] 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.

E. PROJECT PREPARATION GRANT (PPG)[6]

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: **$**100,000					PPG Agency Fee: 9,500		
GEF Agency	**Trust Fund**	**Country/ Regional/Global**	**Focal Area**	**Programming of Funds**	**(in $)**		
					PPG (a)	**Agency Fee**[7] (b)	**Total** c = a + b
UNIDO	GEF TF	Republic of Burundi	Climate Change	N/A	100,000	9,500	109,500
Total PPG Amount					**100,000**	**9,500**	**109,500**

F. PROJECT'S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS[8]

Provide the expected project targets as appropriate.

Corporate Results	**Replenishment Targets**	**Project Targets**
1. Support to transformational shifts towards a low-emission and resilient development path	750 million tons of CO_{2e} mitigated (include both direct and indirect)	*189,232* t CO_{2e}

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

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

[8] 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.*

Global Environmental Problems, Root Causes and Barriers

Burundi is a small, low-income, densely-populated, landlocked country in Southeast Africa. The national per capita income is about USD 140, which is one of the lowest in the world. About 90% of the population lives in rural areas, although the urban population has grown rapidly in the past decade. According to the African Development Bank, 81% of the population was below the international poverty line of USD 1 per day in 2006.

Total primary energy supply for the year 2009 was 98.2 PJ (Peta Joule)[9]. As shown in the figure 1, the energy consumption relies to a greater extent on biomass. This is due to the fact that a majority of the population lives in rural areas consuming wood as their primary fuel. It is the main source of energy for rural households while being prominent in urban areas as well.

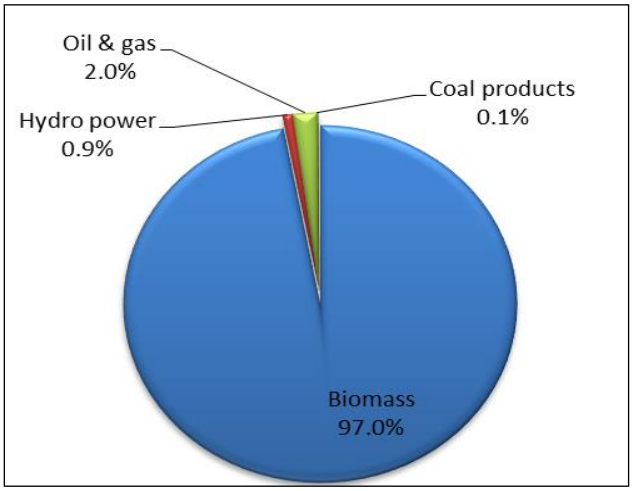


Figure 1: Burundi's Energy Balance

Electricity generation in Burundi is mostly managed by the national water and electricity utility Régie de Production et Distribution d'Eau et d'Électricité (REGIDESCO). The country has an installed capacity of 35.8 MW (of which 30.3 MW is from hydropower plants, and 5.5 MW is from thermal units). Also, a number of micro-hydropower plants are managed by Burundian Agency for Rural Electrification (ABER, formerly known as DGHER) and the private sector including the Burundi Tea Office and various religious missions. In addition, about 3 MW is purchased from Ruzizi I, a hydropower plant in Congo and managed by Congolese National Electricity Company (SNEL). Another 13.3 MW from Ruzizi II, managed by the International Society for Electricity in the Great Lakes Region (SINELAC) is supplied to meet Burundi's electricity demand. The electricity distribution mix in Burundi is shown in figure 2. Even in electrified cities the connection rate is less than 10%. The average consumption of electricity in Burundi is 23 kWh/cap/year which is one of the lowest in the world.

[9] http://www.irena.org/remaps/countryprofiles/africa/burundi.pdf
1 Peta Joule = 10^{15} Joule

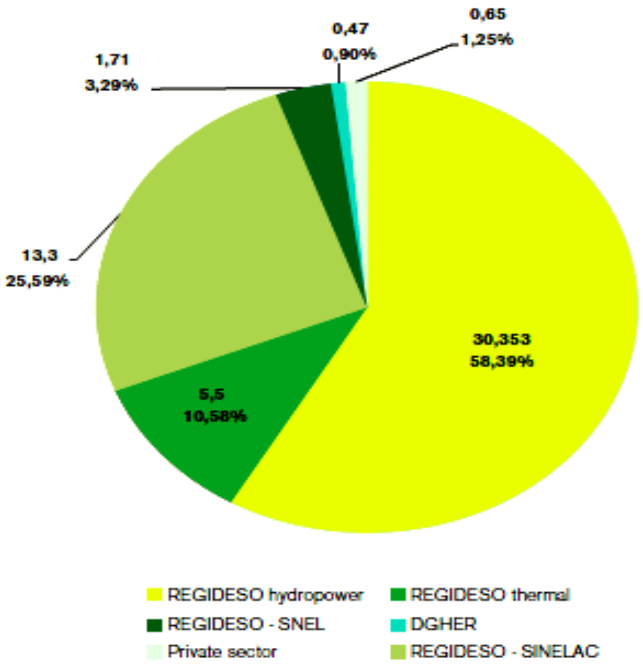


Figure 2: Electricity Distribution Mix in Burundi

Figure 3 shows the comparison of countries with the lowest electrification rate for the year 2010[10].

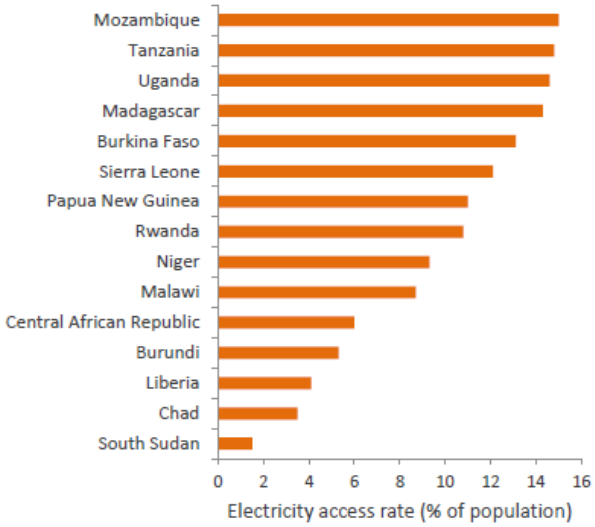


Figure 3: Electricity access in Burundi

The electricity access rate in Burundi was approximately 4% in 2012. REGIDESO serves about 76,000 customers, and 64% of these are located in and around Bujumbura. Electricity supply from REGIDESO is often intermittent coupled with low voltage. REGIDESO estimates that 60% of the grid requires rehabilitation to meet the interconnection standards of the East African Power Pool. To meet the energy demand during peak hours, about 10 MW diesel generators were acquired by the Government in 2013 to augment REGIDESCO supply[11].

[10] SE4ALL Baseline Report (2013)

[11] World Bank Project Appraisal Document on a proposed grant in the USD 100 million equivalent to the Republic of Burundi for Jiji and Mulembwe Hydropower project, March 27, 2014

Besides the low generating capacity, the main challenge of the energy sector of Burundi is the inadequate technical and management skills. Which affects the prospects for developing the country's energy resources, and it also reduces the scope for effective policy-making and implementation. This proposed project intends to address this challenge through promotion of SHP plants as a viable solution to increase the country's generation capacity and the electrification rate, as well as the productive use of energy for sustainable industrial development.

Baseline scenario and baseline project

Baseline scenario

Burundi faces severe constraints in meeting its energy demand. Peak demand in the country is projected to grow from 46 MW in 2012 to 92 MW / 450 GWh by 2018 and 192 MW / 933 GWh by 2025 - under a base case of 10% annual demand growth scenario[12]. The economy is largely subsistence-based, with coffee being the country's chief export as well as cotton and tea. There are few industrial firms that manufacture consumer products and some process cotton. Other agricultural commodities such as sugar, corn, sorghum, sweet potatoes, banana, tapioca, beef, milk, hide, livestock feed and rice are also produced.

Growth of these industries is severely hampered due to lack of grid electricity. As the electricity sector in Burundi is under-developed, the industries are currently self-generating their energy either by using costly solutions or solutions that pose threats to the environment. Such as using firewood for the processing of tea and coffee, etc., backup generators typically cost US$ 0.40 to US$ 0.50 per kWh to operate. As a result, the cost of production increases enormously. This leads to the reduced operation of the industries thereby, affecting the economy, in general. Hence, the need of the hour is to identify a low cost & sustainable electricity option for Burundi's industries. These industries have an interest in supporting and consuming renewable energy both for environmental purpose as well as to reduce their costs. According to the scenarios for economic growth, the energy needs would be approximately 100 MW in 2020, with the industrial consumption at today's low levels. However, a number of industrial activities require additional capacity estimated of at least 100 MW. This indicates the demand and needs for electricity to enhance the economic activities in the country.

On the other hand, renewable energy technologies are viable solutions to meet the increasing energy demand of the country. Burundi is endowed with various renewable energy sources; there is potential for solar power electrification in isolated areas. Hybrid solar-diesel systems and grid-connected solar photovoltaic (PV) farms may be viable substitutes for high-cost diesel generation. Wind potential is limited and is more attractive for water pumping than power generation. Pilot scale private-sector schemes are currently operational. Although a landlocked nation, Burundi is also endowed with vast river resources such as Malagarasi and Ruzizi that stretches over a distance of 475 km and 117 km respectively. The potential for energy generation from hydropower is about 300 MW, but only exploits slightly more than than10% of this (30.3MW). Due to the high generation potential and low utilization of hydropower, SHP technology has been selected to increase energy supply and productive use of energy. The Government of Burundi has developed a strategy to enhance the development of renewable energy sources in the country.

Civil conflict in the 1990s had prevented the development of the country's electricity generation infrastructure. Small hydropower development has been consequently affected. It was planned that investments will be done in new hydropower plants every ten year, but no such investment was made over the last decades. Apart from technical management, the complex nature of the energy sector further hinders the growth of rural electrification and in turn the small hydropower development. Overlapping responsibilities between ministries such as the Ministry of Energy and Mines, the Ministry of Communal Development and the Ministry of Development Planning and Finance (which

[12] This base case scenario takes into account of the elimination of unserved demand (as much as 36% in 2013), loss reduction and increase of household access from 4 to 35% by 2030.

is responsible for investment planning and coordination with foreign donors), slows down the growth process of small hydropower[13].

Fiscal barriers to small hydropower development consist of lack of incentive for foreign investments and high transportation costs for equipment based on the ports of Kenya and the United Republic of Tanzania. One of the major constraints is the lack of small hydropower surveys and data availability as a basis for implementation[14].

Burundi's energy sector is currently under-developed, which means that there are considerable opportunities for investors. Burundi's hydro electrical production costs are among the lowest in the region. According to the World Bank, the average estimated production cost for most of the hydropower plants was approximately 0.04 USD/kWh for thermal power plant it was 0.3 USD/kWh and 0.48 USD/kWh for diesel generators in 2012. The average production costs for the energy mix are consequently estimated at 0.062 USD/kWh for 2012[15].

National strategy for electricity access, 2012: National Strategy for Development of Renewable Energy in Burundi until 2025 aims at: (i) developing least cost national resources for grid based and off-grid power supply; (ii) progressing toward universal access as per SE4All; and (iii) using public sector funding to leverage private sector financing in generation and also distribution. The strategy proposes measures ranging from accelerating implementation of national and regional hydropower projects, development of hydropower sites less than 20 MW by private investors, developing off-grid lighting (pre-electrification) for rural areas and promoting energy efficiency.

Baseline project

In the 1980s, a study by Lahmeyer established that there were 41 potential hydropower sites for Burundi with a capacity of 1,700 MW, of which, 300 MW were technically and economically feasible. Recently, REGIDESO launched a study with a stepwise approach. Ten hydropower sites with capacities less than 10 MW, which had been identified in the 1980's master plan, were selected to be screened again. Pre-feasibility studies were conducted for four selected sites, followed by the feasibility study of two selected sites. The Ministry of Energy and Mines carried out a detailed study on the hydropower sector in the country and came up with a national atlas for hydropower in Burundi. Another study in 2012 showed that through optimization for most of the given sites, the actual SHP potential is much higher than outlined in the master plan study[16]. World Small Hydropower Development Report 2013 for Burundi reported that total small hydropower capacity in the country is around 54 MW[17].

For the forthcoming years, the Government of Burundi is planning to carry out the following actions in the energy sector:
a) Double the generating capacity of Nyemanga (2.8 MW) and Buhiga hydroelectric power stations;
b) Conduct feasibility studies for Kaganuzi (5 MW), Mpanda (10.4 MW) and develop the sites;
c) Increase rural electrification by the implementation of mini-hydro power plants;
d) Refurbish existing hydroelectric power stations, electricity transmission and distribution networks;
e) Rehabilitate non-functioning SHP plants.

[13] United Nations Development Programme (2009). African Micro hydro Initiative: Regional Micro/MiniHydropowerCapacity Development and Investment for Rural Electricity Access in Sub-Saharan Africa. Project Document, Governments of Mali, Togo, Benin, Cameroon, Congo-Brazzaville, Gabon, Central African
Republic, Burundi, Rwanda and the Democratic Republic of Congo.
[14] Meier, Ulrich and Zadoc Abel Ogutu (2010). Mid-term Evaluation of the United Nations Environment Programme / Global Environmental Facility Project. GF/4010-05-02 (4870) Greening the Tea Industry in East Africa. United Nations Development Programme.
[15]
http://www.bi.undp.org/content/dam/burundi/docs/publications/Investment%20opportunities%20in%20renewable%20energy%20Burundi.pdf
[16] Burundi, Ministry of Energy and Mines (2012). Investment Opportunities in Renewable Energy Burundi. Buyumbura
[17] World Small Hydropower Development Report 2013 for Burundi, UNIDO & ICSHP

An ongoing World Bank project includes US$ 1.5 million pre-feasibility and feasibility studies of potential hydropower sites with capacities ranging between 1 MW and 7.5 MW, which could be connected to the grid at a reasonable cost. It is assumed that these hydropower plants could be realized in approximately two years, considering that no major dam construction is required. In December 2013, World Bank approved USD 100 million to implement two hydropower plants in Jiji and Mulembwe with installed capacities of 31.5 MW and 16.5 MW respectively. The fund will finance the construction of hydropower facilities and associated infrastructure to transport the electricity produced at the sites to the consumption centres in Bujumbura and other main towns in Burundi. It will also finance infrastructure to supply electricity to local communities in the vicinity of the power plants. Besides, it aims at reforming the national grid company (REGIDESO). The proposed GEF project is also aligned with the four-year World Bank Group Country Assistance Strategy (CAS), covering the 2013-2016 period adopted in October 2012. The provision of reliable, low-cost electricity will contribute to the CAS objectives of improving competitiveness by establishing an enabling environment for inclusive growth, poverty reduction and increasing resilience by consolidating social stability.

On a regional level, regional electricity generation projects Ruzizi III (145 MW) and Rusumo Falls (80 MW) are currently under development. These two regional hydro generation projects in which Burundi has a share (along with associated transmission lines) are expected to be commissioned in 2018 and 2020, respectively. However, these are large- scale hydro power plants.

On the other hand, Burundi has only 15.84 MW of installed small hydropower capacity if the definition of 10 MW is applied (figure 4). ABER, operates eight small and micro-hydro plants in rural areas, while the Non-Governmental Organizations (NGOs) and Inter Alia, operates another 12 micro hydro plants[18]. UNIDO, in collaboration with MWELUP, is currently implementing a 300 kW SHP project in Burundi. The goal of the project is to promote SHP as a sustainable energy solution for productive use. Construction of the SHP plant has been completed, and mini-grid construction is ongoing and is expected to be completed by the third quarter of 2015.

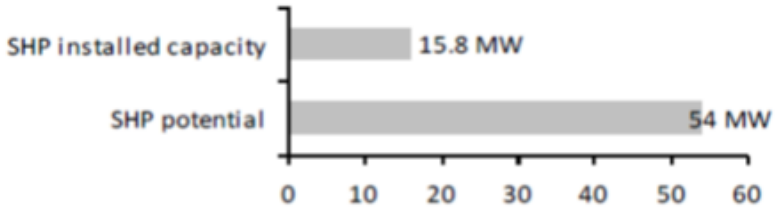


Figure 4: Small Hydropower Capacities in Burundi

In spite of the SHP potential in Burundi, maximum utilization has not taken place because of the following barriers: a) Insufficient awareness about the SHP technology, b) high transportation (either from Kenya or Tanzania) and installation cost, c) inadequate hydrological data, d) lack of after-sale service and spare parts availability, e) lack of interest among the financial institutions to lend for SHP projects, f) lack of appropriate policy support and g) overlapping responsibilities among the following ministries, Ministry of Water, Environment, Land and Urban Planning; Ministry of Communal Development and Ministry of Development Planning and Finance (which is responsible for investment planning and coordination with foreign donors), slowing down the growth process of small hydropower[19].

[18] African Development Bank (2009). An Infrastructure Action Plan for Burundi: Accelerating Regional Integration. Tunis-Belvedère. Available from www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/An%20Infrastructure%20Action%20Plan%20 for%20Burundi%20-%20Main%20Report%20v1.2.pdf

[19] United Nations Development Programme (2009). African Micro hydro Initiative: Regional Micro/Mini- Hydropower Capacity Development and Investment for Rural Electricity Access in Sub-Saharan Africa. Project Document, Governments of Mali, Togo, Benin, Cameroon, Congo-Brazzaville, Gabon, Central African Republic, Burundi, Rwanda and the Democratic Republic of Congo.

In the light of the inadequate awareness, human capacity and the above barriers, it is questionable if the execution of the Government initiatives is realistic, without any country-wide intervention from the international organizations such as UNIDO and GEF. It is thus clear that, apart from the UNIDO project, little activity or programme focuses on kW-sized hydropower plants. The proposed GEF project will link up with the Government initiatives, relevant ongoing project especially the on-going 300 kW project as a viable project to promote SHP for productive uses. The proposed project will address the electricity deficit in Burundi, promote decentralized electricity generation and distribution by focusing on the promotion of micro-mini grids providing access to small-medium sized industries and benefiting rural communities. Thus, Burundi will increase its electricity generation through implementation of decentralized power plants even if those are less than 1 MW sized SHP plants.

Proposed alternative scenario and project

The project will contribute to the twin goals of ending extreme poverty and boosting shared prosperity. Currently, power shortages and the cost of power from expensive thermal power plants constrain the economic growth. The proposed project aims at promoting SHP plants for electricity generation for productive uses in potential sites. The project is designed with four components and the activities and output under each of the components are described below:

Component 1: Capacity building and strengthening of national policy on SHP

Awareness will be created for electricity generation through SHP, by means of training programmes and information dissemination mechanisms. MWELUP and identified national instittutions will collaborate to conduct the trainings. MWELUP will be taking the lead role during the training and hence, will be entrusted with the responsibility of the sustained/recurring training programs on SHP.

Available guidebooks and strategies on SHP project development and operation will be customized for adapting to the local conditions. This will benefit users/utility such as, Non-Government Organization (NGOs)/Civil Service Organizations (CSOs), community groups, individual firms, government agencies, industries, etc., who want to develop SHP plants. Apart from guidebooks and manuals, exclusive website will be created for SHP development, with user-friendly interface. Under this project component, capacity development will be carried out as follows:

Output 1.1.1: Trained key policy makers (at least 30)

Capacity will be developed among the policy makers. Only when the policy makers are well aware of the necessity of the technology, they will be able to put forth the appropriate policy and regulatory environment which is essential for any technology development to take place in the country. Hence, tailored training to at least 30 personnel handling the policy aspects will be provided during the project period. The officials from the concerned ministries can make a study visit (using co-financing budget) to a nearby African country and the 300 kW site developed by UNIDO for understanding and applying the technology better.

Output 1.1.2: Trained personnel from other target groups[20] (30 in each group)

Around 30 individuals from the Renewable Energy (RE)/technical institutions will be trained for SHP development. Around 30 individuals from banks and financial institutions will also be trained for assessing/conducting due diligence on the SHP projects. Training to banks/financial institutions will be conducted at the earliest as a priority in order to enhance their knowledge and build up their confidence in financing the projects.

Awareness- raising materials will be developed and used subsequently. Training for various target groups such as local engineering and O&M institutions will be provided (at least 30 people) to facilitate sustainable operation for the demonstration and replication projects.

[20] Interested project developers, national experts, renewable energy (RE) / technical institutions, banks / financial institutions, engineering companies, NGOs/CSOs, etc.

General awareness through training, workshops, roadshows, etc. will be conducted for NGOs/CSOs, community group, individual firm, government agencies, industries, etc., to increase the local acceptance and adaptation of SHP.

Output 1.1.3: Strengthened National Policy

During the PPG stage, the current policy and legal/regulatory framework for SHP technology will be reviewed, including the available policy instruments such as subsidies and Feed-In-Tariffs. Based on that, a policy summary report will be prepared including recommendation for the most suitable business development plan.

Project component 2: Demonstration and scaling up of SHP plants

Output 2.1: Detailed plant designs prepared for 6 proposed SHP plants

Under this component, technical assistance will be provided for the demonstration projects up to the cumulative capacity of around 1.7 MW, towards the preparation of their feasibility studies, business plans and detailed technical plant designs.

Feasibility studies will be conducted during the PPG stage, whereas the business plans and detailed technical plant design will be carried out during the GEF project implementation. The business plan will provide management information such as, how the maximum load will be optimally allocated for the productive activities, and how the association should secure the self-sufficient income/cost balance to maintain the demonstrated mini-grid system.

An in-depth sustainability assessment will be conducted for the demonstration sites in order to set up the baselines comprising measurable social, economic, environmental and technical aspects (e.g., productive activities, environmental co-benefits, socio-economic impacts, hydrological parameters, silt load, etc.). This information will be used later to monitor and validate the added value of the new technology deployed.

Output 2.2: SHP plants established for a cumulative capacity of 1.7 MW

A portion of the GEF grant will be used to provide subsidy towards the electro-mechanical equipment for the selected SHP plants. The selected projects will be developed in partnership with the private sector investment. The lessons learned would be widely disseminated.

Table 1 shows a list of potential sites and their estimated capacities identified for this proposed project. The listed sites are selected by Ministry of Energy and Mines using "ATLAS HYDROÉLECTRIQUE DU BURUNDI" which was developed by them in September 2013, by considering various factors such as, physical characteristics (flow, head, duration, etc.), catchment analysis, financial viability, socio-economic impacts, etc.

Table 1: Number of identified SHP sites and their potential capacities

S. No.	Name of the water course	Project location	Estimated Power Generation Potential, kW	Areas to be electrified
1	Gikuka	Gitaba, Vugizo commune, Makamba Province	200	Vugizo, Mpinga, Gishiha
2	Mubarazi	Burasira, Ruhororo commune, Ngozi Province	160	Burasira, Mutaho
3	Muyovozi	Karindo, Rutana commune, Rutana Province	250	Musongati, Kayero
4	Nyabaha	Murirwe, Gitega commune, Gitega Province	350	Mubuga
5	Nyamwondo	Nyamwondo, Mwakiro commune, Muyinga Province	150	Gisimbawaga, Mwakiro
6	Waga	Bihomvora, Bisoro commune, Mwaro Province	150	Kuwimpfizi, Kanka
7	Ryarusera	Muranvya commune, Muranvya Province	35	Municipality of Muranvya
8	Kigwena	Rumonge commune, Bururi Province	65	Municipality of Rumonge

S. No.	Name of the water course	Project location	Estimated Power Generation Potential, kW	Areas to be electrified
9	Butezi	Butezi commune, Ruyigi Province	200	Municipality of Butezi
10	Nyabikere	Nyabikere commune, Karuzi Province	140	Municipality of Nyabikere
		Total	**1,700**	

Burundi has a significant growth potential in agriculture, notably in coffee, tea, and sugar. Tea export itself accounts for 20% of the total national export. Members of the East African Tea Trade Association (EATTA) were selected for the initiative known as Greening the Tea Industry in East Africa (GTIEA) implemented by UNEP and the African Development Bank. The GTIEA aims at investing in SHP to reduce tea production energy costs. Currently, six small hydro projects are running in four EATTA countries with capacities of 10 MW each. However, these initiatives have not been replicated in Burundi. The proposed project will seek synergy and coordination with this initiative and replicate it in the tea industry. The focus will be on scaling up SHP for productive use after the successful implementation of the demonstration projects. Thereby contributing towards the achievement of Sustainable Development Goal 9, as well as UNIDO's goal of Inclusive and Sustainable Industrial Development (ISID).

Project Component 3: Sustainable financial scheme

Output 3.1: Financial scheme created

This component will focus on the creation of financial incentives for investors interested in developing SHP projects. Also, instruments such as capital subsidies, credit mechanism, loan guarantees, etc. will be implemented by UNIDO in collaboration with the MWELUP and Bank of the Republic of Burundi. These incentives would then be used for the replication projects. A part of the GEF grant in this component will be used only for designing/facilitating the incentive schemes, whereas the co-financing amount will be used for the replication projects as incentives.

A part of the GEF grant, around USD 500,000, will be used as seed amount for the financial incentive. Around USD 4 million of co-financing resources will be used for operationalizing the financial incentive. To ensure cost-effectiveness, the declining incentive amounts in line with targeted capacity levels, which will reflect the increased economy of scale corresponding to the market maturity, will be followed. The exact modalities and specific involvement of banks/financial institutions will be established during the PPG stage.

Project Component 4: Monitoring & Evaluation (M&E)

Output 4.1: Mid-term M&E report prepared

The project will be subjected to mid-term and final evaluations. The project will be monitored from the beginning, and an independent mid-term evaluation will be carried out at the end of 24th month of the GEF project. Follow- up corrective actions will be done after that. This evaluation will focus on the activities of the project such as construction of the demonstration plants, assessment of the effectiveness of the training sessions, etc. that are carried out until the 24th month of the project.

Output 4.2: End of project M&E report prepared (independent evaluation)

An independent final evaluation will be conducted three months prior to the terminal review meeting. The final evaluation will look at the impact and sustainability of results, including the contribution to the capacity development and the achievement of global environmental benefits goals. The final evaluation will also provide recommendations for the follow-up activities.

The project will involve continuous monitoring. However, monitoring expenses will be covered with co-financing budget. As mentioned above, both mid-term and final evaluations will be carried out by independent M&E experts. Any other interim evaluations will be conducted internally as per the project requirements.

After completion of the technical component, the project performance monitoring will be conducted to study the technical, financial, environmental and socio-economic aspects of the demonstration projects and distribution of SHP plants. Full-scale project demonstration site visit and seminars will be organized, and the project experiences will be disseminated to various interested stakeholders in order to increase the replication potential of the project. Various dissemination tools such as leaflets, website, etc., will be used for effective dissemination.

Methodologies/tools will be developed to use the collated information for better planning and decision-making. Case studies will be prepared and presented to increase investments in similar projects using the trained capacity that is created.

An annual report and periodical newsletter on the best practices, information on country-level projects and key indicators of progress made under the project will be prepared and distributed to the key stakeholders and agencies.

Incremental/Additional cost reasoning

As of now, the deficit in the supply-demand in electricity is met through diesel engines. Hence, the basis of incrementality is diesel replacement (diesel generator's approximate investment cost of USD 900,000). GEF funding will be used for meeting the incremental cost of replacing 1.70 MW of diesel based systems with equivalent SHP systems.

The overall investment cost for the proposed demonstration projects is around USD 7 million. As compared to the baseline diesel generator investment, this results in an incremental cost of approximately USD 6.1 million. GEF provides a grant of around USD 1,438,985 which is approximately 23% of the total incremental cost.

Global environmental benefits

The established SHP plants will result in the avoidance of approximately 107,222 tCO_2e emissions directly throughout their lifetime of 20 years[21]. It is expected that the induction of market transformation in which many others will also initiate and develop SHP projects of at least 5.1 MW within a time span of maximum ten years after the project. This will lead to the avoidance of 160,834 tCO_2e emissions indirectly.

The total GEF resources of around 2.64 million will be used to mitigate CO_2 emission at a rate of USD 24.6/tCO_2 directly and around USD 16.4/tCO_2 indirectly. These initial estimates will be refined during the PPG phase.

Innovativeness, Sustainability and Potential for Scaling up

Innovativeness

SHP technology is not prevalent in Burundi. Hence, an attempt to use such a technology for electricity generation and productive uses as proposed in this project is an innovative approach.

Sustainability

Capacities of various institutions will be built throughout the duration of the project implementation. They will continue to provide technical guidance to a wider group of stakeholders. In addition, each demonstration project will be operated and maintained by the private investor through their operation and maintenance (O&M) staff.

UNIDO has remarkable experience in small hydro and micro-hydro installations in various countries. It has established International Centre for Small Hydro-Power (ICSHP) at Hangzhou in China, Regional Centre for SHP in Trivandrum (India) and Regional Centre for SHP in Abuja (Nigeria) and is developing SHP projects throughout the

[21] Assuming a plant load factor of 45% and an emission factor of 0.8 t CO_2e (diesel generator replacement)

world. In addition, UNIDO has published World SHP report (individual) for many countries[22] and an informative & interactive website for the same[23]. This initiative adds up to UNIDO's experience in SHP. UNIDO's experiences from such project activities can be used here as and when required to run the project sustainably. The proposed project will also link up with the small hydropower technical center at College of Engineering and Technology, University of Dar es Salaam to share experiences and best practice.

The demo sites will be chosen only based on the detailed feasibility studies and bankable document that includes a financial analysis to determine the profitability of the project.
The financial scheme will be operated by a financial institution in Burundi and the proposed 4 million USD for the scheme will be sourced from the stakeholders. Such that the financial scheme will be running even after the completion of project implementation. Interested investors can access the scheme to develop the replication projects.

Scaling-up

Besides capacity building, the following activities are carried out for scaling up of the SHP:

- Successful implementation and operation of the demonstration projects: *This will boost the confidence among private investors;*
- Strengthened policy: *This will improve the investment environment and promote the financial contribution in SHP;*
- Transfer of technology: *This will increase the confidence among investors to provide support and funding for the technology;*

A country's energy market and its industrial growth are interdependent. In this regard, as of now, growth of Burundi industries is severely hampered due to the lack of electricity. Decentralized hydropower generation will lower the production cost and reduce the dependence of diesel. The mini-grids are the promising option for the developing power infrastructure. Given the interest of international development partners in the renewable energy sector, and thanks to an improving business climate, actors who are interested in the energy sector will have a unique opportunity to invest[24].

Productive uses of the project

The proposed project will collaborate with agro-business development branch of UNIDO for productive use of energy generated in Burundi's agro-industry in order to promote ISID. Also, the project will link up the GTIEA initiative for productive use of energy in the tea industry in Burundi.

***2. Stakeholders.* Will project design include the participation of relevant stakeholders from civil society and indigenous people? (yes ☒ /no☐)**

MWELUP is the main executing agency and will take the leading role as the project steering committee chair and will be responsible for executing the proposed programme, overall project delivery of the planned output and achieving the expected outcome. It will also be responsible for inter-ministry communication facilitation and policy matters.

MCIT will be responsible for co-ordination with industries and provide expertise on RE application for productive uses and support.

[22] Burundi's report published in the year 2013 is accessible at http://www.smallhydroworld.org/fileadmin/user_upload/pdf/Africa_Eastern/WSHPDR_2013_Burundi.pdf
[23] http://www.smallhydroworld.org/index.php#cou-225-IN
[24] http://www.bi.undp.org/content/dam/burundi/docs/publications/Investment%20opportunities%20in%20renewable%20energy%20Burundi.pdf

Bank of the Republic of Burundi is the financial institution collaborating for the financial scheme operations and management. The exact mode of collaboration, operation and management will be studied during PPG.

The private sector will work with the project to receive technical support for installing the SHP. Other RE/technical institutions and financing institutions will be the recipients of training on SHP. This will encourage them to support development of similar initiatives.

There are no identified indigenous people within the vicinity of the proposed sites. The proposed project will not involve indigenous people, based on the preliminary assessment that has been conducted during PIF preparation. Local community people will benefit from clean electricity and will contribute through voluntary participation during construction of the plants.

***3. Gender Considerations.* Are gender considerations taken into account? (yes ☒ /no☐)**

UNIDO recognizes that gender equality and the empowerment of women have a significant positive impact on sustained economic growth and inclusive industrial development, which are key drivers of poverty alleviation and social progress. In addition to the UNIDO Policy on Gender Equality and the Empowerment of Women (2009), which provides overall guidelines for establishing a gender mainstreaming strategy, UNIDO has also developed an operational energy-gender guide to support gender mainstreaming of its sustainable energy initiatives.

This intervention in Burundi is expected to have limited direct influence over gender equality and/or women's empowerment in the country and therefore could be classified as a project with "limited gender dimensions"[25] according to the UNIDO Project Gender Categorization Tool. This project possesses only few gender dimensions and entry points for gender mainstreaming activities and/or affirmative action are rare. Nevertheless, UNIDO recognizes that energy interventions are expected to have an impact on people and are, therefore, not gender-neutral[26]. In fact, due to diverging needs and rights regarding energy consumption and production, women and men are expected to be affected differently by the project (in terms of their rights, needs, roles, opportunities, etc.). Therefore, regardless of the project's gender category, the project aims to demonstrate good practices in mainstreaming gender aspects into SHP projects, wherever possible and avoid negative impacts on women or men due to their gender, ethnicity, social status or age. Consequently, it will be considered to include the gender dimension during the whole project cycle.

During the project development (PPG) phase, continued discussions will be held with the UNIDO energy-gender expert to ensure that the relevant gender dimensions are considered, and the project log-frame will be developed to reflect key gender dimensions of the respective outputs, activities, indicators and targets.

Guiding principle of the project will be to ensure that both women and men are provided equal opportunities to access participate in and benefit from the project, without compromising the technical quality of the project results.
In practical terms,

- Gender-sensitive recruitment will be practiced at all levels where possible, especially in selection of project staff. Gender responsive TORs will be used to mainstream gender in the activities of consultants and experts. In cases where the project does not have direct influence, gender-sensitive recruitment will be encouraged. Furthermore, whenever possible existing staff will be trained and their awareness raised regarding gender issues.
- All decision-making processes will consider gender dimensions. At project management level, Project Steering Committee meetings will invite observers to ensure that gender dimensions are represented. Also, at the level of

[25] This would require the project to ensure at least 20% of the project outputs have clearly identified activities promoting gender equality and/ or the empowerment of women, including gender-responsive indicators and a corresponding budget OR at least one indicator in each project output refers to gender in some way. Furthermore, a gender-analysis is conducted of gender issues are included in ESIAs. Please see also "Gender Categorization Tool"

[26] ENERGIA "Turning Information into Empowerment: Strengthening Gender and Energy Networking in Africa. Leusden, 2008; Joy Clancy "Later Developers: Gender Mainstreaming in the Energy Sector", 2009

project activity implementation, effort will be made to consult with stakeholders focusing on gender equality and women's empowerment issues. This is especially relevant in policy review and formulation.

- To the extent possible, efforts will be made to promote participation of women in training activities, both at managerial and technical levels.

When data-collection or assessments are conducted as part of project implementation, gender dimensions will be considered. This can include sex-disaggregated data collection, performing gender analysis as part of ESIAs, etc.

4. Risks.

Component	Risk	Proposed Mitigation Measure	Risk Level
Technical risk	Insufficient technology.	Through careful feasibility studies and technology selection, this risk will be mitigated. Already, SHP is proven across the world including Africa. This is just an extension of the already proven SHP technology. As already mentioned in section A.1., item 6 "Innovativeness, Sustainability and Potential for Scaling up", UNIDO possess remarkable experience in SHP. UNIDO believes that it can control the various factors including managing the technical risk and steer the project to ensure its success.	Low
Market risks	No off-takers for the generated electricity.	The generated electricity will be supplied to the small industries nearby to the power plant. The demand and supply gap is wide and hence, there will not be any risk for the electricity off-take.	Low
Sustainability risk	Lack of human capacity to operate the demonstration projects.	All the demonstration projects' O&M staff will be trained by the respective suppliers. In addition, training will be given to strengthen the capacity of local engineering and O&M companies.	Moderate
Climate Change risk	Drought	Weir facilities will be provided to take care of the water requirements during the dry season. Hence, this risk can be overcome.	Moderate

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

The proposed project will supplement the efforts of GEF and other national projects to achieve the global GHG emission reduction. The proposed project will facilitate the implementation of SHP plants for productive uses and electrification.

<u>GEF initiatives</u>

As of now, Burundi has only 6 approved GEF projects in climate change focal area. Out of them 3 are full sized projects and 3 enabling activities. Among these 6 projects, only one project "SPWA-CC: Energy Efficiency Project", implemented by UNDP has some relevance with the proposed GEF project. It aims at developing and adopting selected policy frameworks for energy efficiency and to selectively improve the energy efficiency of households and buildings in Bujumbura city.

The proposed GEF project will be in synergy with this project and take appropriate lessons learnt from this project. The project will also take necessary experiences and achievements from the other GEF projects to ensure the attainment of the proposed GEF project's objectives.

<u>Other national initiatives</u>

Currently, there are on-going projects in the field of hydropower including that of the recently signed World Bank project for USD 100 million (December 2013). This project aims at implementing 2 hydropower plants for 31.5 MW (Jiji) and 16.5 MW (Mulembwe) capacities. This will finance the construction of hydropower facilities and the

associated infrastructure to transport the electricity produced at the sites to the consumption centres in Bujumbura and other main towns in Burundi. It will also finance infrastructure to supply electricity to local communities in the vicinity of the power plants. It also aims at reforming the national grid company, REGIDESO.

The proposed GEF project is also aligned with the four-year World Bank Group Country Assistance Strategy (CAS), covering the 2013-2016 period adopted in October 2012. The provision of reliable low cost electricity will contribute to the CAS objectives of improving competitiveness by establishing an enabling environment for inclusive growth, poverty reduction and increasing resilience by consolidating social stability.

The project is also aligned with the Sustainable Energy for all (SE4ALL) Initiative as it will double the share of RE in the energy mix of Burundi and will enable an accelerated electrification program.

The proposed project will seek close coordination with all the above initiatives and other concerned stakeholders to ensure that the relevant lessons and experiences are incorporated into the project. More in-depth consultation will be carried out during the PPG phase to identify possible collaborative activities.

***6. Consistency with National Priorities*. Is the project consistent with the National strategies and plans or reports and assessments under relevant conventions? (yes ☒ /no☐).**

The proposed project will support the following Government policies and strategies targeted to increase the percentage of RE in overall energy mix and rural electrification in the country.

Second National Communication, 2010: The proposed project is in line with the National Strategy attached as Annex 4 to Burundi's Second National Communication to the United Nations Framework Convention on Climate Change (UNFCCC), which was completed in June 2010. The strategy is meant to develop hydro power stations every ten years and. The Second National Communication identified strengthening of hydropower capacity as well as developing micro-hydro power plants as priority projects under mitigation measure in chapter six of the communication. The proposed project aims to scale up of small hydro power generation for rural electrification and productive uses in small and medium sized industries whereby mitigating GHG emissions from energy.

Vision Burundi 2025, 2011: Concerning the energy sector, the Vision has a principal objective to ensure that by 2025, both the rural and urban populations have access to reliable, clean sources of energy, at competitive prices, and to provide energy in quantities sufficient for the industrial, artisanal and mining activities. Further efforts will be made to build hydroelectric power stations and invest in renewable energies.

Poverty Reduction Strategy Paper (PRSP) II, 2012: The project is aligned with Burundi's poverty reduction strategy (PRSP II). The proposed GEF project will support the pillar 2 "Transforming Burundi's economy to generate sustainable, job creating growth" by power supply to industries, through the intervention "Improving access to better quality economic infrastructures (energy, transportation, ICT)". PRSP aims at increased electricity production, restoring financial soundness to water and power utility REGIDESO and promote renewable forms of energy.

The project is also aligned with the Sustainable Energy for all (SE4ALL) initiative as it will double the share of RE in the energy mix of Burundi and will enable an accelerated electrification program.

7. Knowledge Management

A database will be developed to manage the guidebooks, training materials and strategies on SHP project development This will benefit users/utility such as, the Non-Government Organizations (NGOs)/Civil Service Organizations (CSOs), community group, individual firm, government agencies, industries, etc., who want to install SHP. Apart from guidebooks and manuals, exclusive website will be created for SHP development, with user friendly interface. The website will serve as a database for SHP development and link with up other global initiatives as well as relevant projects.

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

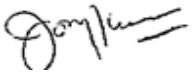
A. RECORD OF ENDORSEMENT[27] OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):

(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. Remy NDAGIJIMANA	Permanent Secretary	Ministry of Water, Environment, Land and Urban Planning	10/14/2014

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF policies[28] 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
Mr. Philippe R. Scholtès, Managing Director, Programme Development and Technical Cooperation Division - PTC, UNIDO GEF Focal Point		03/26/2015	Mr. Jossy Thomas, Project Manager, PTC/ENE/RRE	+43 -1-26026-3727	j.thomas@unido.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.

Not applicable

[27] 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.

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