



GEF-6 REQUEST FOR PROJECT ENDORSEMENT/APPROVAL

PROJECT TYPE: Medium-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 (select) (select)	GEF Agency Project ID:	140332
Other Executing Partner(s):	Ministry of Energy and Mines (MEM)	Submission Date:	06-21-2016
		Resubmission Date:	03-21-2017
GEF Focal Area (s):	Climate Change	Project Duration (Months)	48
Integrated Approach Pilot	IAP-Cities <input type="checkbox"/> IAP-Commodities <input type="checkbox"/> IAP-Food Security <input type="checkbox"/>	Corporate Program: SGP <input type="checkbox"/>	
Name of Parent Program	[Not applicable]	Agency Fee (\$)	149,640

A. FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES²

Focal Area Objectives/Programs	Focal Area Outcomes	Trust Fund	(in \$)	
			GEF Project Financing	Co-financing
CCM-1 Program 1	Promote Innovation, Technology Transfer and Supportive Policies and Strategies	GEFTF	1,575,155	6,530,000
Total project costs			1,575,155	6,530,000

B. PROJECT DESCRIPTION SUMMARY

Project Objective: To promote SHP for productive use and energy services						
Project Components/Programs	Financing Type ³	Project Outcomes	Project Outputs	Trust Fund	(in \$)	
					GEF Project Financing	Confirmed Co-financing
1. Human and institutional capacity building on SHP technology, energy policy and planning	TA	1.1.Improved knowledge base and strengthened national policy on SHP	1.1.1.Key policy makers and other stakeholders* (at least 30 in each group) trained 1.1.2.Institutional setup strengthened for sustainable management of mini-grids 1.1.3.Relevant institutions and national policy on SHP strengthened	GEFTF	90,000	120,000
2. Scaling up of SHP plants	Inv	2.1.Conducive environment created for scaling up of SHP plants	2.1.1.Detailed plant designs prepared for a cumulative capacity of 1 MW SHP plants	GEFTF	1,210,959	5,640,000

¹ Project ID number remains the same as the assigned PIF number.

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.

Project Objective: To promote SHP for productive use and energy services						
Project Components/ Programs	Financing Type ³	Project Outcomes	Project Outputs	Trust Fund	(in \$)	
					GEF Project Financing	Confirmed Co- financing
			2.1.2. SHP plants for a cumulative capacity of 1 MW established** 2.1.3. Centralized electronic monitoring and controlling system for decentralized SHP plants established			
3. Facilitation of replication projects	TA	3.1. Initiatives taken for the replication projects	3.1.1. SHP sites assessed for further replication 3.1.2. Detailed project report (DPR) and business plans developed for the replication projects to a cumulative capacity of 1 MW 3.1.3. Experience shared and information disseminated	GEFTF	91,000	210,000
4. Monitoring and Evaluation (M&E)	TA	4.1. Effectiveness of the outputs assessed, corrective actions taken and experience documented	4.1.1. End of project M&E report prepared (independent evaluation)	GEFTF	40,000	40,000
Subtotal					1,431,959	6,010,000
Project Management Cost (PMC) ⁴				GEFTF	143,196	520,000
Total project costs					1,575,155	6,530,000

* National experts, renewable energy (RE)/technical institutions, banks/financial institutions, engineering companies, interested project developers, NGOs/CSOs, etc.

** Part of GEF fund will be used to finance the cost of electro-mechanical equipment for the identified SHP sites

⁴ For GEF Project Financing up to \$2 million, PMC could be up to 10% 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. CONFIRMED SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE

Please include evidence for co-financing for the project with this form.

Sources of Co-financing	Name of Co-financier	Type of Cofinancing	Amount (\$)
Private Sector	Renewable Energy Development Company Limited (REDCO)	Investment	6,410,000
GEF Agency	UNIDO	Grants	50,000
GEF Agency	UNIDO	In-kind	70,000
Total Co-financing			6,530,000

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

GEF Agency	Trust Fund	Country Name/Global	Focal Area	Programming of Funds	(in \$)		
					GEF Project Financing (a)	Agency Fee ^{a)} (b) ²	Total (c)=a+b
UNIDO	GEF TF	Republic of Burundi	Climate Change	Not applicable	1,575,155	149,640	1,724,795
Total Grant Resources					1,575,155	149,640	1,724,795

a) Refer to the Fee Policy for GEF Partner Agencies

E. PROJECT'S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS⁵

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
1. Maintain globally significant biodiversity and the ecosystem goods and services that it provides to society	Improved management of landscapes and seascapes covering 300 million hectares	<i>hectares</i>
2. Sustainable land management in production systems (agriculture, rangelands, and forest landscapes)	120 million hectares under sustainable land management	<i>hectares</i>
3. Promotion of collective management of transboundary water systems and implementation of the full range of policy, legal, and institutional reforms and investments contributing to sustainable use and maintenance of ecosystem services	Water-food-ecosystems security and conjunctive management of surface and groundwater in at least 10 freshwater basins;	<i>Number of freshwater basins</i>
	20% of globally over-exploited fisheries (by volume) moved to more sustainable levels	<i>Percent of fisheries, by volume</i>
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)	<i>64,320 metric tons - direct and 126,144 metric tons-indirect</i>

⁵ Update the applicable indicators provided at PIF stage. 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.

Corporate Results	Replenishment Targets	Project Targets
5. Increase in phase-out, disposal and reduction of releases of POPs, ODS, mercury and other chemicals of global concern	Disposal of 80,000 tons of POPs (PCB, obsolete pesticides)	<i>metric tons</i>
	Reduction of 1000 tons of Mercury	<i>metric tons</i>
	Phase-out of 303.44 tons of ODP (HCFC)	<i>ODP tons</i>
6. Enhance capacity of countries to implement MEAs (multilateral environmental agreements) and mainstream into national and sub-national policy, planning financial and legal frameworks	Development and sectoral planning frameworks integrate measurable targets drawn from the MEAs in at least 10 countries	<i>Number of Countries:</i>
	Functional environmental information systems are established to support decision-making in at least 10 countries	<i>Number of Countries:</i>

F. DOES THE PROJECT INCLUDE A “NON-GRANT” INSTRUMENT? No

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

PART II: PROJECT JUSTIFICATION

FINDINGS DURING THE PPG PHASE

Private sector investment in energy project is very minimal in Burundi due to political instability and severe disruption of trade with regional markets. Also, the ongoing conflict has affected the development of the private sector and foreign investment, and the country depends on foreign aid to fund about 50 percent of its national budget⁶. Due to these conditions, identifying private investors willing to participate in the project as stated during the PIF stage has been challenging. However, a SHP developer Renewable Energy Development Company Limited (REDCO), active in Burundi, is willing to help the Government of Burundi mobilize investment funding required to develop the identified four sites with a total capacity of 1 MW during the PPG phase. MEM as the government ministry responsible for the development and implementation of energy projects will be the lead executing agency in collaboration with ABER and REGIDISO as executing partners.

A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN WITH THE ORIGINAL PIF⁷

The following are the major changes carried out in the CEO Endorsement document from the approved PIF.

S. No.	In the approved PIF document	In CEO document
1	Private investors were included for SHP scale up projects	A private SHP developer has been identified and is willing to assist the Government of Burundi to mobilize investment funding required to develop the identified four sites with a total capacity of 1 MW during the PPG phase.
2	Ministry of Commerce, Industry and Tourism (MCIT) was also included as executing partner.	Ministry of Energy and Mines is the only executing partner
3	Financial Scheme was included (project component 3)	Financial scheme is removed as all the scale up projects are expected to be installed by MEM
4	Institutional framework for strengthening of mini-grids was not considered exclusively.	Institutional framework for strengthening of mini-grids is included (project component 1)
5	Centralized monitoring and control system for decentralized SHP plants was not considered	Centralized monitoring and control system for decentralized SHP plants is included (project component 2)
6	The co-financing amount is USD 6.65 million	The co-financing amount has been revised to USD 6.53 million

The following changes were made in the project framework due to findings during the PPG stage. The changes are shown in the table below.

⁶ <http://globalriskinsights.com/2016/02/burundi-rwanda-tensions-may-lead-to-ethnic-conflict/>

⁷ For questions A.1 –A.7 in Part II, if there are no changes since PIF, no need to respond, please enter “NA” after the respective question.

Project Component		Expected Outcome		Expected Output		GEF Fund (USD)	
In the approved PIF	CEO Document	In the approved PIF	CEO Document	In the approved PIF	CEO Document	In the approved PIF	CEO Document
1. Capacity building and strengthening of national policy on SHP	Human and institutional capacity building on SHP technology, energy policy and planning	1.1. Improved knowledge base and strengthened national policy on SHP	Not changed	1.1.1. Trained key policy makers (at least 30) 1.1.2. Trained personnel from other target groups (30 in each group) 1.1.3. Strengthened national policy	1.1.1. Key policy makers and other stakeholders (at least 30 persons) trained 1.1.2. Institutional setup strengthened for sustainable management of mini-grids 1.1.3. Relevant institutions and national policy on SHP strengthened	190,000	90,000
2. Demonstration and scaling up of SHP plants	Scaling up of SHP plants	2.1. Technical and economic viability of SHP technology established	Conducive environment created for scaling up of SHP plants	2.1.1. Detailed plant designs prepared for proposed SHP plants (cumulative capacity of 1 MW) 2.1.2. SHP plants established for a cumulative capacity of 1MW 2.1.3. Feasibility studies and business plans developed for replication projects	2.1.1. Detailed plant designs prepared for a cumulative capacity of 1.0 MW SHP plants 2.1.2. SHP plants for a cumulative capacity of 1.0 MW established 2.1.3. Centralized electronic monitoring and controlling system for decentralized SHP plants established	500,500	1,210,959

Project Component		Expected Outcome		Expected Output		GEF Fund (USD)	
In the approved PIF	CEO Document	In the approved PIF	CEO Document	In the approved PIF	CEO Document	In the approved PIF	CEO Document
				(cumulative capacity of 0.7 MW)			
3. Sustainable financial scheme	Facilitation of replication projects	3.1. Improved investment environment	Initiatives taken for the replication projects	3.1.1. Financial scheme created	3.1.1. SHP sites assessed for further replication 3.1.2. Detailed project reports (DPR) and business plans developed for replication projects to a cumulative capacity of 1 MW 3.1.3. Experience shared and information disseminated	690,000	91,000
4. Monitoring and evaluation (M&E)	Not changed	4.1. Effectiveness of the outputs assessed, corrective actions taken and experience documented	Not changed	4.1.1. End of project M&E report prepared (independent evaluation)	Not changed	51,459	40,000

A.1. *Project Description*. Elaborate on: 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 area⁸ 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) innovativeness, sustainability and potential for scaling up.

Global Environmental Problems, Root Causes and Barriers

Burundi is a small, low-income, densely populated, landlocked country in East Africa. It has a population of 10.82 million (2014)⁹. Although the urban population has been growing rapidly in the past decade, about 90% of the population still lives in rural areas. The national annual per capita income is approximately USD 280, which is one of the lowest in the world. According to the African Development Bank (2010)¹⁰, 81.32% of the Burundi population is below the international poverty line of USD 1.25/day.

Energy sector

Though Burundi is a least developed country (LDC), its energy demand has been increasing steadily due to changes in the lifestyle and also due to increased use of modern amenities. The country's current electricity supply is not sufficient to meet the increasing energy demand. The energy consumption relies to a greater extent on biomass (Figure 1). This is due to the fact that high percentage of the population living in rural areas consumes wood as their primary source of fuel. The biomass usage is prominent in urban areas as well.

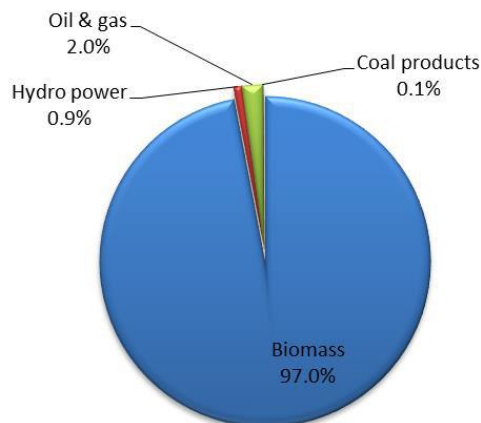


Figure 1: Primary energy balance in Burundi

Electricity scenario

Electricity generation in Burundi is mostly managed by the national water and electricity utility, Régie de Production et Distribution d'Eau et d'Électricité (REGIDESO). Also, many micro-hydropower plants are managed by Burundian Agency for Rural Electrification (ABER) and the private sector including the Burundi Tea Office and various religious missions.

The country has a cumulative installed capacity of less than 40 MW, of which, 33.84 MW is from the hydropower plants and the remaining is from diesel based thermal power plants. In addition, about 3 MW of electricity from Ruzizi I

⁸ 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..

⁹ <http://www.worldbank.org/en/country/burundi>

¹⁰ http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/The%20Middle%20of%20the%20Pyramid_The%20Middle%20of%20the%20Pyramid.pdf

hydro power plant, managed by the Congolese National Electricity Company (SNEL) and about 13.3 MW from Ruzizi II hydro power plant, managed by the International Society for Electricity in the Great Lakes Region (SINELAC) are imported to meet Burundi's electricity demand. Table 1 shows the installed hydro power capacity in the country as well as the imported hydro power to Burundi.

Table 1: Hydropower availability in Burundi

Name of the hydropower plant	Location	Installed capacity (MW)	Ownership authority
National electricity production			
Rwegura	Kayanza	18.00	REGIDESO
Mugere	Bujumbura	8.00	REGIDESO
Nyemanga	Bururi	2.88	REGIDESO
Ruvyironza	Gitega	1.50	REGIDESO
Gikonge	Muramvya	1.00	REGIDESO
Kayenzi	Muyinga	0.85	REGIDESO
Marangara	Kirundo	0.25	REGIDESO
Buhiga	Karuzi	0.24	REGIDESO
6 stand-alone hydropower plants	Various locations	0.47	ABER
12 private hydropower plants(off-grid)	Various locations	0.65	Private (including The Burundi Tea Office and religious missions)
Total installed capacity		33.84	
National electricity imports			
Ruzizi I	Burundi – DRC	3.00	SNEL
Ruzizi II	Burundi – DRC – Rwanda	13.30	SINELAC
Total imports		16.30	
Cumulative capacity		50.14	

Figure 2 shows the percentage of electricity access in Burundi compared to the other countries in Sub-Saharan Africa (2013). REGIDESO alone serves about 76,000 customers, and 64% of them are located in and around Bujumbura, the capital of Burundi. Electricity supply from REGIDESO is often intermittent coupled with voltage fluctuations. REGIDESO has estimated that 60% of the available grid requires rehabilitation to meet the interconnection standards of

the East African Power Pool. To boost the REGIDESO supply for catering to the energy demand during peak hours, about 10 MW diesel generators were acquired by the Government in 2013¹¹.

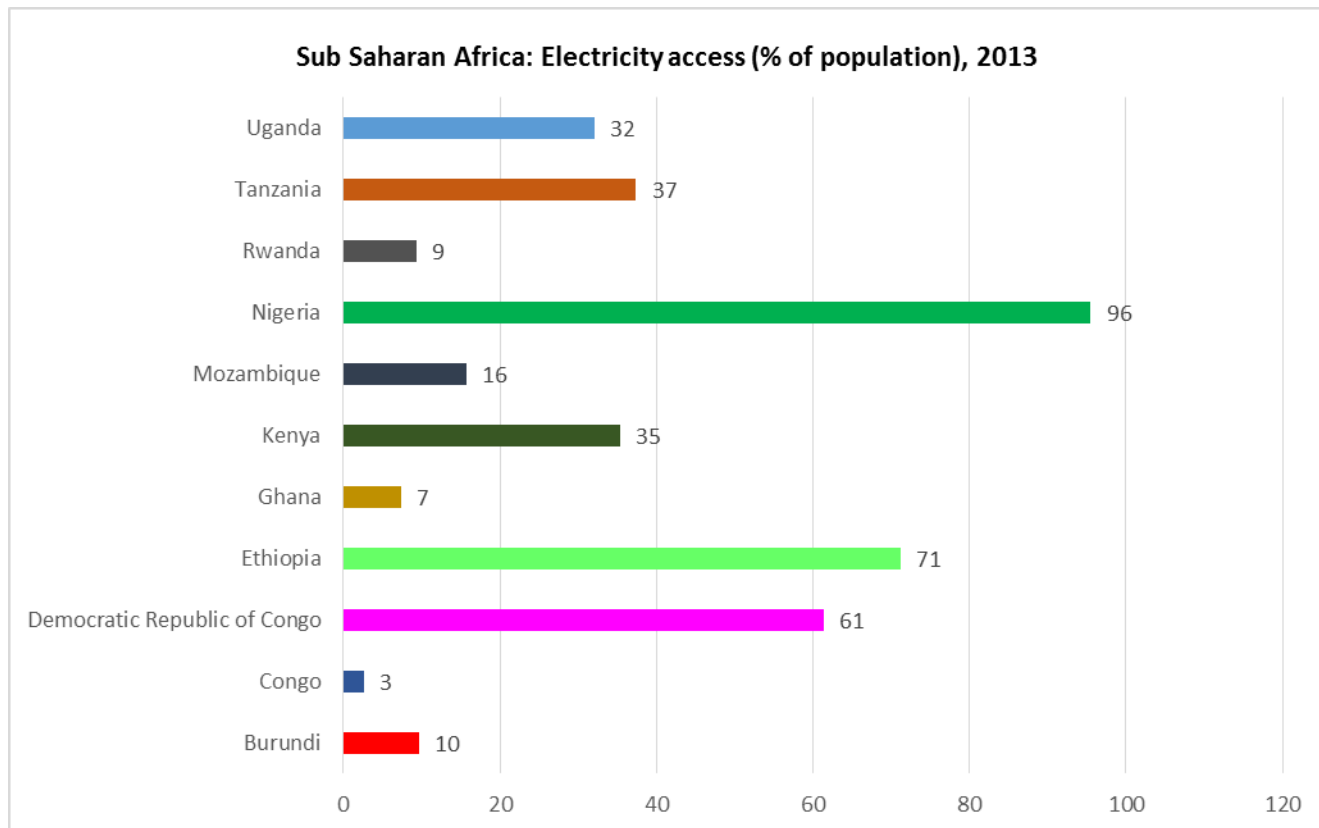


Figure 2: Electricity access in Sub-Saharan Africa (2013)¹²

Figure 3 shows the indigenous electricity generation, import and consumption in Burundi for the year 2014¹³.

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, 27 March 2014

¹² IEA, World Energy Outlook 2015 SE4ALL Baseline Report (2013)

¹³ <http://www.indexmundi.com/g/g.aspx?v=83&c=by&l=en>

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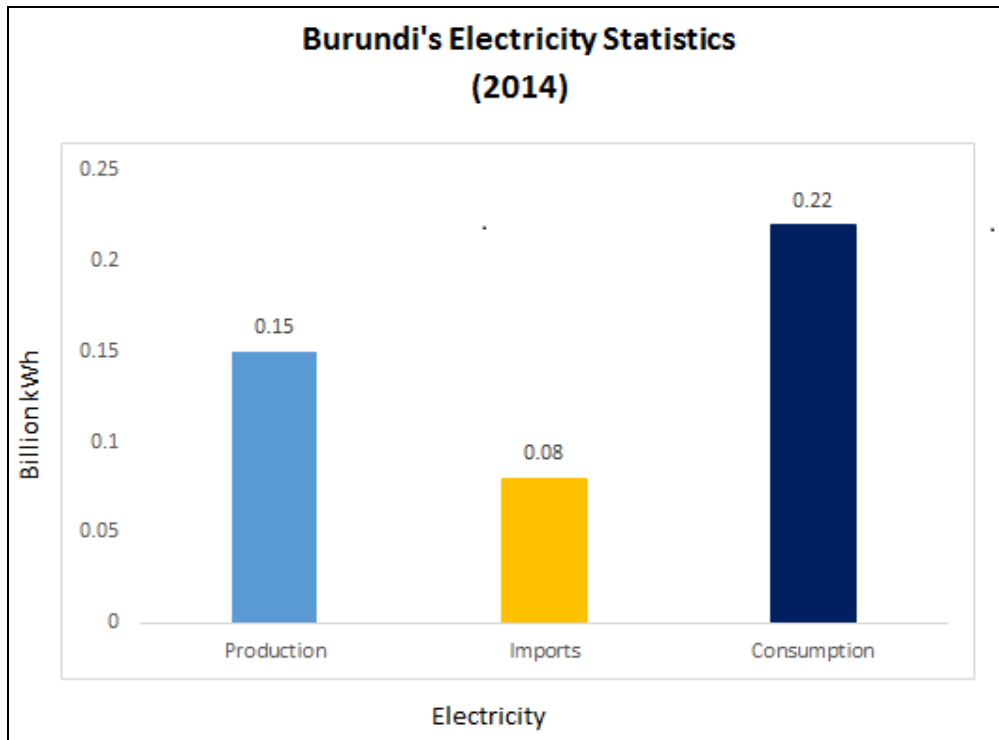


Figure 3: Electricity statistics of Burundi (2014)

Table 2 shows the ranking of Burundi with respect to electricity sector among other countries (2012)¹⁴

Table 2: Ranking of Burundi in the electricity sector

Electricity aspect	Ranking out of 200 countries (2012)
Production	185
Consumption	183
Exports	114
Imports	93
Installed generating capacity	185

Peak demand in the country is projected to grow from 46 MW in 2012 to 92 MW by 2018 and 192 MW by 2025 under a base case of 10% annual demand growth scenario¹⁵.

The economy is largely based on coffee (the country's chief export) followed by cotton and tea. Other agricultural commodities produced in the country include sugar, corn, sorghum, sweet potatoes, banana, tapioca, beef, milk, hide, livestock feed and rice. The industrial firms in Burundi mainly manufacture agro-based consumer products (tea, coffee, etc.) and process cotton. The growth of these process industries is severely hampered due to the shortage of electricity.

¹⁴ <https://www.cia.gov/library/publications/the-world-factbook/geos/by.html>

¹⁵ 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

Most industries are forced to install backup diesel generators for their operations. As a result, it affects the economy and operation of the industries. Industries are the lead emitters of greenhouse gases (GHG). According to the economic growth estimates, the energy demand would be approximately 100 MW in 2020 even with the current low consumption levels in industries. This indicates the demand and need for electricity to enhance the economic activities in the country.

Impacts of energy sector development on climate change

In order to meet the growing energy demand and support the economic development activities in the country, it is estimated that the power generation must be increased from the current 40 MW to 700 MW by 2030.¹⁶ When the consumers are not provided with access to electricity, then the only option they have for meeting their demand is to use diesel power generators. In 2010 and 2011, due to the substantial energy deficit in Burundi, the REGIDESO had to lease a diesel generator of 10 MW¹⁷. More recently, and in the face of the increasing supply deficit, the Government has decided to operate the diesel power generator systems as a complement to insufficient hydropower supply and to assist REGIDESO in meeting the plant's high operating expenses. Stand-alone diesel generator sets are also used in hotels, lodges or public institutions (military camps, hospitals, schools, etc.) and rich individual households¹⁸. These diesel-based systems emit a large quantity of GHGs which are major contributors to global warming. Hence, it is evident that there is a need to reduce the dependency on diesel-based generators to avoid its adverse effect on the climate.

Alternatively, the 300 MW untapped hydro potential in the country which is economically exploitable, could be developed. Hydro power plants are environmentally friendly and lead to a low carbon or no carbon pathway to development. Decentralized hydropower generation will boost access to electricity and reduce the dependence on diesel based systems. Thus, the hydro power based mini-grids are one of the promising options for meeting the country's energy strategic plan targets. More details of Burundi's hydro potential sites and present availability of hydropower are stated under baseline scenario and baseline project.

Baseline scenario and baseline project

Baseline scenario

Burundi is endowed with vast river resources such as Malagarasi and Ruzizi that stretch over a distance of 475 km and 117 km, respectively. The potential for energy generation from hydropower is about 300 MW¹⁹. So far, only about 10% of the potential has been exploited.

In Burundi, out of all forms of energy potential, hydroelectricity ranks the highest (98.08%²⁰) and the technology is a proven one and is easier compared to other renewable systems like solar (expensive) or biomass (requires a high level of technology, skill, operations and maintenance). Also as discussed above, Burundi has high generation potential from hydro, which is still unexploited. Hence, small hydro power (SHP) technology has been proposed to increase its energy supply and productive use as a means of generating economic activities as well as increasing the electrification rate in the country. A cost benefit analysis on small hydro power plant technology as proposed in this project is provided in Annex J.

Civil conflicts in the 1990s had prevented the development of the country's electricity generation infrastructure. It was planned that investments will be made in new hydropower plants every ten years, but no such investment was made over the last decades. The ongoing conflict has affected the development of the private sector and foreign investment, and the country depends on foreign aid to fund about 50 percent of its national budget²¹. Since there is no private sector participation in development projects, there is no technical capacity or skilled resources available for the energy sector

¹⁶<http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/An%20Infrastructure%20Action%20Plan%20for%20Burundi%20-%20Main%20Report%20v1.2.pdf>

¹⁷ Investment opportunities in renewable energy Burundi, Minister for Energy and Mines, 2012

¹⁸ https://energypedia.info/wiki/Burundi_Energy_Situation#REGIDESO

¹⁹ <http://www.undp.org/content/dam/burundi/docs/publications/Investment%20opportunities%20in%20renewable%20energy%20Burundi.pdf>

²⁰ <https://www.recep.org/burundi-2012>

²¹ <http://globalriskinsights.com/2016/02/burundi-rwanda-tensions-may-lead-to-ethnic-conflict/>

in the country. All of the power generation for public utilization is from available government power plants only. Thus, there is a lack of contribution from the private sector towards the development of energy sector in the country.

Apart from technical management, the complex nature of the energy sector further hinders the growth of electrification and in turn the SHP development. Overlapping responsibilities between the ministries such as the Ministry of Energy and Minerals, the Ministry of Communal Development and the Ministry of Finance (which is responsible for investment planning and coordination with foreign donors), slows down the growth process of SHP²². “Law of 27 April 2015, reorganizing the electricity sector in Burundi” proposed that policy regulations would be devised in future to promote Public-Private Partnership (PPP) in the energy sector. Accordingly, regulatory agency has been set up through Law of 06 January 2016 for support of PPP in the country.

Burundi’s energy sector is currently under-developed, which means that there are considerable opportunities for investment and improvement. Burundi’s hydro power production costs are among the lowest in the region. The average production cost for the energy mix is consequently estimated to be 0.062 USD/kWh for 2012²³.

In December 2013, World Bank approved USD 100 million to install two hydropower plants in Jiji and Mulembwe with 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 the other main towns in Burundi. It will also finance the infrastructure for supplying electricity to the local communities in the vicinity of the power plants.

At the regional level, electricity generation projects Ruzizi III (145 MW) and Rusumo Falls (80 MW) are currently under development. These two regional hydro power generation projects, in which Burundi has a stake (along with the associated transmission lines), are expected to be commissioned in 2018 and 2020, respectively. However, these are large-scale hydro power plants. Table 3 shows the initiatives on hydro power projects currently under development in Burundi.

Table 3: Hydropower plant initiatives²⁴

S. No.	Hydropower projects	Capacity (MW)	Current status	Expected year of installation
National projects (under development)				
1	Mpanda	10.40	Civil construction works completed.	2016
2	Kabulantwa	20	Civil construction works initiated.	2017
3	Kagunuzi	12	PPP contract is signed for 25 years ²⁵	-
Regional projects (under development)				
4	Ruzizi III	147	Detailed feasibility study under progress	2018
5	Ruzizi IV	285	Detailed feasibility study under progress	-
6	Rusumo falls	80	Detailed feasibility study under progress.	2019

²² 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.

²³ <http://www.bi.undp.org/content/dam/burundi/docs/publications/Investment%20opportunities%20in%20renewable%20energy%20Burundi.pdf>

²⁴ <http://www.undp.org/content/dam/burundi/docs/publications/Investment%20opportunities%20in%20renewable%20energy%20Burundi.pdf>

²⁵ <http://kagu006.com/category/news/>

S. No.	Hydropower projects	Capacity (MW)	Current status	Expected year of installation
			Finance has been identified	
National projects (under financial negotiations)				
7	Mulembwe	17.10	Final project design studies going on	2017
8	Jiji	32.50	Final project design studies going on	2017
9	Ruzibazi	15.00	Waiting for approval of funds	-
National Projects (pre-feasibility studies done by SOGREAH)				
10	Gitenge	9.30	Finance approved. Detailed feasibility study under progress.	-
11	Kabulantwa	21.90		
12	Kitenge	15.30		

Government initiatives

The Government of Burundi has developed a strategy to enhance the development of renewable energy sources in the country until 2025 namely,

National strategy for electricity access, 2012 aims at: (i) developing least cost national resources for grid and off-grid based power supplies (ii) progressing towards universal access as per SE4All and (iii) using the public sector fund to leverage the private sector financing towards generation and distribution. The strategy proposes measures ranging from accelerating the implementation of national and regional hydropower projects, development of hydropower sites of size less than 20 MW by private investors, developing off-grid lighting (pre-electrification) for rural areas and promoting energy efficiency.

For the forthcoming years, the Government of Burundi is planning to carry out the following activities in the energy sector:

- a) Double the generating capacity of Nyemanga (2.8 MW) and Buhiga hydroelectric power stations (1 MW);
- b) Conduct feasibility studies for Kaganuzi (5 MW) and Mpanda (10.4 MW) and also develop these sites;
- c) Increase the rural electrification rate by installing SHP plants;
- d) Refurbish the existing hydroelectric power stations, electricity transmission and distribution networks and
- e) Rehabilitate the non-functioning SHP plants.

Baseline project

Based on 2012 bibliographical study²⁶ and pre-diagnostic analysis of Burundi's hydropower potential, Ministry of Energy and Mines (MEM) in collaboration with the Belgian Technical Cooperation stated that Burundi has at least 156 potential hydro power sites with a cumulative generating capacity of 1,700 MW. These are untapped until now and out of the total, 300 MW is economically exploitable. World Small Hydropower Development Report, 2013 reported that the total SHP potential in Burundi is around 54 MW (figure 4)²⁷.

²⁶ Burundi, Ministry of Energy and Mines (2012). Investment Opportunities in Renewable Energy Burundi. Buyumbura

²⁷ World Small Hydropower Development Report 2013 for Burundi, UNIDO & ICSHP
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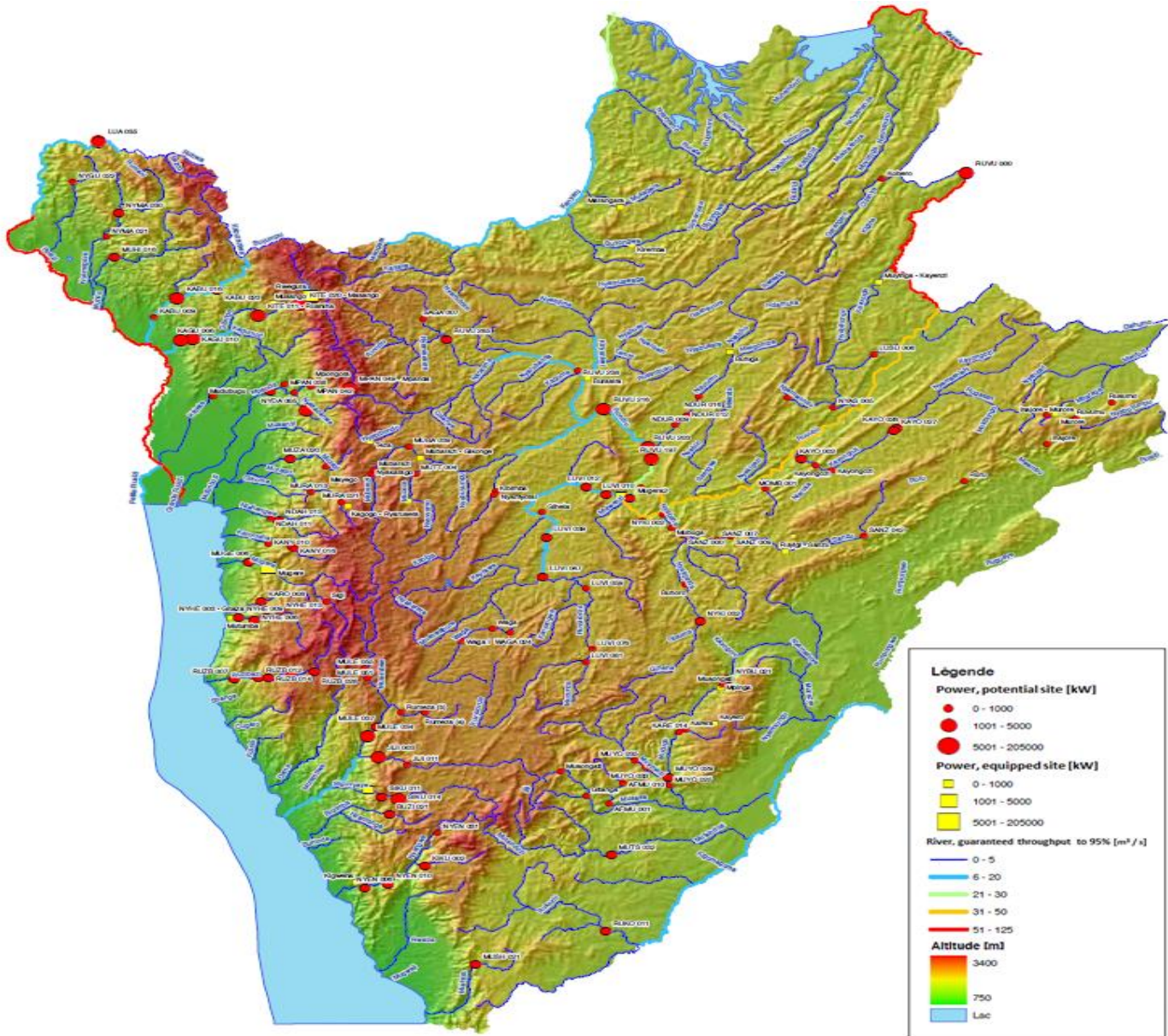


Figure 4: Potential hydro power sites in Burundi

As of now, Burundi has only 15.84 MW of installed SHP (figure 5). ABER operates six small and micro-hydro plants in rural areas, while the NGOs and other private organizations operate another 12 micro hydro plants²⁸. UNIDO, in collaboration with MEM, is implementing a 300 kW SHP project in Burundi. Construction of the SHP plant has been completed and mini-grid construction work is going on.

²⁸ African Development Bank (2009). An Infrastructure Action Plan for Burundi: Accelerating Regional Integration. Tunis-Belvédère. Available at www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/An%20Infrastructure%20Action%20Plan%20for%20Burundi%20-%20Main%20Report%20v1.2.pdf

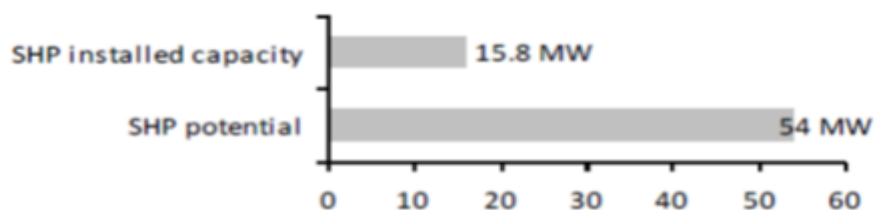


Figure 5: Potential and installed SHP capacities in Burundi²⁹

An ongoing World Bank project includes pre-feasibility and feasibility studies of potential hydropower sites with capacities ranging between 1 MW and 7.5 MW. It is assumed that these potential sites could be realized in approximately two years, considering that no major dam construction is required. SHP is the most suitable for connecting to the existing grids and providing electricity to remote areas. Given their smaller sizes, the storage of water associated with these plants will have a significantly smaller environmental impact.

A list of potential sites for SHP was selected by Ministry of Energy and Mines using “ATLAS HYDROÉLECTRIQUE DU BURUNDI” which was developed by the Ministry in September 2013, by considering various factors such as, physical characteristics (flow, head, duration, etc.), catchment analysis, financial viability, socio-economic impacts, etc. But further development of the projects is hampered by a lack of finance and technical support. Table 4 shows the list of few potential sites and their estimated capacities as suggested by the Ministry to UNIDO for SHP development in Burundi.

Table 4: Potential SHP sites and their capacities

S. No.	Name of the water course	Project location	Estimated power generation potential, kW
1	Gikuka	Gitaba, Vugizo commune, Makamba Province	200
2	Mubarazi	Burasira, Ruhororo commune, Ngozi Province	160
3	Muyovozi	Karindo, Rutana commune, Rutana Province	250
4	Nyabaha	Murirwe, Gitega commune, Gitega Province	350
5	Nyamwondo	Nyamwondo, Mwakiro commune, Muyinga Province	150
6	Waga	Bihomvora, Bisoro commune, Mwaro Province	150
7	Ryarusera	Muranvya commune, Muranvya Province	35
8	Kigwena	Rumonge commune, Bururi Province	65
9	Butezi	Butezi commune, Ruyigi Province	200
10	Nyabikere	Nyabikere commune, Karuzi Province	140
		Total	1,700

²⁹ World Small Hydropower Development Report (2013)
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Taking note on synopsis of these initiatives, UNIDO conducted a pre-feasibility study during PPG stage at these ten sites to verify the estimated power potential at these sites in April 2016. The study estimated that there is good potential for small hydro power generation of 20 - 500 kW in these locations. During the visit, it was found out that some of the sites have been already installed with SHP plants, but were out of operation due to various reasons. A significant difficulty faced by these sites was that, either identified small hydro sites did not have sufficient load centres or the load centres were too far away.

The study also identified some existing barriers for SHP technology in the country. The institutional support is nearly non-existent and the different ministries have many overlapping areas. It is also noted here that all the grid connected power plants are public owned plants only. And as such, there is no hydropower policy in the country on generation licenses, power purchase agreements (PPA), grid connection, wheeling, etc. Lack of effort is also identified at all levels for local capacity development both in on site assessments and manufacture of SHP technology.

In summary, the baseline project activities show that there are serious efforts going on to increase utilization of hydropower in Burundi. The proposed project could use this momentum to achieve its objectives and targets effectively. Though baseline project activities are focussed on hydropower plants more than 1 MW capacity, the proposed project could benefit from the lessons learnt, challenges faced and gaps in technical capabilities in the implementation of hydropower projects in the country. Thus, the baseline projects indicate a positive influence on the proposed project activities.

Barriers in implementation of SHP plants:

Maximum utilization of SHP potential has not taken place in Burundi due to the following barriers:

- Insufficient awareness and technical capacity in the area of SHP technology;
- High equipment transportation (either from Kenya or Tanzania) and installation costs;
- Inadequate hydrological data;
- Lack of interest among the financial institutions to lend for SHP projects;
- Overlapping responsibilities among the following ministries, Ministry of Water, Environment, Land and Urban Planning; Ministry of Communal Development and Ministry of Finance³⁰;
- No sufficient load centres or load centres too far away from potential SHP sites;
- High cost of transmission lines;
- Absence of hydro power policy on generation licenses, Power Purchase Agreement (PPA), grid connection, wheeling, etc.
- Lack of after-sale services and spare parts availability.

In view of the above barriers, there is a need for efforts from all the relevant stakeholders in order to achieve the Government targets. The proposed project therefore will (i) address the electricity supply deficit in Burundi, (ii) promote decentralized electricity generation and distribution by focusing on the promotion of micro/mini grids that provide access to small and medium sized industries and thereby benefiting the rural communities.

Proposed alternative scenario and project

The proposed GEF project will be strategic in contributing to the twin goals of ending extreme poverty and boosting shared prosperity through the productive use of the energy generated. The proposed project aims at promoting and replicating mini-grid based SHP plants for productive use. UNIDO will build on and sustain its achievement so far in SHP development in the region while promoting the development of the 54 MW SHP potential available in the country. The proposed project will promote UNIDO's Inclusive and Sustainable Industrial Development (ISID) mandate as well as Sustainable Development Goals (SDGs) 7 & 9. Furthermore, UNIDO's substantive departments such as Agro

³⁰ 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.
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Business Development Department, Business Investment and Technology Services Department, etc. will be actively involved in developing economic activities in the beneficiary communities to achieve the SDGs as part of its country programme.

Without the GEF intervention and elimination of the identified barriers, the trend will be to opt for diesel-based power generation systems in the country, with little or no significant improvement. Fossil fuel-based energy consumption and GHG emission will continue to increase.

The project

The project is designed with three project components and the outcome, output and activities under each of the components are described below:

Project Component 1: Human and institutional capacity building on SHP technology, energy policy and planning

This project component envisages (i) building the capacity of both the human and the institutions on SHP technology and (ii) adopting and strengthening existing policy framework on power generation for promoting SHP technology. The strengthened policy will be used as the basis for promoting the development of the potential SHP sites. Timeframe and targets will be clearly defined and used as a monitoring tool for the strengthened policy. MEM and identified national institutions such as ABER will be fully involved in the capacity building activities. MEM and ABER will be equipped with sufficient capacity building and resources to carry out the training activities even after the completion of this project. Under this project component, capacity development will be carried out as follows:

Outcome: 1.1. Improved knowledge base and strengthened national policy on SHP

The project will work closely with relevant governmental agencies in creating awareness of electricity generation through decentralized SHP systems using training programmes and information dissemination mechanisms using successful projects in the region, guide books and strategies on SHP development as well as operation to achieve the outcome. This will benefit the users/utilities such as, Non-Government Organization (NGOs)/Civil Service Organizations (CSOs), community groups, individual firms, government agencies, industries, etc. who would want to develop SHP plants.

Output 1.1.1: Key policy makers and other stakeholders³¹ (at least 30 in each group) trained

Capacity will be developed to 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 on handling the policy aspects will be provided during the project period.

Apart from the policy makers, this project will include the stakeholders for capacity building on SHP technology. It is proposed that at least 30 individuals from the Renewable Energy (RE)/technical institutions will be trained for SHP development; at least 30 individuals from banks and financial institutions will be trained in assessing/conducting due diligence on the SHP projects. Training to banks/financial institutions will be conducted at the earliest as a priority to enhance their knowledge level and build up their confidence on SHP projects. This will be useful mainly to promote private investors in SHP, mainly for promoting the off-grid or mini-grid supply. These trainings will also address issues on how SHP plants can be developed environmentally friendly taking into consideration fish passages, transmissivity for organisms and sediments during the design stage. Focus will be on fish by passes and use of tube weirs, which allow the flushing of sediment when rivers are in flood condition.

³¹Interested project developers, national experts, renewable energy (RE) / technical institutions, banks / financial institutions, engineering companies, NGOs/CSOs, etc.

Materials for awareness raising will be developed and used accordingly. Training for various target groups such as local engineering and operation & maintenance (O&M) institutions will be provided (at least 30 individuals) to facilitate sustainable operation of the scale-up and replication projects.

Output 1.1.2: Institutional setup strengthened for sustainable management of mini-grids

Inadequate institutional arrangements will hamper the scaling up of SHP based mini-grids which in turn results in poor access to reliable and affordable electricity. This GEF project will improve capacity of ABER and REGIDESO for effective and sustainable management of mini-grids. The proposed project will organize various activities that will include the clear identification of roles of ministries/organizations responsible for mini-grids and transmission of electricity, development of standards and guidelines for installations, streamlining of licensing and approval process and implementation of best practices in operation, maintenance and continuous monitoring of mini-grids. It will also include development of plan for centralized monitoring system of small decentralized power plants in remote areas through modern information and communication technology systems.

Output 1.1.3: Relevant institutions and national policy on SHP strengthened

During the PPG stage, the current policy and legal/regulatory framework for SHP technology has been reviewed, including the available policy instruments. Since all the existing grid connected power plants in the country are only government owned, there is no Feed-in-Tariff policy as of now. Based on this analysis, a policy summary report will be prepared including a recommendation for an improved policy and strengthening of institutions for facilitating SHP business in the country during the implementation phase. Capacity of ABER and REGIDESO will be strengthened to develop and manage a large network of decentralized mini-grid network of SHP plants in the country.

Impact of the intervention

From the outcome of this project component, it is expected that the following barriers are removed:

Barriers/Challenges	How it is addressed
Insufficient awareness and stakeholder participation	Training activities and information dissemination through various tools
Inadequate knowledge, technology and skill availability for implementing the SHP projects	Training to: <ul style="list-style-type: none"> • Key policy makers • Government officials • National experts • RE/technical institutions • NGOs/CBOs • Local engineering companies • Interested project developers • Banks/financial institutions
Inadequate local technical capacity for sustainable operation and maintenance	Training to: <ul style="list-style-type: none"> • Local engineering companies • Local O&M companies

Barriers/Challenges	How it is addressed
Inadequate institutional capacity for sustainable management of mini-grid	<ul style="list-style-type: none"> • Strengthening of institutions such as REGIDESO and ABER for sustainable management of mini-grids • Establishing centralised monitoring system for mini grid projects

Project component 2: Scaling up of SHP plants

Under this component, the GEF grant will be used for technical assistance will be provided for the scale-up projects for a cumulative capacity of at least 1.0 MW towards the development of business plans and detailed technical plant designs of the identified SHP sites. Pre-feasibility study for the potential sites was conducted during the PPG stage. The pre-feasibility study report of the identified SHP sites is provided as Annex G of this document.

Outcome: 2.1. Conducive environment created for scaling up of SHP plants

Some of the significant barriers in scaling up of SHP plants are insufficient technical capacity and overlapping functions of relevant ministries. This outcome will primarily focus on creating a conducive environment for scaling up SHP plants through the availability of technical capacity of MEM and ABER. This outcome will benefit from the capacity building activities of component one.

Output 2.1.1: Detailed plant designs prepared for a cumulative capacity of 1.0 MW SHP plants

Detailed technical designs and business plans will be prepared during the implementation stage. The reports 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 associated mini-grid system.

An in-depth sustainability assessment will be conducted at the project sites to measure social, economic, environmental and technical aspects (e.g., productive activities, environmental co-benefits, socio-economic impacts, hydrological parameters, silt load, etc.).

Output 2.1.2: SHP plants for a cumulative capacity of 1.0 MW established

A portion of the GEF grant will be used to provide subsidy towards the electro-mechanical equipment for the selected SHP sites of at least 1.0 MW cumulative capacity. The selected projects will be developed completely through public sector investment. The co-financing contribution from the Ministry will be used to execute the civil works and transmission/distribution lines for the selected sites. The generated power will be transmitted and distributed through the mini-grids developed in the adjacent load centres. The lessons learnt would be widely disseminated. Table 5 shows the list of identified sites and their estimated capacities to be developed (subject to detailed studies and technical analysis) under this proposed project.

Table 5: Identified SHP sites for scale up

S. No.	Name of the water course	Project location	Estimated power generation potential, kW	Areas to be electrified
1.	Waga	Bihomvora, Bisoro commune, Mwaro Province	240	Kanka, Masango, Nyarasange
2.	Gikuka	Gitaba, Vugizo commune, Makamba Province	500	Mpinga, Kavyiru, Gishiha, Vuzigo and Vuzigo market
3.	Muyovozi	Karindo, Rutana commune, Rutana Province	180	Musongati and Kayero
4.	Nyamwondo	Nyamwondo, Mwakiro commune, Muyinga Province	100	Gisimbawaga and Mwakiro
	Total		1,020	

Output 2.1.3: Centralized electronic monitoring and controlling system for decentralized SHP plants established

An automated electronic monitoring and control system will be installed in each of the installed SHP plants under the proposed project. This system will include an integrated automatic control unit which supervises and collects the data automatically from the turbine, generators, transmission lines, mini-grids, etc. through the sensors connected. Data logging at SHP plants will have complete information of power generation, power output, water level, speed of electro-mechanical equipment, plant operation/shutdown, frequency, voltage, pressure, transmission lines, fault at the power plant, weather forecast, etc.

A standardized central monitoring and control unit will be developed with functions (including frequency of data gathering, time stamping, alarming, etc.) for efficient communication from different control units of SHP plants installed at different locations, which serves as a single data acquisition. This centralized monitoring and control unit will be maintained by MEM.

Impact of the intervention

The expected output and outcome of the component 2 will mitigate the following barriers:

Barriers/Challenges	How it is addressed
Lack of information sharing on the existing projects	<ul style="list-style-type: none"> • Scaling up of SHP projects. More projects means, more information available for sharing through leaflets, websites, etc. • Information sharing through site visits and workshops.
Inadequate local technical capacity for sustainable operation and maintenance	Training to: <ul style="list-style-type: none"> • Local engineering companies • Local O&M companies / institutions

Barriers/Challenges	How it is addressed
High costs of installing the systems	Successful scale up projects will lead to: <ul style="list-style-type: none"> • Replication of the technology within the country will induce healthy competition in the market, thereby reducing the costs. • Transfer of technology will reduce the project cost.
Lack of monitoring and control system for decentralized SHP plants	Development of centralized electronic monitoring and control systems for the SHP plants

Project Component 3: Facilitation of replication projects

The proposed project will focus on various initiatives to support further replication projects.

Outcome: 3.1. Initiatives taken for the replication projects

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. The outcome will seek synergy and coordination with the Greening the Tea Industry in East Africa (GTIEA) initiative and replicate it in Burundi's tea industry. The focus will be on further replication of SHP for productive use after the successful implementation of the scale up projects.

Output 3.1.1: SHP sites assessed for further replication

Based on successful implementation and lessons learnt from the proposed SHP plants, an assessment of other potential sites and availability of load centres will be done in order to identify further replication projects in the country. The outcomes of the assessment will be shared with MEM. The replication projects will be executed through public investment or public-private partnerships or private investments, as applicable, based on future developments in SHP policy, Feed-in-Tariff structure, interests of private investors, etc. Other aspects of grid expansion, electrification rate, development of load centres, etc. will also be taken into consideration in this assessment.

Output 3.1.2: Detailed project report (DPR) and business plan developed for the replication projects to a cumulative capacity of 1.0 MW

Detailed project reports (DPR) will be prepared for the sites identified for replication in the country. The DPR will focus on the precise power generation potential and any existing infrastructure available in the sites. Appropriate business plan for development of these sites will also be formulated for a cumulative capacity of 1.0 MW.

These activities will boost confidence in SHP technology and encourage replication projects through the establishment of new SHP sites. This output will also link up with the GTIEA initiative implemented by UNEP and the African Development Bank. The GTIEA aims at investing in SHP to reduce energy costs in tea production. Currently, six SHPs are running in four East African Tea Trade Association (EATTA) countries with capacities of 10 MW each. However, these initiatives have not been implemented in Burundi.

Output 3.1.3: Experience shared and information disseminated

After successful commissioning of proposed SHP sites under 2.1.2, project 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 collected 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.

Impact of the intervention

As a result of this component, it is expected that the following barriers will be addressed:

Barriers/Challenges	How it is addressed
Lack of information on potential sites	<ul style="list-style-type: none"> • Feasibility studies and business plan developed will provide required information on potential sites for further replication of SHP projects. • Information sharing through site visits, workshops.
High costs of installing the systems	Successful scaling up of SHP plants will lead to: <ul style="list-style-type: none"> • Replication of the technology within the country which in turn will induce healthy competition in the market, thereby reducing the costs. • Transfer of technology which in turn will reduce the project cost.

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

The monitoring of project progress is essential for the adequate and timely delivery of results. This project component covers project monitoring and oversight by UNIDO in close coordination with MEM and other relevant government agencies. Initial activities under this component include the organization of an inception workshop, the definition of progress and impact indicators and the design of a detailed monitoring plan and methodology. Particular attention will be paid to gender aspects and it is anticipated that a gender analysis will be carried out during the inception phase to facilitate gender mainstreaming throughout project implementation.

Outcome: 4.1. Effectiveness of the outputs assessed, corrective actions taken and experience documented

Methodologies and tools developed during the project implementation will be documented; the collated information will be used for better planning and decision making.

Output 4.1.1: 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. 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. The final evaluations will be carried out by the independent M&E experts.

Incremental/Additional cost reasoning

As of now, the deficit in the electricity supply-demand is met through the diesel engines. Hence, the basis of incrementality is the diesel replacement³². GEF funding will be used for meeting the incremental cost of replacing 1.0 MW of diesel-based systems with equivalent SHP systems.

The overall investment cost for the proposed scale-up projects is around USD 6.85 million. When compared to the baseline diesel generator investment, this results in an incremental cost of approximately USD 6.05 million. GEF provides a grant of around USD 1.2 million which is approximately 20% of the total incremental cost.

Table 6 shows the scenario before and after the project. It indicates the increment of the project. This increment can be practically realized to the fullest extent only with the GEF/UNIDO intervention. In the absence of the GEF project, the existing scenario would have improved only to a smaller extent which may have included a few SHP projects. But these efforts without any proper planning for sustainability and replicability would not have an impact similar to that of the proposed GEF project. The proposed projects are designed not only to demonstrate the viability of SHP technology but also to provide a framework for replication in other parts of Burundi.

Table 6: Pre and Post Project Scenarios

Scenario before the project	Scenario after the project
Low human and institutional capacity on SHP technologies.	Improved human and institutional capacity.
Low level of confidence in carrying out SHP technology and investing in SHP projects.	Improved confidence in investing for the SHP projects and adopting the SHP technology.
Low awareness on SHP technologies.	Training and awareness creation on SHP technologies provided to key stakeholders.
Low level use of hydro resources in Burundi.	Improved hydro resource utilization for electricity generation.
Usage of diesel for electricity needs.	The diesel usage for electricity generation is avoided. It is expected that 1.0 MW of electricity from the scale up projects will reduce the diesel usage by approximately 1.1 million litres/year directly ³³ . Also, through replication projects for an additional capacity of 3.0 MW, approximately 4.4 million litres/year of diesel will be avoided indirectly.

Global environmental benefits

The established SHP plants will result in the avoidance of CO₂ emissions directly as well as indirectly and will improve the electricity supply situation in the country through the installation of 1 MW SHP plants. Approximately 64,320 tCO₂e will be abated directly throughout their lifetime of 20 years³⁴. It is expected that the induction of market transformation through demonstration projects and other initiative activities carried out (for further 1 MW replication in project component 3) during this project will help to develop replication projects of an additional capacity of 3 MW within a time span of maximum ten years after the project. This will lead to the avoidance of 126,144 tCO₂e emissions

³²Diesel generator's approximate investment cost considered is USD 800,000 per MW

³³ Assuming litre of diesel generates 3.6 kWh of electricity.

³⁴ Assuming a plant load factor of 45% and an emission factor of 0.8 t CO₂e (diesel generator replacement)

indirectly. The overall emission reduction to be derived from the intended projects is estimated based on “Manual for Calculating GHG Benefits of GEF Projects Renewable Energy Projects”³⁵, see Annex L:

- Diesel electricity³⁶ is taken as the baseline (emission factor of 0.8 t CO₂/MWh is considered)³⁷
- Emission reduction potential from the intended projects is presented in table 7.

Table 7: Emission reduction potential from the intended projects

S. No.	Name of water course	Demonstration capacity (kW)	Annual electricity generation (MWh/year)	Annual (tCO ₂ e) reduction
1.	Waga	240	946	756
2.	Gikuka	500	1,971	1,577
3.	Muyovozi	180	710	568
4.	Nyamwondo	100	394	315
	Total	1,020	4,021	3,216

Note: Demonstration capacity figures are taken from the pre-feasibility study conducted during the PPG phase.

The total GEF resources of around 1.58 million will be used to mitigate CO₂ emission at a rate of USD 24.5/tCO₂ directly and around USD 12.5/tCO₂ indirectly.

As per Intended Nationally Determined Contribution (INDC)³⁸, Burundi has set a target of 1,958 million tons of CO₂ emission reductions by 2030. The proposed project will contribute a total of 64,320 tons of CO₂ emission reductions directly towards achieving the above target.

Innovativeness, Sustainability and Potential for Scaling up

Innovativeness

The installed capacity of SHP technology in Burundi is of approximately 15.8 MW, which accounts to only 30% of the SHP potential of 54 MW in Burundi. This indicates that still 70% of resources for SHP technology remain unexploited in Burundi. Hence, an attempt to use such technology for electricity generation and productive uses as proposed in this project along with institutional support for sustainable mini-grids is an innovative approach. Also, the proposed project attempts to bring centralized electronic monitoring and controlling system for decentralized SHP plants. This is an innovative step towards improving the monitoring and management of SHP plants in the country.

Productive uses of the project

The proposed project will collaborate with the department of agro-business development of UNIDO for developing productive uses of energy. Also, the project will link up to the GTIEA initiative for productive use of energy in the tea industry in Burundi. This productive uses of the project is also an innovative approach in Burundi’s tea industry.

³⁵ https://www.thegef.org/gef/sites/thegef.org/files/documents/C.33.Inf_18%20Climate%20Manual.pdf

³⁶ Although diesel generators are used to supplement grid electricity, conservatively only diesel electricity is considered for calculating emissions.

³⁷ <http://www.iges.or.jp/en/cdm/report.html> (IGES)

³⁸ http://www4.unfccc.int/submissions/INDC/Published%20Documents/Burundi/1/Burundi_INDC-english%20version.pdf

Sustainability

During project implementation, the capacities of various institutions will be built through,

- training on policy framework to policy makers
- workshop on financing for SHP projects to banks/financial officials
- training to local engineering and O&M institutions to encourage local hydro services
- training to RE/technical institutions, NGOs, CSOs, etc. for development of SHP projects
- training to project developers on SHP technology for further replication projects

MEM will be strengthened with sufficient capacity building and resources such as guidebooks, manuals, case studies, training materials, etc., to ensure the training activities are sustained even after the completion of this project. The proposed project will also link up with the SHP technical centre at College of Engineering and Technology, University of Dar es Salaam, Tanzania to share the experiences and best practices and capacity building. The successful implementation of SHP projects in line with the proven technical assistance will be a case for the untapped SHP sites in the country. Hence, this will support the sustainability of the project.

Scaling-up

The following activities will encourage further scaling up of SHP technology in Burundi:

- Successful implementation and operation of the projects will boost the confidence among the private investors
- Strengthened institutions and policies will improve the investment environment and promote the financial contribution in SHP
- Training to investors and financing community will increase the confidence among investors to provide support and funding for the technology
- Training to local engineering companies and technology developers will motivate them to develop the technology locally or do business in the technology equipment which will ultimately reduce the cost of the equipment.
- Training to various O&M companies, local engineering companies will help in increasing the availability of spares which will help the replication projects to go for the technology without much hindrance.
- Also, to encourage replications, technical studies and business plans will be developed for 1.0 MW cumulative capacity.

A.2. Child Project? If this is a child project under a program, describe how the components contribute to the overall program impact.

Not applicable.

A.3. Stakeholders. Identify key stakeholders and elaborate on how the key stakeholders engagement is incorporated in the preparation and implementation of the project. Do they include civil society organizations (yes /no)? and indigenous peoples (yes /no)? ³⁹

Ministry of Energy and Mines (MEM)

MEM is responsible for the development and implementation of energy policies, sectoral planning and programme coordination, as well as for the management of the energy sector in Burundi. The policies and programs of the ministry are implemented through the Directorate General of Water and Energy (DGEE) and the Directorate General of Hydraulics and Rural Electrification (DGER).

³⁹ As per the GEF-6 Corporate Results Framework in the GEF Programming Directions and GEF-6 Gender Core Indicators in the Gender Equality Action Plan, provide information on these specific indicators on stakeholders (including civil society organization and indigenous peoples) and gender.

MEM is the main counterpart that will provide entire co-financing for this proposed project. It 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 aspects.

Régie de Production et Distribution d'Eau et d'Électricité (REGIDESO)

REGIDESO (Directorate for Production and Distribution of Water and Electricity) is state controlled organisation. Its responsibility is to ensure generation, transmission, distribution and commercialisation of electricity and drinking water in urban areas and rural centres. It is endowed with financial autonomy and is under the supervision of the MEM. It will provide its support in exporting power generated in this project to end users in its capacity related to transmission and distribution of power through mini-grids.

Burundian Agency for Rural Electrification (ABER)

ABER was established by Decree No. 100/318 dated 22 December 2011. The objective of this entity is to develop and implement rural electrification projects and programmes, including small-scale hydropower, solar and wind energy, as well as other forms of energy that can improve electricity access for the rural population. ABER will support in identifying the rural load centres and processing the regulatory approvals in execution of rural electrification through this proposed project. It will also maintain all the training materials, guide books, case studies prepared for future trainings after this project.

Other RE/technical institutions and financing institutions will be the recipients of training on SHP. This will encourage them to support the development of similar initiatives.

During the implementation phase, the project will identify and collaborate with civil society organizations (CSOs)/non-governmental organizations (NGOs) promoting gender equality and women empowerment, in particular, those focusing on energy needs and entrepreneurship to execute the productive use of energy aspect of the project.

There are no identified indigenous people within the vicinity of the proposed sites. The proposed project will not impact the indigenous people based on the preliminary assessments. Local community people will benefit from the clean electricity and will contribute through voluntary participation during the construction of the plants.

A.4. *Gender Equality and Women's Empowerment*. Elaborate on how gender equality and women's empowerment issues are mainstreamed into the project implementation and monitoring, taking into account the differences, needs, roles and priorities of women and men. In addition, 1) did the project conduct a gender analysis during project preparation (yes /no)?; 2) did the project incorporate a gender responsive project results framework, including sex-disaggregated indicators (yes /no)?; and 3) what is the share of women and men direct beneficiaries (women %, men %)?⁴⁰

a) Gender Mainstreaming at UNIDO

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. Commitment of UNIDO towards gender equality and women's empowerment is demonstrated in its policy on Gender Equality and the Empowerment of Women (2015), which provides overall guidelines for establishing a gender mainstreaming strategy that:

⁴⁰ Same as footnote 38 above.

- Ensures that a gender perspective is reflected in its programmes, policies and organizational practices;
- Advances the overall goal of gender equality and the empowerment of women, particularly the economic empowerment of women;
- Benefits from the diversity of experiences and expertise within the United Nations system to advance the internationally agreed development goals related to gender equality and the empowerment of women;
- Accelerates the Organization’s efforts to achieve the goal of gender balance, in particular at decision-making levels.

At the operational level, UNIDO has developed an energy-gender guide to support gender mainstreaming of its sustainable energy programmes and initiatives at all stages of the project cycle. In addition to introduction of basic concepts and strategic approaches, it also includes tools that can be used at relevant points of the project cycle to guide the thought processes and activities. These tools include:

- gender categorization tool, which assesses how much direct impact the project will have on gender dimensions;
- gender mainstreaming check list, which summarizes key considerations which must be considered during project development;
- gender analysis tool which provides specific questions that can guide the project developer in considering gender dimensions of a project, before full gender analysis is conducted by an expert;
- gender mainstreaming the project cycle tool, which lists key activities to be considered at each step of the project cycle;
- gender indicator framework that encourages results based management by indicating potential gender dimensions and quantitative indicators for specific energy interventions.

To ensure that all projects consider gender dimensions from inception, UNIDO has also integrated a robust gender review as part of the project appraisal process both at technical and organizational level.

b) Gender dimensions of the proposed project

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”⁴¹ according to the UNIDO Project Gender Categorization Tool. Nevertheless, UNIDO recognizes that all energy interventions are expected to have an impact on people and are, therefore, not gender-neutral⁴². 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. Figure 6 provides an overview of key issues that will be further considered on gender mainstreaming during the implementation of the project.

An in-depth gender assessment will be conducted at the identified SHP sites to measure social, economic, and environmental impacts at the project sites and nearby communities. During the PPG phase, a preliminary gender analysis of the country context has been conducted, based on which potential gender dimensions of the project outcomes and outputs, as well as potential entry points for gender equality and women's empowerment (GEEW) were developed and incorporated into the project logical framework. Key gender dimensions of the project outcomes and outputs as well as potential gender-relevant indicators are provided in the logical framework in Annex I. These proposed gender dimensions will be used as a guide during the implementation of the project as well as during M&E.

⁴¹ This would require the project to ensure at least 40% 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. Please see also “Gender Categorization Tool”

⁴² 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
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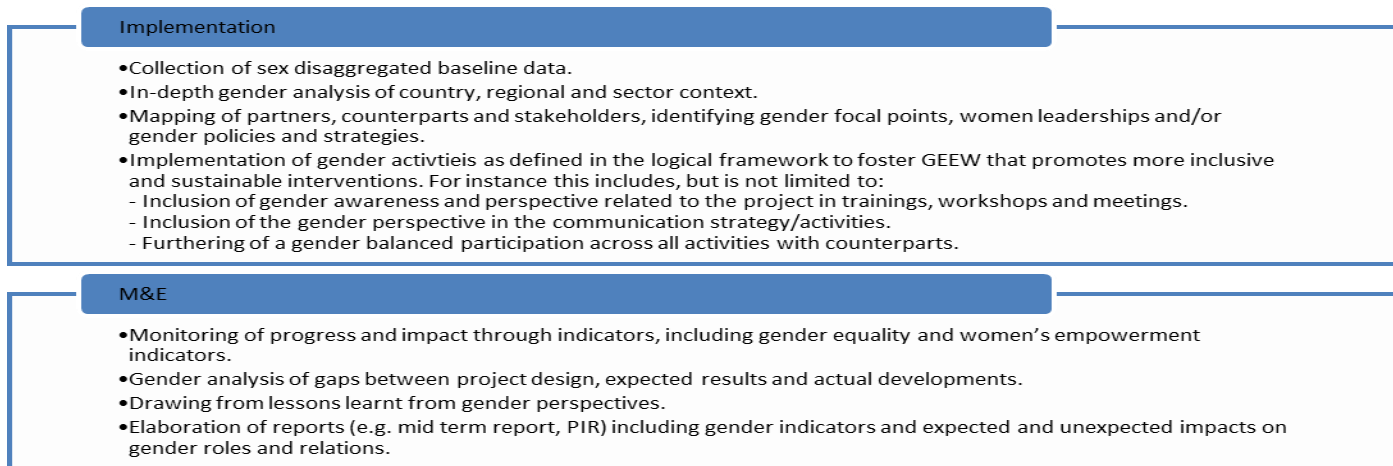


Figure 6: Gender mainstreaming of the project cycle

c) Project gender mainstreaming strategy

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 ever possible, especially in selection of project staff. Gender neutral 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 the existing staff will be trained and their awareness will be raised regarding gender issues.
- All decision-making processes will consider gender dimensions. At project management level, the identified CSO/NGO will be a member of the Project Steering Committee (PSC) to ensure that gender dimensions are represented. Also at the level of 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, as participants and trainers. This can include advertising of the events to women's technical associations, encouraging companies to send women employees, selection of the trainers, etc.
- 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 Environmental and Social Monitoring Plan (ESMP), etc.
- Efforts will be taken to consider at least 40% women participation in all activities of the project.

A.5 Risk. Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation.(table format acceptable):

Component	Risk	Proposed mitigation measure	Risk level
Technical risk	Insufficient technical capacity for operation and maintenance	Burundi already has few SHP plants, whose experience will be incorporated in the proposed projects. Assistance will be provided through the proposed project to technical services such as feasibility studies, procurement of equipment and power plant operation training. As already mentioned in section A.1., under “Innovativeness, Sustainability and Scaling up”, UNIDO possesses remarkable experience in SHP in the region. UNIDO, has experience in the technology and implementation of SHP projects, especially, GEF funded projects and can influence various factors including managing the technical risk and can steer the project to ensure its success.	Low
Market risks	<ul style="list-style-type: none"> No off-takers for the generated electricity Lack of capacity of private sector 	<p>The exact off takers will be decided during the detailed technical study itself. The generated electricity will be supplied to the small industries nearby the power plant.</p> <p>In general, the demand and supply gap is wide in Burundi. Hence, there will not be any risk for the electricity off-take.</p> <p>The proposed project is implemented by MEM only so private sector participation and its related risks are minimum. However, training will be provided to national experts, renewable energy (RE)/technical institutions, banks/financial institutions, engineering companies, interested project developers, NGOs/CSOs. This will boost confidence and capacity of private sector for future investment in SHP.</p>	Low
Sustainability risk	Lack of human capacity to operate the SHP plants	<p>All the SHP plants management and O&M staff will be trained by the respective equipment suppliers.</p> <p>In addition, training will be given through the proposed project to strengthen the capacity of local engineering and O&M companies.</p>	Moderate
Climate Change risk	Drought, flood and silting	Feasibility study and design of the scale up projects will consider the historical rain patterns and intensity. Based on the feasibility study report, a detailed ESMP will be developed. Spillways and diversion channels will be constructed where required to mitigate the risk of flooding as well as utilization of environmental flow devices to address fish passages.	Moderate
Social and gender risk	Lack of interest, thus underrepresentation from the specific stakeholder groups	This Project will pursue thorough and gender responsive communication and ensure stakeholder involvement at all levels, with special regard to involving women and men, as well as CSOs and NGOs promoting Gender Equality and Empowerment of Women (GEEW), and a gender expert. This will mitigate the social and gender-related risks, promote gender equality, create a culture of mutual acceptance, and maximize the potential contribution of the project in improving gender equality in the energy field.	Low
Security risk	Unstable political conditions	UNIDO will carefully keep tracking the political conditions in the country. Agreements will be with signed with Government of Burundi/MEM to ensure implementation of project activities as per plan. UNIDO’s International experience in handling such projects in developing countries will help to overcome this risk.	Moderate

A.6. Institutional Arrangement and Coordination. Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

The proposed project will supplement the efforts of GEF and other national projects to achieve the global GHG emission reduction.

GEF initiatives

As of now, Burundi has only six approved GEF projects in climate change focal area. Out of which three are full sized projects and remaining three are enabling activities. Among these six 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 also at selectively improving the energy efficiency of households and buildings in Bujumbura city. The proposed GEF project will be in synergy with this project and will be taking up 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 its proposed objectives.

Other national initiatives

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), which aims at installing 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 the local communities in the vicinity of the power plants.

The proposed GEF project is in alignment 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 in alignment 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 as well as the other concerned stakeholders to ensure that the relevant lessons and experiences are incorporated into the project.

Additional Information not well elaborated at PIF Stage:

The proposed GEF project implementation arrangement is given below:

Implementing Agency

UNIDO is the only GEF Implementing Agency involved in this project and no specific arrangement with other GEF Agencies is sought.

Executing Partner

MEM will be the lead executing agency coordinating with UNIDO.

Project Implementation Arrangement

The project will be implemented by UNIDO, which is responsible for the achievement of the expected outcome through its guidance, in collaboration with MEM, ABER, REGIDESO and relevant government departments and ministries.

Ministry of Energy and Mines (MEM)

MEM is responsible for executing the proposed project in Burundi. It will assist in the overall delivery of the planned outputs and achieve the expected outcomes of the project. It will also be responsible for inter-ministry communication facilitation and policy matters for wide adaptation of the technology and services in Burundi. The project will directly support the development of 1.0 MW cumulative capacity of installed SHP. MEM will be responsible for mobilizing finance for investment in the proposed plants. It will be responsible for O&M of the plant and will be operating the projects throughout their life time. It will be in charge of keeping records of the plant operations necessary for monitoring the energy generated and ultimately the GHG emission reductions.

There will be a contractual agreement with MEM to carry out project activities such as hosting of Project Management Unit (PMU), facilitation of co-ordination among ministries and other project promotional activities as required by the executing partner with the support of international service assistance, if necessary.

Régie de Production et Distribution d'Eau et d'Électricité (REGIDESO)

REGIDESO is one of the executing partners of the project, who is responsible for transmission and distribution, monitoring and tariffs for hydro power in line with the regulations.

Burundian Agency for Rural Electrification (ABER)

ABER is one of the executing partners of the project, who is responsible for the implementation of small scale hydro projects and electricity supply to the identified rural areas. ABER will be equipped with sufficient capacity building and resources to carry out the sustained training activities.

Renewable Energy Development Company Limited (REDCO)

REDCO is a private SHP developer active Burundi. REDCO will assist the government to mobilize investment fund required to develop the four sites identified during the PPG phase.

UNIDO

UNIDO will be specifically responsible for:

- Oversight and supervision of the overall execution of the project
- Reporting on the project performance to the GEF
- Procurement of the technology and services needed for delivering the planned outputs under the four project components
- Approving the national expertise needed for delivering the planned output under the four project components
- Managing, supervising and monitoring the work of the international teams and ensuring that the deliverables are technically sound and consistent with the project requirements.

UNIDO will fulfil this responsibility by mobilizing services of its other technical, administrative and financial branches at UNIDO Headquarters and the UNIDO Office in Burundi. Considering that there is a lack of technical capacity in SHP in Burundi, UNIDO will facilitate procurement of international services and equipment purchases through its standard rules and regulations.

Any amendments to the project will be done in accordance with the GEF policy C39. Inf. 3 and UNIDO rules and regulations.

Project Management Unit

A PMU will be established within the MEM. PMU will consist of a National Project Coordinator (NPC), the Project Administrative Assistant (PA) and short term technical advisors. The responsibilities of PMU will be as follows:

- Daily management of project execution
- Coordination of all the project activities carried out by the national and international experts and the other partners
- Day-to-day management and monitoring of project activities as per planned project work plan
- Organization of various capacity building activities (seminars and training)
- Track and account for co-financing contributions

Throughout the period of project execution, the PMU will receive the necessary management advisory support from UNIDO.

Project Steering Committee

A Project Steering Committee (PSC) will be established consisting of all relevant stakeholders (key stakeholders including MEM, REGIDESO, ABER, REDCO and UNIDO) for providing strategic guidance and reviewing the progress in project execution. The committee will be chaired by Ministry of Water, Environment, Land and Urban Planning, who is also the GEF Operational Focal Point (OFP) for Burundi. The final composition of the PSC will be defined during the project execution start-up phase. The PSC will meet once a year.

It will also facilitate coordination among other ministries/departments; maintain transparency and support the sustainability of the project. PSC will be responsible for:

- Providing strategic guidance in line with the country needs and priorities;
- Promoting partnership among stakeholders;
- Reviewing project progress reports;
- Approving the work plans based on this project document;
- Initiating remedial action to remove impediments to the progress of project activities that were not envisaged earlier.

At the beginning of the project execution, a detailed work plan for the entire duration of the project will be developed by UNIDO in collaboration with the PMU, Government of Burundi and the international teams of experts. The work plan will be used as a management and monitoring tool by PMU and will be reviewed and updated appropriately on a biannual basis. Figure 7 shows the project management structure.

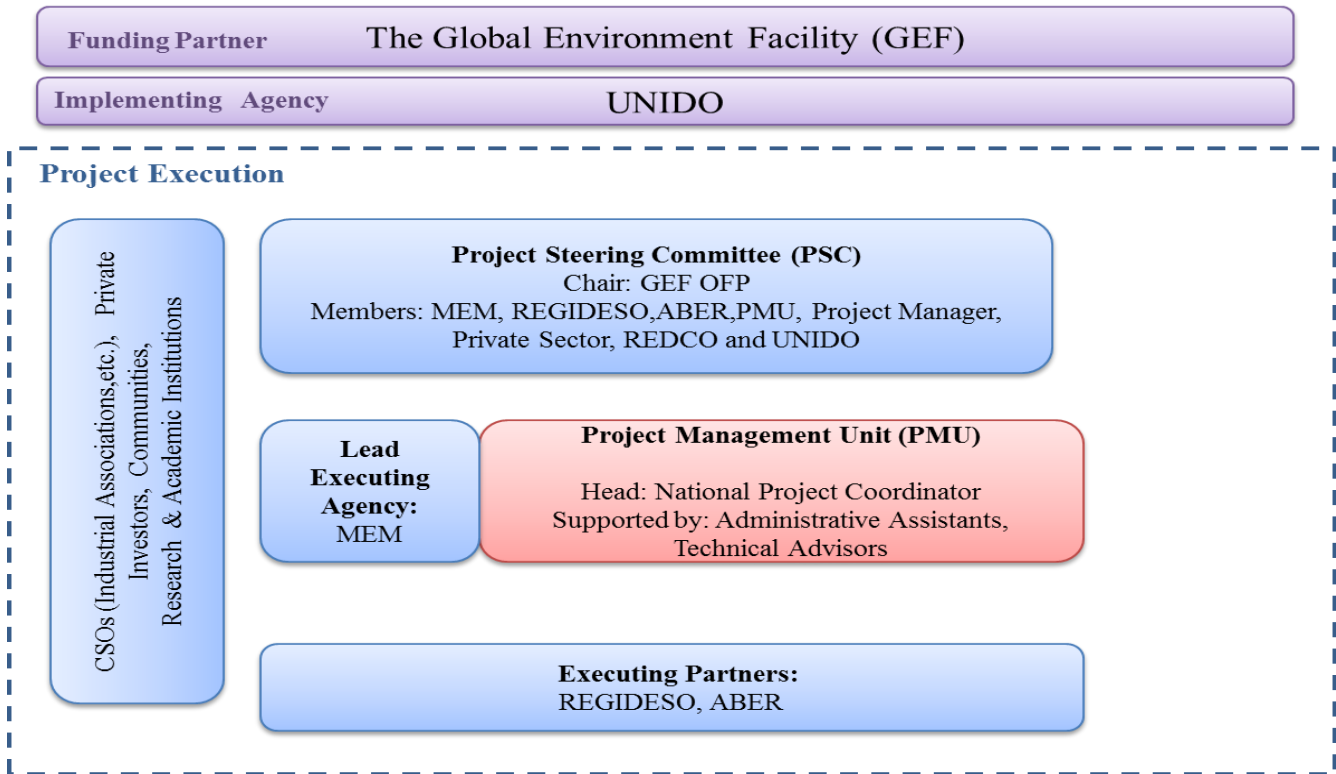


Figure 7: Project management structure

A.7 *Benefits*. Describe the socioeconomic benefits to be delivered by the project at the national and local levels. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCE/SCCF)?

The project will provide considerable socio-economic benefits to various beneficiaries both at national and the local level.

Gender Benefits

Increased access to electricity situation will improve the health services in hospitals, education services in schools, children’s study performance, reading conditions for the students during nights at home, reduce health hazards (especially eye problem), particularly to children and women who otherwise will spend hours in poor quality lighting while doing domestic activities in the night.

Enrolment of female students in schools will be significantly increased by way of electrification in schools, public streets along with the households as a result of increased electricity availability. Reduced gender violence due to improved security during night hours and reduced women drudgery are some of other gender benefits.

Increased economic opportunities for women at home and the village are perceived to be an outcome of electrification. It will address their labour-saving and human energy needs, such as drinking water pumping, food processing like grain grinding and transport.

All the required efforts will be made by the project to enrol as many women as possible in its planned activities, both as entrepreneurs and technical staff (such as energy managers) and encourage them to participate in all the relevant project and decision-making activities.

Eligible women candidates will be involved as trainers and technical consultants. Terms of reference will be prepared to encourage qualified women applicants and experts, to mainstream the gender relation in the proposed project. Moreover, women will also be encouraged to participate as trainees in various capacity building sessions. This project will promote women's participation and leadership in energy institutions at the national and local level and support women's role as energy managers.

Socio-economic benefits at national level

Through this proposed GEF project, around 1.10 million litres of diesel use per year by diesel-based systems for electricity generation will be considerably reduced and gross cost savings will be around 1.36 million USD per year⁴³. This will ensure the reduction in the import of diesel and savings in foreign exchange for the country.

Socio-economic benefits at local level

The local benefits of this project include: (1) access to clean and reliable energy for the industries and population around them; (2) improved self-employment and employment opportunities leading to a better economic environment; (3) additional income to the industries through generation of own electricity and savings from the reduced use of diesel generator (4) increased electricity access and hence, improved living quality, health and education of the nearby community of the power plant sites.

The implementation of SHP plants for a cumulative capacity of 1.0 MW will benefit 185,070⁴⁴ of Burundi's population to access clean electricity directly. The power plants will create employment opportunities to at least 30 people directly in continuous operation and around 200 people during the implementation phase indirectly. The installed SHP plants will help to boost up the start-up of spare parts manufacturing organizations, local fabrication works, etc. At least, there will be five manufacturing/business units in each location of SHP plants and create employment offers for 25-30 individuals.

Indirectly, this scale up projects can assist the people and the industries to gain access to electricity, thereby reducing the burden to the grid, which at the moment is not able to serve the demand in the country.

A.8 Knowledge Management. Elaborate on the knowledge management approach for the project, including, if any, plans for the project to learn from other relevant projects and initiatives (e.g. participate in trainings, conferences, stakeholder exchanges, virtual networks, project twinning) and plans for the project to assess and document in a user-friendly form (e.g. lessons learned briefs, engaging websites, guidebooks based on experience) and share these experiences and expertise (e.g. participate in community of practices, organize seminars, trainings and conferences) with relevant stakeholders.

Presently, SHP plants of cumulative capacity 3.2 MW is under implementation at Tanzania by GEF and UNIDO. Burundi SHP project will collaborate with the Tanzania SHP project in terms of technical support from various institutions, technology transfer, local fabrication of equipment, adaptation of guidelines and standards for mini-grid establishment, policies, financing and overall implementation process. The lessons learnt from Tanzania project will be incorporated in the successful implementation of SHP projects in Burundi.

A database will be developed to manage the guidebooks, training materials and strategies on SHP project development. This will benefit users/utility such as, NGOs/CSOs, community groups, individual firm, government agencies, industries, etc. who wants to install SHPs. The feasibility study reports, business plan reports and bidding documents prepared for various SHP plants will be consolidated and stored as part of project database. Interested private sectors companies and entrepreneurs can access these documents to develop their replication projects. Apart from guidebooks

⁴³ Calculated, 1 litre of diesel = 1.24 USD (http://www.globalpetrolprices.com/Burundi/diesel_prices/)

⁴⁴ Calculated based on electricity consumption per capita per year in Burundi (21.3 kWh/year), 2014

<http://www.indexmundi.com/g/r.aspx?v=81000>

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and manuals, an 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 other global initiatives as well as relevant projects.

The project will collaborate with the recently established East African Centre for Renewable Energy and Energy Efficiency (EACREEE). The centre would have a significant role to play in promoting and sustaining SHP in the region that would include (i) intermediary role between utilities and government; (ii) holistic integrated planning; (iii) consumer and community engagement; (iv) provision of expertise to communities throughout the region; and (v) policy and standard stipulation and drive, especially considering the fact that regulation for SHP is not available in the EAC. Through this centre, knowledge and expertise in SHP technology from other East African countries will be maximized for successful implementation of SHP projects.

B. DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH:

B.1 Consistency with National Priorities. Describe the consistency of the project with national strategies and plans or reports and assessments under relevant conventions such as NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, etc.:

The proposed project will support the following Government policies and strategies targeted to increase the percentage of RE in the 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. The Second National Communication identified the need for 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 at scaling up SHP generation for rural electrification and productive uses in small and medium sized industries thereby mitigating the GHG emissions that would have occurred from the use of fossil fuel.

Vision Burundi 2025, 2011: The vision has a principal objective to ensure that by 2025, both the rural and urban populations have access to reliable and clean sources of energy at competitive prices. It also aims at providing energy in quantities sufficient for the industrial, artisanal and mining activities. Further efforts will be made to build more hydroelectric power stations and also to increase the investments in renewable energies.

Poverty Reduction Strategy Paper (PRSP) II, 2012: The project is aligned with Burundi's poverty reduction strategy paper (PRSP II). PRSP aims at increasing the electricity production, restoring financial soundness to water and power utility REGIDESO and promoting the renewable forms of energy. The proposed GEF project will support transforming Burundi's economy by (i) generating sustainable and new jobs in power supply to the industries and (ii) improving access to better quality economic infrastructures such as energy, transportation, Information and Communication Technology (ICT), etc.

Law of 23 April 2015, reorganizing the electricity sector in Burundi: The Burundi's electricity sector has proposed to develop hydroelectric projects of capacities ranging from 500 kW to 1 MW under Public Private Partnership (PPP) for a period of 25 years. The period of PPP can be renewed.

Sustainable energy for All (SE4ALL), Country Action Agenda (2014)⁴⁵ : SE4ALL has identified the following potential high impact opportunities in the countries: (i) energy and women's health (ii) phase out of gas flaring in oil production, (iii) sustainable bioenergy, (iv) vehicle fuel efficiency, (v) water –energy-food nexus, (vi) clean energy mini – grids and (vii) universal adoption of clean cooking solutions. Thus, the proposed project is also in alignment with the SE4ALL initiative as it will double the share of RE in the energy mix of Burundi and will enable an accelerated electrification program.

C. DESCRIBE THE BUDGETED M&E PLAN:

⁴⁵ [http://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Action_AgendaTemplate - March 2014.pdf](http://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Action_AgendaTemplate_-_March_2014.pdf)
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Project monitoring and evaluation (M&E) will be conducted in accordance with the established UNIDO and GEF procedures. The M&E activities are defined under project component 4. Monitoring of the project will be based on indicators (for project component 1, 2 and 3) defined in the strategic results framework given in Annex A (which details the means of verification) and the annual work plans. M&E will make use of the GEF Tracking Tool, which will be submitted to the GEF Secretariat two times during the project tenure, i.e., at CEO Endorsement and at the final evaluation. UNIDO as the implementing agency will involve the GEF Operational Focal Point and other stakeholders at all stages of project M&E activities to ensure the use of the evaluation results for further planning and implementation.

According to the Monitoring and Evaluation policy of the GEF and UNIDO, follow-up studies like Country Portfolio Evaluations and Thematic Evaluations will be initiated and conducted. All project partners and contractors are obliged to (i) make available studies, reports and other documentation related to the project; and (ii) facilitate interviews with staff involved in the project activities.

The overall objective of the M&E process is to ensure successful and quality implementation of the project by: i) tracking and reviewing the execution of the project activities, ii) taking early corrective action if performance deviates significantly from the original plans and iii) adjusting and updating the project strategy and implementation plan to reflect possible changes on the ground results achieved and taking the corrective actions. All monitoring and evaluation documents, such as periodic progress reports and terminal evaluation reports, as well as learning and knowledge sharing products, will include gender dimensions wherever adequate.

a. Monitoring

A detailed monitoring plan for tracking and reporting on project's time-bound milestones and accomplishments will be prepared by UNIDO at the beginning of project implementation and then will be updated periodically. Monitoring activities will be carried out on the basis of the periodic reports developed by the PMU on a quarterly basis.

By making reference to the impact and performance indicators defined in the Project Results Framework, the monitoring plan will track, report and review the SHP project activities and accomplishments in relation to the following:

- Implementation;
- Various capacity building trainings and their usefulness;
- Level of awareness and technical capacity of relevant institutions in the SHP technology;
- Replication of similar projects elsewhere in Burundi;
- CO₂ emission reduction from the implemented scale up projects;
- CO₂ emission reduction from the other replication projects;
- Effectiveness and usefulness of the dissemination activities such as trainings, seminars, site visits, performance reports, project website, leaflets, etc.

b. Reporting

PMU will present a report to UNIDO every two months with detailed information on the progress of the project as per the annual implementation plan and activities that have been carried out during the period of each report. An annual report shall be submitted by PMU at the end of each project cycle year with a summary of activities carried out over the year and will be the basis of Project Implementation Reviews (PIRs). The annual report will also cover the benefits gained and impacts made on the implementation of the project. In addition, the report will include the evidence to demonstrate the progress made in the achievement of the indicators highlighted in the Project Results Framework.

c. Evaluation

A final independent evaluation will be conducted three months prior to the terminal review meeting. The final evaluation will focus on various activities of the project such as the construction of the plant, assessment of the effectiveness of the trainings, establishment of incentives, soft loan facilities, impact and sustainability of results including the contribution to capacity development and the achievement of global environmental benefit goals. The final evaluation will also provide recommendations for follow-up activities.

All the project stakeholders and contractors are obliged to (i) make available relevant documents and reports and (ii) facilitate interviews with the staff involved in the project activities.

Table 8 provides the tentative budget summary for the total evaluation, which has been included in Project Component 4.

Table 8: Project M&E budget

Activity	GEF (USD)	Co-financing (USD)	Responsible party
Monitoring of project impact indicators	10,000	10,000	<ul style="list-style-type: none"> Independent M&E expert to provide feedback to PMU PMU will submit inputs for consolidation and approval by PSC
Measurement of GEF tracking tool specific indicators		10,000	
Periodic Monitoring Reports (will be completed through co-financing resources)	-	20,000	
Final evaluation	30,000	-	Independent M&E experts
Total	40,000	40,000	

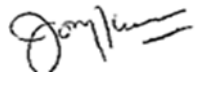
Legal Context

“The present project is governed by the provisions of the Standard Basic Cooperation Agreement between the Government of the Republic of Burundi and UNIDO, signed and entered into force on 25 June 1990.”

PART III: CERTIFICATION BY GEF PARTNER AGENCY(IES)

A. GEF Agency(ies) certification

This request has been prepared in accordance with GEF policies⁴⁶ and procedures and meets the GEF criteria for CEO endorsement under GEF-6.

Agency Coordinator, Agency Name	Signature	Date (MM/dd/yyyy)	Project Contact Person	Telephone	Email Address
Mr. Philippe R. Scholtès, Managing Director, Programme Development and Technical Cooperation - PTC, UNIDO-GEF Focal Point		03/21/2017	Josy Thomas, Project Manager, PTC/ENE/RRE	+43 - 1 - 26026-3727	j.thomas@unido.org 

⁴⁶ GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, and SCCF
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ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

Project Narrative		Objectively verifiable indicators				
		Indicator	Baseline	Target (quantified and time-bound)	Source of verification	Risks and Assumptions
Goal	Promote Small Hydro Power (SHP) for productive use and energy services	<ol style="list-style-type: none"> MW of SHP plants installed. Number of potential sites identified for replication projects tCO₂e emission reduced Percentage of women participation in project activities 	<ol style="list-style-type: none"> Electricity generation primarily from fossil fuel 85% of fossil fuel used as primary fuel for energy generation Not many women in the SHP related activities 	<ol style="list-style-type: none"> Install SHP plants for at least 1.0 MW cumulative capacity Achieve 64,320 tCO₂e of emission reduction directly Replicate at least another 3 MW cumulative capacity (expected in next 10 years after the project period) Achieve 126,144 tCO₂e of emission reduction indirectly To ensure at least 40% women participation in all activities of the project 	<ol style="list-style-type: none"> Physical verification of installed SHPs Physical verification of potential sites Potential assessment report End of project M&E report 	Support from the Government ministries.
Objective of the project	Promote SHP plants for energy services in Burundi	USD investment for implementing SHPs in Burundi	<ol style="list-style-type: none"> Energy generation primarily from fossil fuel. Around 1.1 million litres of diesel usage for 1.0 MW power generation Limited initiative activities for scale up Not many women in the SHP related activities 	<ol style="list-style-type: none"> Invest at least approximately USD 6.85 million in establishing SHP plants for at least 1 MW cumulative capacity. Initiate activities such as assessment, FS, etc. to help replication projects of at least 1 MW cumulative capacity To gender mainstream as far as possible 	<ol style="list-style-type: none"> Physical verification of plant sites End of project M&E report 	Support from the Government ministries.

Project Narrative		Objectively verifiable indicators				
		Indicator	Baseline	Target (quantified and time-bound)	Source of verification	Risks and Assumptions
Project Component 1: Human and institutional capacity building on SHP technology, energy policy and planning						
Outcome 1	Improved knowledge base and strengthened national policy on SHP	<ol style="list-style-type: none"> Number of trained personnel including men and women in SHP Institutional setup for mini-grids established Strengthened institutions and policy 	<ol style="list-style-type: none"> Insufficient human and institutional capacity in promoting SHP plants Inadequate institutional setup for mini-grids Not much supporting policy aspects Not many women with sufficient knowledge in SHP among various stakeholder groups 	<ol style="list-style-type: none"> Undertake capacity building activities to at least 30 beneficiaries from each stakeholder group⁴⁷ Formulation of institutional framework for mini-grids Prepare a policy summary report including recommendation for improved policy to facilitate SHP business Include at least 12 women trainees in each stakeholder group for training 	<ol style="list-style-type: none"> Training reports Guidelines, books and strategies of SHP plant projects Institutional framework for mini-grids Policy summary report with recommendations End of the project M&E report 	<ul style="list-style-type: none"> Support from the Government ministries and the training participants Qualified women will participate as trainer
Output 1.1.1	Key policy makers (at least 30) trained	<ol style="list-style-type: none"> Number of training organized Number of persons trained in each group including men and women 	<ol style="list-style-type: none"> Inadequate knowledge on policy making among project stakeholders and ministry personnel Less women policy makers in SHP 	<ol style="list-style-type: none"> Assess capacity of the policy makers. Engage qualified woman for preparing the assessment report Conduct at least 2 trainings. Engage at least one qualified woman trainer. Improve capacity of at least 30 key policy makers. Include at least 12 women policy makers for training. 	<ol style="list-style-type: none"> Training reports Assessment report End of the project M&E reports 	Support from the Government ministries and the training participants

⁴⁷Interested project developers, national experts, renewable energy (RE)/technical institutions, banks/financial institutions, engineering companies, NGOs/CSOs, etc.
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Project Narrative		Objectively verifiable indicators				
		Indicator	Baseline	Target (quantified and time-bound)	Source of verification	Risks and Assumptions
	Personnel from other target groups (30 in each group) trained	<ol style="list-style-type: none"> Number of training organized Number of persons trained in each group including men and women 	Inadequate knowledge on SHP development, O&M, local engineering and finance	<ol style="list-style-type: none"> Assess capacity of other target groups Educate and train at least 30 persons interested in SHP development Educate and train at least 30 persons from RE/technical institutions Educate and train at least 30 bank/financial institution personnel Educate and train 30 persons in plant O&M To include at least 12 women in each training group 	<ol style="list-style-type: none"> Training reports Assessment report End of the project M&E reports 	<ul style="list-style-type: none"> Support from the Government ministries and training participants One qualified women engaged for preparing the assessment report
Output 1.1.2	Institutional setup strengthened for sustainable management of mini-grids	Strengthened institutions enough for sustainable management of mini-grids	Inadequate institutional capacity for mini-grids management	<ol style="list-style-type: none"> Strengthen capacity of ABER and REGIDESO Establish centralised monitoring system for mini-grids 	<ol style="list-style-type: none"> Training/workshop reports Centralised monitoring system for mini-grids End of the project M&E reports 	<ul style="list-style-type: none"> Support from the Government ministries and training participants One qualified women engaged for preparing the institutional framework
Output 1.1.3	Relevant institutions and national policy on SHP strengthened	Improved policy on SHP business created	Not much encouraging policies for SHP in operation	<ol style="list-style-type: none"> Conduct review of existing policies Prepare policy summary report Recommend the most suitable business development plan Engage at least 1 qualified woman for preparing any 	<ol style="list-style-type: none"> Policy summary report End of the project M&E reports 	Support from the Government ministries, and other stakeholders

Project Narrative		Objectively verifiable indicators				
		Indicator	Baseline	Target (quantified and time-bound)	Source of verification	Risks and Assumptions
				of the above reports.		
Project component 2: Scaling up of SHP plants						
Outcome 2.1	Conducive environment created for scaling up of SHP plants	MW cumulative capacity of SHP scale up plants	<ol style="list-style-type: none"> Inadequate knowledge on SHP technology and unidentified SHP potential Not many female experts are available to do environmental and social impact related reports 	Facilitate SHP plants for at least 1.0 MW cumulative capacity	<ol style="list-style-type: none"> Physical verification of the SHP plants Related environmental and social reports End of the project M&E report 	Continuous support from the Government ministries, stakeholders and local experts
Output 2.1.1	Detailed plant designs prepared for a cumulative capacity of 1.0 MW SHP plants	Status of the scale up project progress	<ol style="list-style-type: none"> Lack of plant design reports for SHP plants Not many female experts are available to do such reports 	Prepare detailed project reports for the proposed SHP scale up plants	<ol style="list-style-type: none"> Plant design reports End of the project M&E report 	Continuous support from the Government ministries, stakeholders and local experts
Output 2.1.2	SHP plants for a cumulative capacity of 1.0 MW established	MW of SHP plants installed	Not many small hydro power plants exist	Install SHP plants for at least 1.0 MW cumulative capacity	<ol style="list-style-type: none"> Physical verification of project sites End of the project M&E report 	Continuous support from the Government ministries, stakeholders and local experts
Output 2.1.3	Centralized electronic monitoring and controlling system for decentralized SHP systems established	Efficient electronic monitoring and control system for decentralized SHP plants	No systematic electronic monitoring and control system	Development of central electronic monitoring and control system for decentralized SHP plants	<ol style="list-style-type: none"> Physical verification of project sites End of the project M& E report 	Continuous support from the Government ministries, stakeholders and local experts
Project component 3: Facilitation of replication projects						
Outcome 3.1	Initiatives taken for the replication	Number of DPRs and business plan	1. Non-availability of	Conduct feasibility study for at least 1.0 MW cumulative	1. DPRs	Continuous support from the Government ministries,

Project Narrative		Objectively verifiable indicators				
		Indicator	Baseline	Target (quantified and time-bound)	Source of verification	Risks and Assumptions
	projects	reports of the replication projects	data 2. Hesitant to do feasibility studies and such development activities	capacity towards potential replication projects ⁴⁸	2. Business plan reports 3. End of the project M&E report	stakeholders and local experts
Output 3.1.1	SHP sites assessed for further replication	Number of potential SHP sites identified in the country	Lack of data availability on potential SHP sites	1. Conduct study on potential SHP sites in the country 2. Engage at least 1 qualified woman for conducting assessment.	1. Physical verification of the SHP sites 2. End of the project M& E report	Continuous support from GEF, Government, stakeholders and local experts
Output 3.1.2	Detailed project report (DPR) and business plans developed for the replication projects to a cumulative capacity of 1.0 MW	Cumulative capacity of potential SHP sites identified	Lack of hydrological data at potential SHP sites	1. Develop DPR and prepare business plan report for minimum of 1.0 MW cumulative capacity 2. Engage at least 1 qualified woman for preparing any of the above reports.	1. DPRs 2. Business plan reports 3. End of the project M&E report	Continuous support from GEF, Government, stakeholders and local experts
Output 3.1.3	Experience shared and information disseminated	Case studies, annual reports and newsletters	No tools for SHP and information dissemination	1. Preparation of cases studies on successful scale up projects 2. Preparation of annual reports and periodic newsletters 3. Methodologies/tools developed for better use of collected data	1. Case study reports 2. Annual reports 3. Newsletters	Continuous support from GEF, Government, stakeholders and local experts

⁴⁸ The project installs power plants for at least 1 MW cumulative capacity. The project expects a replication of at least additional 3 MW in the next ten years after the end of the project. As an initiative towards the future replication, the proposed project undertakes site assessment, conducts technical study and prepares business plan for at least 1 MW cumulative capacity of replication projects.

Project Narrative		Objectively verifiable indicators				
		Indicator	Baseline	Target (quantified and time-bound)	Source of verification	Risks and Assumptions
Project component 4: Monitoring and Evaluation (M&E)						
Outcome 4.1	Effectiveness of the outputs assessed, corrective actions taken and experience documented	Achievement of global environmental benefits and socio-economic benefits	No evaluation system in place to monitor and track project benefits	Independent final evaluation to capture the impact and sustainability of results	Final evaluation report	Continuous support from GEF, Government, stakeholders and international experts
Output 4.1.1	End of project M&E report prepared (independent evaluation)	Achievement of project targets and improvement in gender mainstreaming	No evaluation system in place to monitor and track project benefits	Independent final evaluation to capture the impact and sustainability of results	Final evaluation report	Continuous support from GEF, Government, stakeholders and international experts

Note:

1. Apart from the above, even in M & E aspect, wherever possible, qualified women will be engaged for various activities.
2. Efforts will be taken to consider at least 40 % women participation in all activities where applicable.

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

Not applicable

ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS⁴⁹

A. Provide detailed funding amount of the PPG activities financing status in the table below:

PPG Grant Approved at PIF: 50,000			
<i>Project Preparation Activities Implemented</i>	<i>GEF/LDCF/SCCF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent To date</i>	<i>Amount Committed</i>
Supplemental data collection	6,000	6,000	
Existing institutional set up and policy study	7,000	7,000	
Stakeholder consultations	6,000	6,000	
Selection of potential sites and conduct of detailed feasibility studies	13,000	13,000	
Preparation and finalization of full-sized project document	18,000	18,000	
Total	50,000	50,000	

⁴⁹ If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue to undertake the activities up to one year of project start. No later than one year from start of project implementation, Agencies should report this table to the GEF Secretariat on the completion of PPG activities and the amount spent for the activities. Agencies should also report closing of PPG to Trustee in its Quarterly Report.

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

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

Not applicable

ANNEX E: PROJECT IMPLEMENTATION SCHEDULE

Activity	Year 1				Year 2				Year 3				Year 4			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
PC 1- Human and institutional capacity building on SHP technology, energy policy and planning																
<i>1.1.1. Key policy makers and other stakeholders (at least 30 in each group) trained</i>																
a. Assessment of capacity of policy makers	■															
b. Training to at least 30 policy makers		■		■												
c. Assessment of capacity requirement of each target groups		■														
d. Training to at least 30 interested project developers in SHP project development and project implementation			■													
e. Training to at least 30 individuals from Renewable Energy (RE) / technical institutions				■												
f. Training to at least 30 individuals from banks and financial institutions					■											
g. Training to at least 30 personnel from local engineering and O&M companies						■										
h. Customization of available guidebooks, websites and strategies on SHP project development						■	■									
<i>1.1.2. Institutional setup strengthened for sustainable management of mini-grids</i>																

Activity	Year 1				Year 2				Year 3				Year 4			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
a. Strengthening the capacity of institutions for sustainable management of mini-grids																
b. Plan for central monitoring system of mini-grids created																
1.1.3. Relevant institutions and national policy on SHP strengthened																
a. Preparation of policy summary report including recommendation for the most suitable business development plan																
PC 2- Scaling up of SHP plants																
2.1.1. Detailed plant designs prepared for a cumulative capacity of 1.0 MW SHP plants																
a. Preparation of detailed business plans for the scale up projects																
b. Preparation of detailed plant designs for the scale up projects																
2.1.2. SHP plants for a cumulative capacity of 1.0 MW established																
a. Installation of SHP plants of a cumulative capacity of at least 1.0MW																
2.1.3. Centralized electronic monitoring and controlling system for decentralized SHP plants established																
a. Installation of effective electronic monitoring and control systems in SHP plants																
PC 3- Facilitation of replication projects																
3.1.1. SHP sites assessed for further replication																
a. Conduct preliminary study																

LIST OF ATTACHMENTS

1. ANNEX F - Itemized Budget
2. ANNEX G - Pre-feasibility study Report
3. ANNEX H - Co-financing Letters
4. ANNEX I - Gender Analysis
5. ANNEX J - Cost Benefit Analysis
6. ANNEX K - GHG Emission Reduction Estimation