Gold Standard
for the Global Goals

TEMPLATE

KEY PROJECT INFORMATION & PROJECT DESIGN DOCUMENT (PDD)

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VERSION **v. 1.2**

RELATED SUPPORT

- TEMPLATE GUIDE Key Project Information & Project Design Document v.1.2

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Key Project Information

SECTION A – Description of project

SECTION B - Application of approved Gold Standard Methodology (ies) and/or demonstration of SDG Contributions

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KEY PROJECT INFORMATION

GS ID of Project	GS11398
Title of Project	Biolite Solar Lighting Project in Rwanda
Time of First Submission Date	15/09/2021
Date of Design Certification	DD/MM/YYYY
Version number of the PDD	1.0
Completion date of version	13/09/2021
Project Developer	Biolite, Inc.
Project Representative	Biolite, Inc.
Project Participants and any communities involved	Swiss Carbon Value Ltd.
Host Country (ies)	Rwanda
Activity Requirements applied	☒ Community Services Activities ☐ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Scale of the project activity	☐ Micro scale ☒ Small Scale ☐ Large Scale
Other Requirements applied	
Methodology (ies) applied and version number	AMS-I.A: "Electricity generation by the user", version 17.0
Product Requirements applied	☒ GHG Emissions Reduction & Sequestration ☐ Renewable Energy Label ☐ N/A
Project Cycle:	☐ Regular ☒ Retroactive

Land-use & Forest Key Project Information[1]

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[1] Please refer to Appendix 3 for detailed information on LUF projects

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Not Applicable.

Table 1 – Estimated Sustainable Development Contributions

Sustainable Development Goals Targeted	SDG Impact (defined in B.6.)	Estimated Annual Average	Units or Products
SDG 13 - Climate Action	GHG Emission Reductions	63,298	tCO_{2e}
SDG 1 - No Poverty	Expenditure savings per year by the project activity on household Lighting	3,008,000	USD
SDG 7 - Clean, Affordable Energy for all	Population with access to clean and affordable solar lights	192,000	No. of LEDs distributed

SECTION A. DESCRIPTION OF PROJECT

A.1 Purpose and general description of project

The Biolite Solar lighting project in Rwanda is a Solar home lighting distribution system project being implemented in Rwanda. The country of Rwanda is a Least Developed Country[2] with very low electrification rate in both rural and urban areas. In Rwanda, the current rate of electrification of households stands at 37.8%[3], which is very low. In these circumstances, and owing to the lack of any cheap alternatives, the local population of Rwanda relies on various alternatives such as battery-operated torches (flashlights), kerosene lamps, firewood, etc. for their lighting requirements. Kerosene, being a fossil fuel, releases GHG emissions in the atmosphere when burnt. The Biolite Solar Lighting project in Rwanda distributes Solar home lighting systems in the host country Rwanda through on-ground networks and is leading to a reduction in GHG emissions released into the atmosphere.

The technology that is being sold includes a solar flat plate panel, battery, connection box, switch box, and LED light bulbs. There are various presets available in the lighting system solutions, and with the help of solar power, the charged battery

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[2] https://unctad.org/topic/least-developed-countries/list
[3] https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=RW

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provides lighting to the local people whenever they need it. The project boundary is the geographical boundaries of Rwanda, where the project is mitigating the CO_2 emissions from the kerosene-based lighting technologies that were used in the project baseline.

The project activity distributes solar lighting system to individuals, households, and communities who used to have kerosene fuel-based lighting technologies in the project baseline.

A.1.1. Eligibility of the project under Gold Standard

The Solar Lighting System distribution project is fulfilling the GS4GG eligibility criteria, as stipulated in the Section 3.1.1 of the GS4GG 101 Principles and Requirements, ver. 2.0, which is elaborated below.

S. No.	GS4GG Eligibility Criteria	Fulfilment by the project activity
i	Demonstrate if project is pre identified as eligible by being referenced in Gold Standard Activity Requirements, Impact Quantification Methodologies or Product Requirements	The project activity is eligible under the "End-use energy efficiency" category, as provided in the Community Services Activity requirements, ver. 1.2. Para 3.1.1 (b) states the category as follows: "***End-use energy efficiency:*** *Project activities that reduce energy requirements as compared to baseline scenario without affecting the level and quality of services or products, where the end-user of the products and services are clearly identified and when the physical intervention is required at the user end. For example, efficient cooking, heating, lighting, etc.*"
ii	If not pre identified as eligible, provide evidence of Gold Standard approval	N/A
iii	Demonstrate how the project meets the General Eligibility criteria of the applicable Activity Requirements	The fulfillment of general eligibility criteria is provided right below this table.
iv	Confirm that the project is not registered with any other voluntary or compliance schemes.	The project is not registered as any other activity name or with any other voluntary or compliance scheme. A signed declaration is being submitted by the PP to validate this.

v	Demonstrate the activity is NOT located in a host country, region, locality or state that has an emission reduction cap enforced OR has the possibility to trade emissions that include the scope of the proposed project	The activity is NOT located in a host country, region, locality or state that has an emission reduction cap enforced OR has the possibility to trade emissions that include the scope of the project. This can be checked via host country Rwanda DNA and their commitments to Kyoto protocol.
vi	Demonstrate that no potential for double counting of impacts if the Project Area overlaps with that of another Gold Standard or other voluntary or compliance standard programme of a similar nature.	This will be ensured by assigning unique serial numbers/tags to the project technologies that will be distributed during the monitoring period. Also, it will be ensured that the specific model, the design elements are unique to the project activity, ensuring unique value of the project in the end-user household.
vii	Demonstrate that the project is in compliance with applicable Host Country's legal, environmental, ecological and social regulations	The project activity is in compliance with the applicable host country requirements, which are not limited to legal, environmental, ecological and social regulations. This can be verified through the company registration documents in the host country, which requires information sharing with the government on the nature of business, the scale, the tax and other regulatory requirements, etc. Further, a declaration signed by the project proponent will also be shared.

GS4GG General eligibility criteria fulfillment:

a. Project Type: Gold Standard Principles & Requirements version 1.2 Section 3, para 3.1, sub-para 3.1.1 (a) states that "*Eligible projects shall include physical action/implementation on the ground. Pre-identified eligible project types are identified in the Eligibility Principles and Requirements section.*" In the applicable section 4, para 4.1.3 states that "*A Project type is automatically eligible for Gold Standard Certification if there are Gold Standard approved Activity Requirements and/or Impact Quantification Methodologies associated with it or it's referenced in the Gold Standard Product Requirements. These are published to the Gold*

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Standard website and shall be followed where provided for a given Project type.". Since this project activity falls under the "Community Services Activity" category, where it is replacing kerosene-based lighting technologies with the solar based lighting technology, it is eligible under the end-user energy efficiency category. This is clarified below.

Community Services Activity requirements, ver. 1.2. Para 3.1.1 (b) states the category as follows:

"*End-use energy efficiency: Project activities that reduce energy requirements as compared to baseline scenario without affecting the level and quality of services or products, where the end-user of the products and services are clearly identified and when the physical intervention is required at the user end. For example, efficient cooking, heating, lighting, etc.*" Therefore, the project is eligible under the "lighting" end-use energy efficiency category.

b. Project Location: The project is located in Rwanda, which is in accordance with the Gold Standard Principles & Requirements version 1.2 Section 3, para 3.1, sub-para 3.1.1 (b). Further details have been provided in section A.2 of this report.

c. Project area, project boundary and scale: As per Gold Standard Principles & Requirements version 1.2 Section 3, para 3.1, sub-para 3.1.1 (c), the project activity is not implemented in an area where any project of similar nature is installed or operating. The project boundary includes the physical boundary of the project activity operations (i.e. distribution of Solar Home Lighting Systems within the geographical boundaries of Rwanda). Within the project boundary, GHG emissions are namely – CO_2 emissions, but does not include CH_4 or N_2O emissions. The project qualifies for the small-scale category. This is elaborated in Section A.4 below.

d. Host Country Requirements: The project activity is in compliance with the host country's environmental, ecological and social regulations, and fulfils the requirements set under Gold Standard Principles & Requirements version 1.2 Section 3, para 3.1, sub-para 3.1.1 (d).

e. Contact Details: The contact details of the project participants is provided in Appendix – 2 of this PDD.

f. Legal Ownership: In line with Gold Standard Principles & Requirements version 1.2 Section 3, para 3.1, sub-para 3.1.1 (f), the project owner declares that they have full and uncontested legal ownership of the projects that are eligible for generation under this project.

g. Other Rights: Project developer possesses all the uncontested legal rights and permissions concerning changes in use of other resources required to service the Project.

h. Official Development Assistance (ODA) Declaration: Gold Standard Principles & Requirements version 1.2 Section 3, para 3.1, sub-para 3.1.1 (h) requires declaration on ODA, and the project owner does not avail any ODA for the project activity. GS template declaration stating the same is being submitted alongwith the PDD.

A.1.2. Legal ownership of products generated by the project and legal rights to alter use of resources required to service the project

The legal ownership of products generated by the project and legal rights to alter use of resources required to service the project are with the project participant Biolite, Inc.

A.2 Location of project

The project activity is located in the LDC Rwanda, which is one of the poorest nations in Africa. In terms of grid connectivity, Rwanda is among the lowest performing nations. The project's boundary will include the geographical boundaries of Rwanda. The coordinates of Rwanda are 1° 56' 6.4104'' S, 30° 4' 55.5996'' E.

The map below gives a brief of the project's host country Rwanda, a land-locked nation in Central Africa, with its neighboring countries being Uganda, Tanzania, Burundi, and Congo.

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Figure 1: Map of Project Host Country Rwanda; Source: Nations Online Project[4]; Map No., Version, and Year: Map No. 3717, Version 11.1, published on 01 September 2018; GS Project Title: Biolite Solar Lighting Project in Rwanda; GS Project Number: N/A; Satellite Information: N/A

A.3 Technologies and/or measures

The Solar Home Lighting Systems (hereinafter referred to as SLS) are compact lighting devices utilizing Solar energy. The components include the Solar lights, connecting wires/cables, main distribution box, power switches, Battery, and Solar PV plate for charging.

The project will include different models of SLS to cater to the variety of user requirements, and thus do the justification with their actual requirements and value proposition. For example, the battery capacities of the technologies may vary based on their level of use, while some may have additional features and ports, e.g. radio. Also, the output (wattage) may vary, or the number of lighting points. This way, the models will vary based on multiple factors. However, the type of battery, the distribution box system, the type of Solar PV panel, and the LED lightbulbs will be more or less same in quality and configuration. Therefore, the key distinction between

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[4] Based on UN Geospatial Information Section (formerly UN Cartographic Section). URL:
https://www.un.org/geospatial/content/rwanda

the various models for the project's ER quantification will be the number of LED lightbulbs installed with the project technology.

The most common SLS model is Solar Home 620 (also known as SH620). Figure below provides the image of the project technology model SH620.

Figure 1: The different components of the SLS SH620 are shown as segregated in the image.

The salient features of the technologies are:

1. All the models are in compliance with the IEC Standard 62257-9-5: "Recommendations for renewable energy and hybrid systems for rural electrification - Part 9-5: Integrated systems - Laboratory evaluation of stand-alone renewable energy products for rural electrification", ver. 4.0.
2. All the models meet the Lighting Global Pico PV quality standards.
3. The lighting models have included LED lightbulbs with light output in 100+ lumens.
4. SH620 has a power output of 3.9 W and provides lighting via 4 ports (i.e. 4 LED bulbs), with an average of 4-hours runtime on simultaneous use of all the lights. This model comes with Radio as standard addition.

Rest of the technologies included also will have similar specifications and features.

A.4 Scale of the project

The project qualifies as a small-scale activity, since it is <15 MW renewable Energy project. This is also in-line with the project specific activity requirements (Community Services Activity Requirements). This is demonstrated in the para 3.1.2 (c) which states that

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"*For the purpose of applying UNFCCC methodologies for quantification of GHG reductions, 'small scale' is defined as in CDM Modalities and Procedures for three projects types; Renewable Energy, Energy Efficiency and Others. Please refer to the GHG Emission Reductions and Sequestration Product Requirements for more information on the definition of 'small scale'.*"

As the project is applying Renewable Energy intervention and is using the UNFCC methodology for quantification of GHG emission reductions, it qualifies for the small-scale category.

A.5 Funding sources of project

The project activity does not receive public funding in any form. Also, the project does not receive any support through ODA route. A signed Official Development Assistance (ODA) Declaration is being submitted with the PDD.

SECTION B. APPLICATION OF APPROVED GOLD STANDARD METHODOLOGY (IES) AND/OR DEMONSTRATION OF SDG CONTRIBUTIONS

B.1. Reference of approved methodology (ies)

The Solar Lighting System distribution project activity is applying the CDM approved small scale methodology AMS-I.A: "Electricity Generation by the user", version 17.0. The applicable tools referenced alongwith the methodology are:

i) Tool05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation, ver. 03.0

ii) Tool16: Project and leakage emissions from biomass, ver. 04.0

iii) Tool21: Demonstration of additionality of small-scale project activities, ver. 13.1

iv) Tool22: Leakage in biomass small-scale project activities, ver. 04.0

No standardized baselines have been used for the project activity.

B.2. Applicability of methodology (ies)

The project activity has applied AMS-I.A: "Electricity Generation by the user" ver. 17.0. The methodological applicability conditions are provided in the table below.

Table 1: Methodological applicability for the project activity

Methodology applicability requirement	Justification related to the project activity	Confirmation
1. The methodology is applicable to project activities that involve new installations (greenfield) or replace existing onsite fossil-fuel-fired generation.	The project activity involves new installations.	This will be demonstrated with the help of sales invoices for the SLS installations.
2.The applicability of the methodology is limited to individual households and users that do not have a grid connection except when: (a) A group of households or users are supplied with electricity through a standalone mini-grid powered by renewable energy generation unit(s) where the capacity of the generating units does not exceed 15 MW (i.e. the	For this specific case, though most of the target end-users are not connected to the grid, however, applicability condition (b) applies to the project activity, since it is a Solar based lighting application.	In order to demonstrate the applicability fulfilment under sub-section (b), following will be shared as supporting documents. i) SLS technical specifications document, and

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sum of installed capacities of all renewable energy units connected to the mini-grid is less than 15 MW) e.g. a community-based stand-alone off-the-grid renewable electricity systems; or (b) For renewable energy-based lighting applications, the emission reductions per system is less than 5 tonnes of CO_2e a year and it shall be demonstrated that that fossil fuels would have been used in the absence of the project activity by: (i) A representative sample survey of target households; or (ii) Official statistics from the host country government agencies; (c) A group of households or users are connected to a grid prior to the start date of the project activity (or the start date of validation with due justification), however the electricity from the grid is available for the households and users for less than 36 hours in any given calendar month during the crediting period or the grid connected household coverage in the host country is less than 50%.		ii) A representative sample survey of target households
3. The methodology is not applicable to project activities that include units that will be connected to the grid at any time during the crediting period.	The project SLS will not be connected to the grid at any point during the crediting period.	This can be established through the technical specifications of the SLS models being sold. They are installed in such a way that they only rely on the Solar energy for charging the device battery.
4. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: (a) The project activity is implemented in an existing reservoir with no change in the volume of reservoir;	N/A, since this is not a hydro powered activity.	N/A

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(b) The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity is greater than 4 W/m2; (c) The project activity results in new reservoirs and the power density of the power plant, is greater than 4 W/m2.		
5. Combined heat and power (cogeneration) systems are not eligible under this category.	N/A, since this is not a cogeneration activity.	N/A
6. If the electricity generation unit added has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	N/A, since only renewable energy is used to provide energy supply to the project technology.	N/A
7. Project activities that involve retrofit or replacement of an existing renewable electricity generation unit are included in this category. To qualify as a small-scale project, the total output of the modified or retrofitted unit shall not exceed the limit of 15 MW.	N/A, as the project technology does not involve any retrofit or replacement of an existing RE generation unit.	N/A
8. In the case of project activities that involve the addition of renewable electricity generation units to an existing renewable electricity generation facility, the total capacity of the units added by the project should be lower than 15 MW and should be physically distinct1 from the existing units.	N/A, since the project activity is a new activity, with installation of solar lighting applications, making SLS reach resource deprived households.	N/A
9. In cases where the project activity utilizes biomass, the applicability conditions of "TOOL16: Project and leakage emissions from biomass" shall apply.	N/A, as it is not a biomass based project activity.	N/A

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B.3. Project boundary

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Source		GHGs	Included?	Justification/Explanation
Baseline scenario	Kerosene	CO_2	Yes	Major source of GHG emissions from Kerosene burning
		CH_4	No	Doesn't release on Kerosene burning.
		N_2O	No	Doesn't release on Kerosene burning.
Project scenario	Solar Lighting System	CO_2	No	Solar technologies do not emit GHGs.
		CH_4	No	Solar technologies do not emit GHGs.
		N_2O	No	Solar technologies do not emit GHGs.

B.4. Establishment and description of baseline scenario

Prior to the project activity, the baseline in the project location was usage of fossil fuels for lighting purposes. The project technology end users were using kerosene for their lighting needs. This is mainly because of the lack of available infrastructure in the host country Rwanda. In Rwanda, only 37.8% of households have been electrified by 2019, which is very low. From the total population, only 26.2% of rural population has access to electricity. In the lack of available resources, the local population seeks alternatives which are cheaper as well as easily available. In Rwanda, kerosene is a readily available and cheap option.

Kerosene, being a fossil fuel leads to GHG emissions in the form of CO_2, whereas it is also a major health concern among the users. Kerosene burning releases Black Carbon (BC) which leads to respiratory diseases among the population exposed, and is a primary reason for death among children in developing nations due to pneumonia. Apart from kerosene, the extremely poor population in Rwanda relies on firewood as well for their lighting needs. The use of firewood and kerosene are cheapest options and do not require any expert knowledge on their application for lighting. Both of these options are harmful for the environment as well as users' health, and therefore, the project replaces these fossil fuels for lighting purposes.

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A team of researchers led by Dr. Bates[5], during one of their reviews[6] on kerosene uses, has led to conclude the below:

"Kerosene lamps have seldom been considered in studies of the health impacts of fuels in developing countries," Dr. Bates states, and adds that this is probably because lamps consume a relatively small amount of fuel compared to stoves. However, it was presumed by their research team that this "overlooks the fact that exposure to emission products from lamps may be considerable due to the close proximity of the user, often for extended periods of time in the evening." Bates found that kerosene use, especially for lighting, was associated with tuberculosis in a developing country Nepal.

In developing nations within South-East Asia and Africa, people depend on the cheaper options of lighting for their survival. These cheaper options generally include kerosene and firewood, and they do come at a much higher environmental cost, which causes an irreparable damage to the planet, and generally becomes a cause of respiratory health hazards.

Despite its short lifespan, Black Carbon[7] (BC) absorbs a million times more energy per unit mass than CO_2. Black Carbon also contributes to the melting of glaciers as it reduces the amount of light they reflect when it settles upon the ice and snow surfaces (WHO, 2016).

Household Air Pollution account for 25% of the global BC emissions, and after CO_2, BC is estimated to be the most important contributor to global warming. It is therefore the world's second largest contributor to climate change. However, since BC has such a short lifespan in the atmosphere, reducing it would almost instantly slow global warming (WHO, 2016).

In Section 3.7.1 of the National GHG Inventory of Rwanda 2021, Kerosene is mentioned as a major source of GHG emissions from households. Kerosene is used for both lighting and cooking activities.

In one of the research papers on household lighting fuel choices in Rwanda[8], following was observed:

"*In terms of the Rwandan household energy choice, results show that the highest proportion (45.02%) of households used batteries with bulbs as main lighting fuel. This was seconded by kerosene (18.60%), then electricity (18.01%) with solar panels (1.78%) being the lowest on the frequency of use as main primary energy source for*

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[5] https://www.niehs.nih.gov/research/programs/geh/geh_newsletter/2013/1/spotlight/kerosene_a_widely_used_fuel_with_unknown_health_risks.cfm
[6] https://pubmed.ncbi.nlm.nih.gov/22934567/
[7] http://www.diva-portal.org/smash/get/diva2:1213974/FULLTEXT01.pdf
[8] https://www.researchgate.net/publication/344711624_Determinants_of_Home_Lighting_Fuel_Choices_in_Rwanda_A_Discrete_Choice_Analysis

lighting. Other fuels such as candles (7.07%) and fuelwood (9.52%) constituted smaller proportions of the total sample."

This states that Kerosene is prevalent as a lighting fuel in Rwanda.

The Solar Home Lighting system distributed under the GS project activity is a cleaner, eco-friendly alternative, and uses Solar light as fuel which is available to the locals at no additional cost.

Also, there are no project emissions released by the project technology use.

B.5. Demonstration of additionality

The Gold Standard Community Activity Requirements v1.2 in Paragraph 4.1.9 states

that:

"Projects that meet any of the following criteria are considered as deemed additional and, therefore, are not required to prove Financial Additionality at the time of Design Certification:

(a) Positive list (Annex B of this document)

(b) Projects located in LDC, SIDS, LLDC

(c) Microscale projects"

Below table specifies the auto-additionality of the project activity in terms of GS4GG requirements.

Specify the methodology, activity requirement or product requirement that establishes deemed additionality for the proposed project (including the version number and the specific paragraph, if applicable).	Paragraph 4.1.9 of the GS Community Services Activity Requirements (Version 1.2): "Projects that meet any of the following criteria are considered as deemed additional and therefore are not required to prove Financial Additionality at the time of Design Certification: (a) Positive list (Annex B of this document) (b) Projects located in LDC, SIDS, LLDC (c) Microscale projects"
Describe how the proposed project meets the criteria for deemed additionality.	This VPA is located in Rwanda, which is a Least Developed Country (LDC) as

	defined by the United Nations and therefore, can be considered as deemed additional as per the paragraph 4.1.9 (b) above and consequently the Financial Additionality is not required to be proved at the time of Design Certification.

B.5.1 Prior Consideration

N/A

B.5.2 Ongoing Financial Need

N/A

B.6. Sustainable Development Goals (SDG) outcomes

Relevant Target/Indicator for each of the three SDGs

Sustainable Development Goals Targeted	Most relevant SDG Target	SDG Impact
		Indicator (Proposed or SDG Indicator)
13 Climate Action (mandatory)	Target 13.3 – Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.	GHG Emission Reductions
1 No Poverty	Target 1.1- By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day.	Expenditure savings per year by user households on lighting
7 Clean, Affordable Energy for all	Target 7.1: By 2030, ensure universal access to affordable, reliable and modern energy services.	Population with access to clean and affordable solar lights

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B.6.1 Explanation of methodological choices/approaches for estimating the SDG Impact

The methodological choices are in line with the applied methodologies - **AMS-I.A. "Electricity generation by the user"**, Ver. 17.0. The methodological applicability has already been justified in Section B.2 above in this PDD.

Total baseline emissions for period v are calculated as the sum of the baseline emissions of each lamp type i in the period:

$BEv = \sum_{i=1}^{n} BEi,v$

Parameter	Unit	Type	Value
BEv	tCO$_2$	Calculated	Emissions generated in the absence of the project activity in period v by all lamps
BEi,v	tCO$_2$	Calculated	Emissions generated in the absence of the project activity in period v by all lamps of type i

Ex post baseline emission for each lamp type i is calculated with the following equation:

$$BE_v = \sum_{a=1}^{n}(N_{i,a}*d_{i,a,v})*l_i * h * \frac{1}{LE_{ker}}*EF_{ker}*10^{-6}*3.6*CF_{i,v,LFR}$$

Where $CF_{i,v,LFR} = 1 - LFR_{i,v}$

Parameter	Unit	Type	Description
BE$_v$	tCO$_2$	Calculated	Emissions generated in the absence of the project activity in period v by all lamps of type i
N$_{i,a}$	Number	Monitored	The total number of solar lamps of type i deployed in period a
d$_{i,a,v}$	Days	Monitored/ calculated	Average number of days lamps of type i that have been deployed in period a were operating in period v
l$_i$	Lumen	Monitored (once per lamp type)	Nominal lumen output of solar lamps of the type I deployed as part of the project activity
h	Hours/day	Fixed	Average operating hours of kerosene lamps in the baseline
LE$_{ker}$	Lumen/W	Fixed	The specific light output of kerosene when burnt in a kerosene lantern

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EF_{ker}	tCO_2/GJ	Fixed	The specific CO_2-emissions of kerosene
$CF_{i,v,LFR}$	-	Monitored/ Calculated	This factor corrects the BE to calculate for total number of lamps of type *i* that were found to be operational, by accounting the Lamp Failure rate.
$LFR_{i,v}$	%	Monitored	Share of lamps of lamp type *i* in checked sample group $g_{i,v}$ not operational in period *v*.

In line with the applied methodology, project emissions and leakage emissions are not present and hence not included.

B.6.2 Data and parameters fixed ex ante

SDG13

Data/parameter	LE_{ker}
Unit	Lumen/W
Description	The specific luminous efficiency of kerosene when burnt in a kerosene lantern
Source of data	Table – 1, comparison of non-electric lamps with standard lamp; Working paper, titled "Domestic Lighting" by Robert van der Plas, Industry and Energy Department, World Bank, 1988[9]
Value(s) applied	0.1
Choice of data or Measurement methods and procedures	A kerosene wick lamp has a luminous efficiency of 0.1 lumen/W, which is mentioned in the World Bank study.
Purpose of data	Calculation of Baseline Emissions
Additional comment	-

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[9] https://documents1.worldbank.org/curated/en/274831468739224368/pdf/multi-page.pdf

Data/parameter	EF_{ker}
Unit	tCO_2/GJ
Description	The specific CO_2 emissions of kerosene
Source of data	2006 IPCC guidelines for National Greenhouse Gas inventories
Value(s) applied	0.0708
Choice of data or Measurement methods and procedures	Applied methodology states the following – For option 3, EF_{CO2} shall be determined as per the "TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation". Tool05 "Option d" for the Emission Factor (within the table) is that the usage of option d will be applicable only in case where value from option a is not available. Option d: "*IPCC default values at the upper or lower limit – whatever is more conservative – of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.*" Option d under Tool05 gives the default value of 0.0716 tCO_2/GJ, 0.0708 tCO_2/GJ at lower limit and 0.0737 tCO_2/GJ at upper limit (both at 95% confidence interval). Of these three, the most conservative value was the lower limit, which has been applied here.
Purpose of data	Calculation of Baseline Emissions
Additional comment	-

Data/parameter	h
Unit	Hours/day

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Description	Number of hours baseline lighting technology was used in a day
Source of data	Methodological default value from the applied methodology
Value(s) applied	3.5
Choice of data or Measurement methods and procedures	Para 25 of AMS-I.A, ver. 17.0 states that "*In the specific case of lighting devices, a daily usage of 3.5 hours per day shall be assumed for the projection of the fuel consumption.*"
Purpose of data	Calculation of Baseline Emissions
Additional comment	-

SDG 1

N/A

SDG 7

N/A

B.6.3 Ex ante estimation of SDG Impact

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SDG 13 Impact:

The ex-ante estimates have been considered using the appropriate fixed ex-ante parameter values and assumptions for to-be-monitored values.

There have been a few considerations, which were part of the VER calculations. These are provided below.

1. The ER calculations below are only considering the crediting period's First[10] year distribution data indicated here.

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[10] In order to access the ER calculations for the whole first crediting period, please refer the ER estimation Sheet drafted and designed for the same purpose.

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2. To maintain uniformity while representing the ER calculations, only Solar Home 620 model for the SLS was considered. As more and more models will add up to the project, the ER calculations will be done separately for each of those models.

3. The final values shown as SDG impacts are the annual average for the whole first crediting period.

The ex-ante estimates for GS VERs expected during the first year of crediting are calculated using the equation below.

$$BE_v = \sum_{a=1}^{n}(N_{i,a}*d_{i,a,v})*l_i * h * \frac{1}{LE_{ker}}*EF_{ker}*10^{-6}*3.6*CF_{i,v,LFR}$$

Parameter	Unit	Type	Value
BE_v	tCO_{2e}	Calculated	Provided as calculated, at the end of this table.
$N_{i,a}$	Number	Monitored	180,000
$d_{i,a,v}$	Days	Monitored/ calculated	365
l_i	Lumen	Monitored (once per lamp type)	100
h	Hours/day	Fixed	3.5
LE_{ker}	Lumen/W	Fixed	0.1
EF_{ker}	tCO_2/GJ	Fixed	0.0708
$CF_{i,v,LFR}$	-	Monitored/ Calculated	1
$LFR_{i,v}$	%	Monitored	0%

$BE_y = BE_{i,y}$, for the SLS model Solar Home 620 for year – 1.

$BE_{SH620,y1}$ = $(180,000*365*100*3.5*(1/0.1)*0.0708*(10^{-6})*3.6*1.0)$ tCO_{2e}

$\qquad$ = 58,609.656 tCO_{2e}

$BE_{SH620,y1}$ (rounded-down) = 58,609 tCO_{2e}

SDG 1 Impact:

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The per household annual savings on Kerosene for lighting purposes in Rwanda is estimated at USD ~60.0, which is sourced from OECD[11] 2014 report data. The data provides that the households with Solar lights save around RWF 5,000 per month on expenditure, which lead to an annual savings of around RWF 60,000. If we convert this data into USD, we get USD 59.613[12].

However, since the inflation, fuel price rise, and other factors have not played any significant role on the kerosene price, it is conservatively assumed that the price would be considerably at the same levels. Therefore, the annual savings to households is calculated by multiplying the number of users who purchased the project SLS with the savings per household.

Expenditure savings = Baseline Expenditure – Project Expenditure.

As we assumed that 60,000 SLS would be sold in year – 1, in that case the savings in the fuel cost for the first year by the project activity in the households would total at USD 3,600,000. The annual average for the whole crediting period comes at USD 3,840,000.

Expenditure savings$_{y1}$ = USD 3,600,000 – USD 0.0

$$= USD\ 3,600,000.0$$

SDG 7 Impact:

In this case, the number of LED lamps are considered the impact technology. As every individual Solar powered lamp is replacing a kerosene lamp/lantern, it is contributing towards the clean energy access for all. At one point of time, 3 different LED lights are being used, thus reducing users' reliance on the conventional fossil-fuel based lighting technologies.

For year – 1, the number of lamps sold is 180,000[13]. The annual average of this parameter is 192,000.

B.6.4 Summary of ex ante estimates of each SDG Impact

SDG 13: Climate Action

Year	Baseline estimate	Project estimate	Net benefit

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[11] Source: Section 5.7, Table 22; https://www.oecd.org/derec/netherlands/Access-to-Energy-in-Rwanda.pdf
[12] https://www.xe.com/currencyconverter/convert/?Amount=60000&From=RWF&To=USD
[13] Each Solar Home 620 Solar Lighting System consists of 3 separate LED lightbulbs, and the total technologies sold for year – 1 are around 80,000. Therefore, total number of lamps sold is 240,000.

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Year 1 (2020-2021)	58,609	0	58,609
Year 2 (2021-2022)	64,470	0	64,470
Year 2 (2022-2023)	64,470	0	64,470
Year 4 (2023-2024)	64,470	0	64,470
Year 5 (2024-2025)	64,470	0	64,470
Total	**3,16,489**	**0**	**3,16,489**

Total number of crediting years	5		
Annual average over the crediting period	**63,298**	**0**	**63,298**

SDG 1: No Poverty

Year	Baseline expenditure	Project exenditure	Net benefit
Year 1 (2020-2021)	36,00,000	0	36,00,000
Year 2 (2021-2022)	39,60,000	0	39,60,000
Year 2 (2022-2023)	39,60,000	0	39,60,000
Year 4 (2023-2024)	39,60,000	0	39,60,000
Year 5 (2024-2025)	39,60,000	0	39,60,000
Total	1,94,40,000	0	1,94,40,000
Annual average over the crediting period	**38,40,000**	**0**	**38,40,000**

SDG 7: Clean, affordable energy for all

Year	Baseline estimate	Project estimate	Net benefit

Year 1 (2020-2021)	0	1,80,000	1,80,000
Year 2 (2021-2022)	0	1,98,000	1,98,000
Year 2 (2022-2023)	0	1,98,000	1,98,000
Year 4 (2023-2024)	0	1,98,000	1,98,000
Year 5 (2024-2025)	0	1,98,000	1,98,000
Total	0	9,72,000	9,72,000
Annual average over the crediting period	**0**	**1,92,000**	**1,92,000**

B.7. Monitoring plan

B.7.1 Data and parameters to be monitored

SDG 13

Data / Parameter	$N_{i,a}$
Unit	Number
Description	Total number of solar lamps[14] of type i that have been deployed in period a
Source of data	Sales Database

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[14] It is to be noted here that ER calculations are accounting for each individual LED light bulb installed with SLS, as it is replacing kerosene lamp and thus accounting towards GHG emission reductions.

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Value(s) applied	Year	Total No. of Lamps Sold*
	Year 1 (2020-2021)	1,80,000
	Year 2 (2021-2022)	1,98,000
	Year 2 (2022-2023)	1,98,000
	Year 4 (2023-2024)	1,98,000
	Year 5 (2024-2025)	1,98,000
Measurement methods and procedures	All the Solar LED light bulbs in the Solar Lighting Systems will be counted, based on the Sales database records and the SLS model sold.	
Monitoring frequency	Annual	
QA/QC procedures	Each SLS has a unique serial number assigned, which will provide information on date of installation, model number, ownership information, etc. This information will be added to the Sales database.	
Purpose of data	Calculations of Baseline Emissions	
Additional comment	-	

Data / Parameter	L_i
Unit	Lumens
Description	Lumen output of each solar LED lightbulb i deployed as part of the project activity
Source of data	Manufacturer's specifications of the SLS models added to the project activity
Value(s) applied	100

Measurement methods and procedures	Will be inserted to the project sales database at the time of introduction of an SLS model into project activity
Monitoring frequency	Annual
QA/QC procedures	Each individual lamp's actual Lumen value will be used, and will be checked via the models sold for that duration.
Purpose of data	Calculations of Baseline Emissions
Additional comment	A conservative value of 100 Lumen is used to calculate the ERs in the ex-ante scenario. At the time of project monitoring and verification, conservative upper cap 100 Lumens will be used. In case the value is below 100 Lumens, actual will be used, whereas if it is >100 Lumens, 100 Lumens will be used for ER calculations.

Data / Parameter	$D_{i,a,v}$
Unit	Number
Description	Average number of days lamps of type i that have been deployed in period a were operating in period v
Source of data	Sales database
Value(s) applied	365
Measurement methods and procedures	The value applied will be average of number of days in the monitoring period from the day the solar lighting technology is installed. This will vary for different models.
Monitoring frequency	Annual
QA/QC procedures	The sales database management team will make sure no SLS are doubly counted, and no two different SLS models (with varying number of LED lightbulbs) data are clubbed to create a higher number of operation days for the LED bulbs.
Purpose of data	Calculations of Baseline Emissions
Additional comment	-

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Data / Parameter	$LFR_{i,v}$
Unit	%
Description	Lamp failure rate: Share of LED lightbulbs of SLS type i in a checked sample group not operational in period v
Source of data	Monitoring Survey report
Value(s) applied	0
Measurement methods and procedures	Number of non-functional LED bulbs will be tracked during the monitoring survey. $$Lamp\ Failure\ Rate = \frac{Number\ of\ non\text{-}functional\ LEDs}{Total\ no.\ of\ LEDs^{15}\ checked}$$
Monitoring frequency	Annual
QA/QC procedures	During the survey, it'll be checked if any SLS has any of the multiple lights not working, non-functional. All the non-functional LED bulbs will be added to the survey records, and will be used to arrive at the Lamp Failure Rate.
Purpose of data	Calculations of Baseline Emissions
Additional comment	-

Data / Parameter	Kerosene usage in the baseline
Unit	N/A
Description	Parameter to determine whether the end-user used kerosene for lighting prior to using the project technology or not

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[15] For this parameter, number of LED bulbs will be used to arrive at LFR and not the SLS.

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Source of data	Data recorded in the sales database at the time of sales of SLS, getting the user's confirmation that they were using the kerosene before using the project technology
Value(s) applied	0
Measurement methods and procedures	There will be no monitoring or measurement methods required for this confirmation. This will be recorded directly at the time of sales of the SLS to the user.
Monitoring frequency	Annual
QA/QC procedures	Sales database records and individual confirmation alongwith the sales receipt/invoice can be matched to cross-check the kerosene usage status of the user(s).
Purpose of data	Calculations of Baseline Emissions
Additional comment	-

SDG 1

Data / Parameter	SDG 1: No Poverty Indicator: Expenditure savings per year by user households on lighting
Unit	USD[16]
Description	Savings on expenditure spent on lighting purposes annually after using project SLS
Source of data	For expenditure savings, the data is used from a literature source[17], which provides USD 47 as the value households in Rwanda save annually. In order to obtain the value for a whole year, the number of SLS sold will be multiplied with the per household savings value (i.e. USD 60), in order to obtain annual savings achieved by the project activity households.

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[16] United States Dollar will be used as the standard comparison currency, and the exchange rate will be accessed from the below website. URL: https://www.xe.com/currencyconverter/convert/?Amount=1&From=USD&To=MWK
[17] Source: Section 3.4; https://www.sciencedirect.com/science/article/abs/pii/S0301421509008209

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Value(s) applied	USD 30,08,000
Measurement methods and procedures	For 60,000 SLS (sales data for year – 1), it'll be USD 60*60,000 = USD 3,600,000.
Monitoring frequency	Annual
QA/QC procedures	The reference value of savings will be reviewed for every monitoring, and will be revised if more than 10% variation will be noticed via credible study.
Purpose of data	Calculation of SDG – 1 impact
Additional comment	For the whole crediting period, estimates may be accessed using the ER estimation sheet.

SDG 7

Data / Parameter	SDG 7: Clean, affordable energy for all Indicator: Population with access to clean and affordable solar lights
Unit	Number
Description	Number of Solar LED lightbulbs distributed by the project activity
Source of data	Sales Database
Value(s) applied	180,000 (year – 1)
Measurement methods and procedures	The calculation for the parameter value will be done as follows. Number of LED lightbulbs sold = Number of LED lightbulbs in a Solar Home Lighting System model * Number of units of that specific model sold during the period. For example,

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	For year – 1, sales is assumed to be at 80,000 units for SH620 model. The number of LED lightbulbs available in the model are 3. Therefore, Number of LED lightbulbs sold (year – 1) = 60,000 * 3 = 180,000.
Monitoring frequency	Annual
QA/QC procedures	N/A
Purpose of data	Calculation of SDG – 7 impact
Additional comment	The estimates for rest of the crediting period may be accessed from the corresponding ER estimation sheet.

B.7.2 Sampling plan

A statistically valid sampling will be applied to the parameters that'll require monitoring surveys. This will follow the CDM Standard on Sampling: Sampling and surveys for CDM project activities and programmes of activities, ver. 09.0.

The most probable sampling method that is expected to be adopted will be Simple random sampling. The whole population of Rwanda is demographically similar when it comes to similar use of identical lighting technologies. It cannot be expected that two households using kerosene lamp as baseline lighting technology would vary with each other in terms of their lighting usage behavior.

The surveys will use questionnaires, on-site visits or telephone calls (whichever is possible at the time of monitoring), and will also ensure statistical confidence & precision rule of 90:10[18].

Sampling Methodology

To reduce monitoring efforts a single sample is drawn based on which all of the parameters determined via sampling shall be monitored. The Project Owner (PO) will determine the number of users/appliances monitored during sampling for each of the parameters separately. The reason is that the variation within the values obtained will

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[18] This is in conformity with the confidence:precision level defined in the CDM Standard: Sampling and surveys for CDM project activities and programmes of activities, ver. 09.0, Para 6 (c) (iii) & para 11.

be different for each parameter. Since the precision of a sampled parameter depends on the variation of its values, the necessary number of users/appliances to be monitored in order to achieve the 5% or 10% precision will also depend on the variation of values. Therefore, although the monitoring team will undertake monitoring of various parameters simultaneously and on the same sample, the managing entity may decide to stop monitoring of a particular parameter during the campaign once the required precision for this parameter is achieved. The monitoring team will continue to monitor appliances in the sample with respect to the remaining parameter(s) until again the required precision for these parameters is achieved.

Statistical sampling using a random number generated will be used to select samples from sampling frames drawn from Credit Tracker for monitored parameters.

Sample size will be determined through the below:

Step 1: For each monitoring period, contact details from end-users will be collected for all, or a subset of, SLS deployed. This will be stored in Sales Database.

Step 2: In order to reflect the different age of SLS sold (i.e. the different installation dates), the relative share of SLS vintages within the total population of appliances deployed as recorded in sales database shall be established.

Example: If after the second monitoring period, 75% of all SLS were installed during the end of the first Monitoring Period, and 25% were installed during the end of the second Monitoring Period, then the final selection shall also represent that share. Similarly, within each monitoring period, probability weighted sampling will reflect the number of SLS sold per calendar year.

B.7.3 Other elements of monitoring plan

The sampling, survey, and monitoring for the project activity will be done by a dedicated team. This shall include

1. Introduction of Monitoring Plan

This Monitoring plan will set out a number of monitoring tasks in order to ensure that all aspects of projected greenhouse gas (GHG) emission reductions for the proposed project are controlled and reported. This requires an ongoing monitoring of the project to ensure performance according to its design and that claimed emission reductions are actually achieved.

The monitoring plan of the GS project is a guidance document that provides the set of procedures for preparing key project indicators, tracking and monitoring the impacts

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of the proposed project. The monitoring plan will be used throughout the defined crediting period for the project to determine and provide documentation of GHG emission impacts from the proposed project. This monitoring plan fulfils the requirement set out by the Kyoto Protocol that emission reductions projects have real, measurable and long-term benefits and that the reductions in emissions are additional to any that would occur in the absence of the certified project activity.

The monitoring plan provides the requirements and instructions for:

• Establishing and maintaining the appropriate monitoring systems for electricity generated by the project;

• Quality control of the measurements;

• Procedures for the periodic calculation of GHG emission reductions;

• Assigning monitoring responsibilities to personnel;

• Data storage and filing system;

2 Management of the Monitoring Plan & Procedure

2.1 Staffs training

To ensure the successful implementation of the monitoring plan, the staffs responsible for project operation, data recording, documents storage etc. should be trained to meet their positions. This program includes the operational training, the equipment maintenance training, the data management training, the examining and repairing training and etc., which is able to ensure the successful operation and the data & documents management.

2.2 Monitoring structure

Project proponents (Biolite, inc. & Swiss Carbon Value Ltd.) will conduct monitoring procedures according to the monitoring methodology chosen for this project activity. This monitoring methodology will enable the recording of emission reductions and any possible leakage effects in an accurate and conservative manner.

Project proponents will appoint on-site staff (at the project activity site), who will be in-charge of gathering and registering all the required information described in the monitoring plan. Such duties will be included into the routine work of the operators to ensure continuity and high-quality standards. The information will be partially processed and stored there, and will be sent periodically (monthly) for final processing (table formats, reports, etc.).

The responsibilities for carrying out these tasks are broadly elaborated in below.

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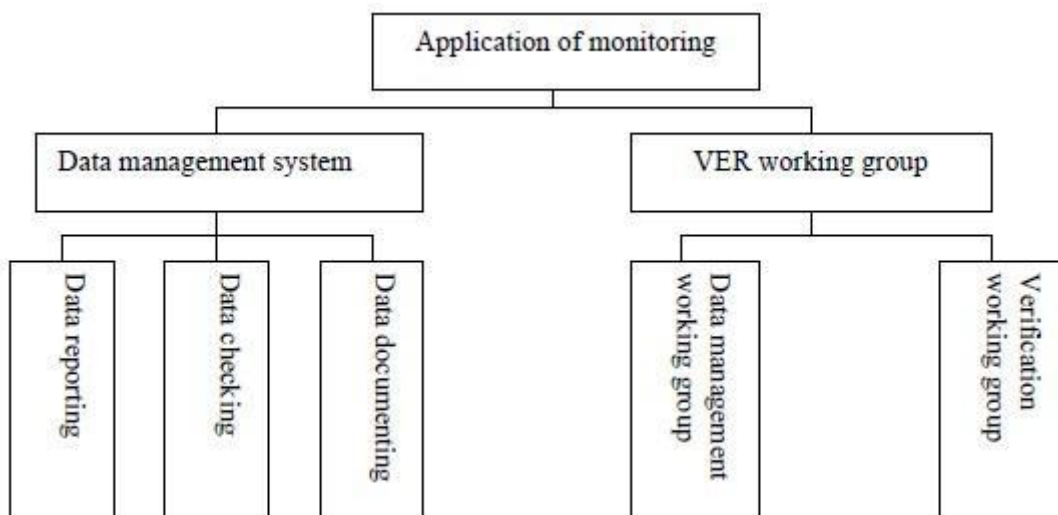
SECTION C. DURATION AND CREDITING PERIOD

C.1. Duration of project

C.1.1 Start date of project

15/09/2020.

C.1.2 Expected operational lifetime of project

15 years. The maximum applicable crediting period for the project activity is 15 years (5 years of crediting period with an option for renewal twice), hence considered as the project's expected operational lifetime.

C.2. Crediting period of project

C.2.1 Start date of crediting period

15/09/2020

C.2.2 Total length of crediting period

5 Years (i.e. from 15/09/2020 to 16/09/2025) The crediting period may be renewed twice in line with the Community Services Activity Requirements.

SECTION D. SUMMARY OF SAFEGUARDING PRINCIPLES AND GENDER SENSITIVE ASSESSMENT

D.1 Safeguarding Principles that will be monitored

A completed Safeguarding Principles Assessment is in Appendix 1, ongoing monitoring is summarised below.

Principles	Mitigation Measures added to the Monitoring Plan
Principle 2. Gender Equality and Women's rights	The project activity doesn't endorse any form of discrimination based on gender. Solar home systems will be distributed to all willing customers within the project boundary.
Principle 3. Community Health, Safety and Working Conditions	The project doesn't expose the community to increased health risks and is not adversely affecting the health of workers and the community. Use of project solar home systems will contribute in improving the health of users as compared to inefficient traditional lighting sources by reducing the indoor air pollution. The workers participating in the project activity are not exposed to unsafe or unhealthy work environments as the sale/distribution of solar home systems or the monitoring activities of the project will not include any hazardous chemicals or other hazardous material.
Principle 6.1. Labour Rights	The project is implemented on the ground by the PO in collaboration with other project partners. The project employment will be in compliance with national labor occupational health and safety laws and with the principles and standards embodied in the ILO fundamental conventions. The workers employed by PO for the project are able to establish and join labor organizations. The working agreements with the individual workers will be documented and implemented and the minimum requirements stated will be respected as applicable. The minimum age for possible staff hired is 18. All the workers will be provided with appropriate equipment, training documentation and reporting of accidents and incidents, and emergency preparedness and response measures.
Principle 7. Climate and Energy	The project will reduce the GHG emissions which will be monitored and verified in line with the applied methodology. The project does not use energy from a local grid or power supply.
Principle 8.2. Erosion and/or water body stability	The project will not affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity. Similarly the project will not directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion.

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Principle 9.4. Release of pollutants	As the project includes distribution of solar home systems, there is no risk of releasing pollutants to the environment.

D.2. Assessment that project complies with GS4GG Gender Sensitive requirements

Question 1 - Explain how the project reflects the key issues and requirements of Gender Sensitive design and implementation as outlined in the Gender Policy?	The project will incorporate measures to ensure that there is no discrimination based on gender. The solar home systems will be distributed to all willing customers within the project boundary.
Question 2 - Explain how the project aligns with existing country policies, strategies and best practices	Rwanda has a National Gender Policy, 2010 which highlights principal guidelines on which sectoral policies and programmes will base to integrate gender issues in their respective social, cultural, economic and political planning and programming. The Government of Rwanda also attaches great importance to the promotion of gender equality and equity as a prerequisite for sustainable development. The project will contribute towards the goal of the policy by providing households with efficient, clean and reliable solar energy thereby they will spend less money on inefficient and polluting lighting sources and will be able to live in cleaner environments.
Question 3 - Is an Expert required for the Gender Safeguarding Principles & Requirements?	No
Question 4 - Is an Expert required to assist with Gender issues at the Stakeholder Consultation?	No

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SECTION E. SUMMARY OF LOCAL STAKEHOLDER CONSULTATION

The below is a summary of the 2 step GS4GG Consultation for monitoring purposes. Please refer to the separate Stakeholder Consultation Report for a complete report on the initial consultation and stakeholder feedback round.

E.1 Summary of stakeholder mitigation measures

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The Local Stakeholder consultation meeting could not be hosted by the project activity due to COVID-19 outbreak at the time project was being initiated in mid-2020. Ever since, situation has not improved much on allowing the stakeholders to meet in person and put forward their grievances and concerns, voice out their suggestions and opinions related to the project.

However, given the criticality of this step, it is being planned that the project proponents will conduct the Local Stakeholder Consultation meeting at the time of project validation.

Currently, for the preliminary review, the project is seeking relaxation on this Section, in-line with the COVID-19 interim measures introduced by the GS4GG.

E.2 Final continuous input / grievance mechanism

Method	Include all details of Chosen Method (s) so that they may be understood and, where relevant, used by readers.
Continuous Input / Grievance Expression Process Book (mandatory)	Grievance Expression book has been placed at our distribution/retail partner office locations in Rwanda. Stakeholders are free to voice their concerns via the Grievance Expression Book. By maintaining feedback book at the local office, it is ensured that stakeholders that don't have access to electronic media for expressing concerns / grievances are also able to share their concerns / feedback. Additionally, the end users always have an option to revert to the salesperson (representative of distribution/retail partners etc.) in case of any feedback / complaints with the product post distribution.
GS Contact (mandatory)	help@goldstandard.org

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Other	Customer Care: +254 706 896 556, Email: support@bioliteenergy.com As per para 2.4 of Annex W of GS, the stakeholders with internet access have an option of contacting PO through the email id provided.

APPENDIX 1 - SAFEGUARDING PRINCIPLES ASSESSMENT

Complete the Assessment below and copy all Mitigation Measures for each Principle into SECTION D above. Please refer to the instructions in the Guide to Completing this Form.

Assessment Questions/ Requirements	Justification of Relevance (Yes/potentially/no)	How Project will achieve Requirements through design, management or risk mitigation.	Mitigation Measures added to the Monitoring Plan (if required)
Principle 1. Human Rights			
1. The Project Developer and the Project shall respect internationally proclaimed human rights and shall not be complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights 2. The Project shall not discriminate with	No	The project will be implemented in collaboration with local partners and PO will respect internationally proclaimed human rights and shall not be complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Right. The project will not discriminate with regards to participation and inclusion.	N/A

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regards to participation and inclusion			
Principle 2. Gender Equality			
1. The Project shall not directly or indirectly lead to/contribute to adverse impacts on gender equality and/or the situation of women 2. Projects shall apply the principles of nondiscrimination, equal treatment, and equal pay for equal work 3. The Project shall refer to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks 4. (where required) Summary of opinions and recommendations of an Expert Stakeholder(s)	No	The project activity doesn't endorse any form of discrimination based on gender. Solar Home Systems will be distributed to all willing customers within the project boundary. Rwanda has a National Gender Policy, 2010 which highlights principal guidelines on which sectoral policies and programmes will base to integrate gender issues in their respective social, cultural, economic and political planning and programming. The Government of Rwanda also attaches great importance to the promotion of gender equality and equity as a prerequisite for sustainable development. The project will contribute towards the goal of	N/A

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		the policy by providing households with efficient, clean and reliable solar energy thereby they will spend less money on inefficient and polluting lighting sources and will be able to live in cleaner environments.	
Principle 3. Community Health, Safety and Working Conditions			
1. The Project shall avoid community exposure to increased health risks and shall not adversely affect the health of the workers and the community	No	1. The project doesn't expose the community to increased health risks and is not adversely affecting the health of workers and the community. Use of Solar home systems will contribute in improving the health of users as compared to inefficient lighting sources by reducing the indoor air pollution. The workers participating in the project activity are	N/A

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		not exposed to unsafe or unhealthy work environments as the sale/distribution of solar lights or the monitoring activities of the project will not include any hazardous chemicals or other hazardous material.	
Principle 4.1 Sites of Cultural and Historical Heritage			
Does the Project Area include sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture?	**No**	Since this is a solar home system project, there is no risk of risk to cultural and historic heritage.	**N/A**
Principle 4.2 Forced Eviction and Displacement			

Does the Project require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial)?	**No**	Since this is a solar home system project, there is no risk of risk of forced eviction and displacement.	**N/A**
Principle 4.3 Land Tenure and Other Rights			
a. Does the Project require any change, or have any uncertainties related to land tenure arrangements and/or access rights, usage rights or land ownership? b. For Projects involving land use tenure, are there any uncertainties with regards to land tenure, access rights, usage rights or land ownership?	**No**	Since this is a solar home system project, there is no risk of uncertainty due to land rights/ownership.	**N/A**
Principle 4.4 - Indigenous people			

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Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?	No	Since this is a solar home system distribution project, there is no risk to land/territory claimed by indigenous peoples. Solar Home systems will be distributed to all willing customers within the project boundary.	N/A
Principle 5. Corruption			
1. The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects	No	PO will ensure that the project doesn't involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects.	N/A
Principle 6.1 Labour Rights			
1. The Project Developer shall ensure that all employment is in compliance with national labour occupational health and safety laws and with the principles	No	1. The project is implemented on the ground by the PO in collaboration with other project partners. The project employment will be in compliance	N/A

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and standards embodied in the ILO fundamental conventions
2. Workers shall be able to establish and join labour organisations
3. Working agreements with all individual workers shall be documented and implemented and include:
  a) Working hours (must not exceed 48 hours per week on a regular basis), AND
  b) Duties and tasks, AND
  c) Remuneration (must include provision for payment of overtime), AND
  d) Modalities on health insurance, AND
  e) Modalities on termination of the contract with provision for voluntary
		with national labor occupational health and safety laws and with the principles and standards embodied in the ILO fundamental conventions.
		
		2. The workers employed by PO for the project are able to establish and join labor organizations.
		3. The working agreements with the individual workers will be documented and implemented and the minimum requirements stated will be respected as applicable.
		4. The minimum age for possible staff hired is 18.
		5. All the workers will be provided with appropriate equipment, training

resignation by employee, AND f) Provision for annual leave of not less than 10 days per year, not including sick and casual leave. 4. No child labour is allowed (Exceptions for children working on their families' property requires an Expert Stakeholder opinion) 5. The Project Developer shall ensure the use of appropriate equipment, training of workers, documentation and reporting of accidents and incidents, and emergency preparedness and response measures		documentation and reporting of accidents and incidents, and emergency preparedness and response measures.	
Principle 6.2 Negative Economic Consequences			

1.	Does the project cause negative economic consequences during and after project implementation?	**No**	The project involves sale of solar home systems to willing customers within the project boundary. Carbon revenues are important for creating awareness among the end users and strengthening the local sales and distribution services.	N/A
Principle 7.1 Emissions				
Will the Project increase greenhouse gas emissions over the Baseline Scenario?		No	The project will reduce the GHG emissions which will be monitored and verified in line with the applied methodology.	N/A
Principle 7.2 Energy Supply				
Will the Project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?		No	The Biolite SLS project is a solar home system distribution project activity and does not use energy from a local grid or power supply.	N/A

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Principle 8.1 Impact on Natural Water Patterns/Flows			
Will the Project affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?	No	The project is a solar home system distribution project activity and will not affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity.	N/A
Principle 8.2 Erosion and/or Water Body Instability			
a. Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion? b. Is the Project's area of influence susceptible to excessive erosion and/or water body instability?	No	The project is a solar home system distribution project activity and will not directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion.	N/A

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Principle 9.1 Landscape Modification and Soil			
Does the Project involve the use of land and soil for production of crops or other products?	No	The project is a solar home system distribution project activity and does not involve the use of land and soil for production of crops or other products.	N/A
Principle 9.2 Vulnerability to Natural Disaster			
Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?	No	The project is a solar home system distribution project activity and will not be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions.	N/A
Principle 9.3 Genetic Resources			

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Could the Project be negatively impacted by or involve genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development, or take place in facilities or farms that include GMOs in their processes and production)?	No	The Project is not negatively impacted by the use of genetically modified organisms or GMOs.	N/A
Principle 9.4 Release of pollutants			
Could the Project potentially result in the release of pollutants to the environment?	No	As the project includes distribution of solar home systems, there is no risk of releasing pollutants to the environment.	N/A
Principle 9.5 Hazardous and Non-hazardous Waste			
Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials?	No	The Project does not involve the manufacture, trade, release, and/or use of hazardous chemicals and or materials.	N/A

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Principle 9.6 Pesticides & Fertilisers			
Will the Project involve the application of pesticides and/or fertilisers?	No	The project does not involve the application of pesticides and/or fertilisers	N/A
Principle 9.7 Harvesting of Forests			
Will the Project involve the harvesting of forests?	No	The project does not involve the harvesting of forests.	N/A
Principle 9.8 Food			
Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?	No	The project does not modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives.	N/A
Principle 9.9 Animal husbandry			
Will the Project involve animal husbandry?	No	The project does not involve animal husbandry.	N/A

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Principle 9.10 High Conservation Value Areas and Critical Habitats			
Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified?	No	The project is a solar home system distribution project activity and do not physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified.	N/A
Principle 9.11 Endangered Species			
a. Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)? b. Does the Project potentially impact other areas where endangered species may be present through transboundary affects?	No	The project boundary is geographical sites of solar home systems distribution and there are no endangered species identified as potentially being present within the Project boundary.	N/A

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APPENDIX 2- CONTACT INFORMATION OF PROJECT PARTICIPANTS

Organization name	Biolite, Inc.
Registration number with relevant authority	
Street/P.O. Box	65 Jay St
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State/Region	New York
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Country	United States of America
Telephone	+1-347-529-5720
E-mail	eric@bioliteenergy.com
Website	www.bioliteenergy.com
Contact person	Erik Wurster
Title	Director of Carbon Finance
Salutation	Mr.
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Middle name	-
First name	Erik
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Mobile	-
Direct tel.	-

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Personal e-mail	erik@bioliteenergy.com

Organization name	Swiss Carbon Value Ltd.
Registration number with relevant authority	-
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State/Region	Zurich
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Country	Switzerland
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E-mail	registration@southpole.com
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Contact person	Renat Heuberger
Title	CEO
Salutation	Mr.
Last name	Heuberger
Middle name	-
First name	Renat
Department	-
Mobile	-

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Direct tel.	–
Personal e-mail	registration@southpole.com

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APPENDIX 3- LUF ADDITIONAL INFORMATION

Not applicable.

Risk of change to the Project Area during Project Certification Period:	-
Risk of change to the Project activities during Project Certification Period:	-
Land-use history and current status of Project Area:	-
Socio-Economic history:	-
Forest management applied (past and future)	-
Forest characteristics (including main tree species planted)	-
Main social impacts (risks and benefits)	-
Main environmental impacts (risks and benefits)	-
Financial structure	-
Infrastructure (roads/houses etc):	-
Water bodies:	-
Sites with special significance for indigenous people and local communities - resulting from the Stakeholder Consultation:	-
Where indigenous people and local communities are situated:	-
Where indigenous people and local communities have legal rights, customary rights or sites with special cultural, ecological, economic, religious or spiritual significance:	-

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APPENDIX 4-SUMMARY OF APPROVED DESIGN CHANGES

Not Applicable.

Revision History

Version	Date	Remarks
1.2	14 October 2020	Hyperlinked section summary to enable quick access to key sections Improved clarity on Key Project Information Inclusion criteria table added Gender sensitive requirements added Prior consideration (1 yr rule) and Ongoing Financial Need added Safeguard Principles Assessment as annex and a new section to include applicable safeguards for clarity Improved Clarity on SDG contribution/SDG Impact term used throughout Clarity on Stakeholder Consultation information required Provision of an accompanying Guide to help the user understand detailed rules and requirements
1.1	24 August 2017	Updated to include section A.8 on 'gender sensitive' requirements
1.0	10 July 2017	Initial adoption