Project design document form
(Version 10.1)

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION	
Title of the project activity	**NURU Light - Cameroon**
Scale of the project activity	☐ Large-scale ☒ Small-scale
Version number of the PDD	04.2
Completion date of the PDD	30/08/2017
Project participants	S2 Services Sarl Swedish Energy Agency
Host Party	Republic of Cameroon
Applied methodologies and standardized baselines	AMS-III.AR./Version 05.0
Sectoral scopes linked to the applied methodologies	01
Estimated amount of annual average GHG emission reductions	38,668tCO_2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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The purpose of this CDM small-scale PDD is the dissemination of LED lighting systems (solar lanterns and solar lighting kits) in the Republic of Cameroon, hereafter referred as Cameroon. The PDD will replace Kerosene lanterns and tin lamps with renewable energy based LED lighting systems.

The small-scale PDD will distribute renewable energy based LED lighting systems (project lamps) to end users (households and small and medium enterprises) in the rural communities of Cameroon. The project lamps will be solar lanterns and solar lighting kits certified Lighting GlobalThrough the introduction of LED based lighting systems the project activity will replace Kerosene lanterns and tin lamps. As such, the PDD is expected to achieve emission reductions of 38,668tCO_2e per year.

The project is a small-scale Type III and in line with CDM methodology AMS-III.AR Version5, it is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar lighting needs. The replacement of Kerosene lanterns and tin lamps by the solar lanterns and solar lighting kits reduce the amount of greenhouse gases emitted into the atmosphere due to the reduction of Kerosene fuel use by the Kerosene lanterns and tin lamps.

The yearly average emission reductions 38,668tCO_2e, less than 60,000tCO_2e and therefore qualifies the project as a Type III small-scale.

The proposed project is a voluntary action undertaken by S2 Services SARL, a company based in Douala.

The project will have a maximum emission reduction of less than or equal to 60 ktCO_2 per year within the small-scale threshold. It's the desire of the PP to reach around 18% of the market in Cameroon. To date, the National Institute of Statistics estimate that around 3.6 million kerosene lanterns are in used all over the country and 18% penetration will represent around 660,000 lamps distributed under this project.

Entrepreneurs will be identified and selected based on location, local experience, capacity (i.e. management and financial capacity) to implement the activities (i.e. selling project solar lanterns and solar lighting kits), credit history and membership of groups (e.g. cooperatives and microfinance organized lending groups).
Entrepreneurs can be any person willing to sell project's products, such as individuals, NGOs, Associations, Cooperative, small shop owners in rural area. The staff of S2 available in the field will provide training to prospective entrepreneurs. The training sessions will cover all the necessary information for the entrepreneurs to successfully operate their own micro franchises, taking into account the specific needs of each entrepreneur.
The solar lanterns and solar lighting kits will be bought in cash by end users through S2 trained entrepreneurs, or directly from S2's staff, in cash or using Pay As You Go systems whereby end users pay periodically a small amount of money against energy credits.

Sustainable Benefits

Besides a total of over 38,668tCO_{2e} emission reduction over the 10 years crediting period, the other sustainable benefits of the project are the following:

- Kerosene lamps cause respiratory diseases because of the incomplete combustion of the wick that produces carbon monoxide and other noxious gases. This project will avoid the production of such gases damaging the health of off grid population;

- This project has the potential to positively impact the life of millions (around 3 million if we assume a 25% penetration rate) of people using Kerosene lamps for lighting in rural areas. This project will provide clean, affordable, practical lighting to these millions of people. Without this project these people will continue to rely on Kerosene burning for lighting which is expensive, noxious and unsafe;

- Children can greatly benefit from the solar lanterns and solar lighting kits in their homes. Kerosene is very expensive; hence children are unable to study during the evening. Studies have shown increased number of study hours by children, from 1 to 4 hours per evening, for households that switched to the solar lanterns and solar lighting kits systems;[1]
- Access to Kerosene is very time consuming in rural areas. People walk over 10 km to buy a liter of Kerosene, use it for 3 days and walk back again to the seller. Those who do not walk pay over 1000FCFA (US$2) for a motorbike ride to get access to Kerosene, increasing tremendously their cost for lighting. For the solar lanterns and lighting kits, we are planning to have a maximum distance of 3 km between an entrepreneur and end users. The time saved can be used for studying or other income generating activities;

- Economically, our very initial studies show that switching from Kerosene lamps to the solar lanterns and lighting kits, can help rural poor reduce their lighting cost by 65% per year, i.e. around 100 US$, and this money can bring many families out of poverty and help breaking the cycle of poverty;

- The other social effect, besides lighting is employment creation. Many jobs will be created for the distribution, monitoring and overall management of the project. More than 5000 direct and indirect jobs will be created as a result of this project.

- Our entrepreneurs are trained in basic accounting, grass roots marketing and management. We will create a critical mass of entrepreneurs that will be highly competent in customer service and sales. In addition, young Cameroonians will be recruited and trained in equipment maintenance, thus creating more green jobs for the country.

This project is not a CPA that has been excluded from a registered CDM PoA as a result of erroneous inclusion of CPAs. In fact this project is the first-of-its-kind in Cameroon and cannot be a CPA of a registered PoA.

A.2. Location of project activity

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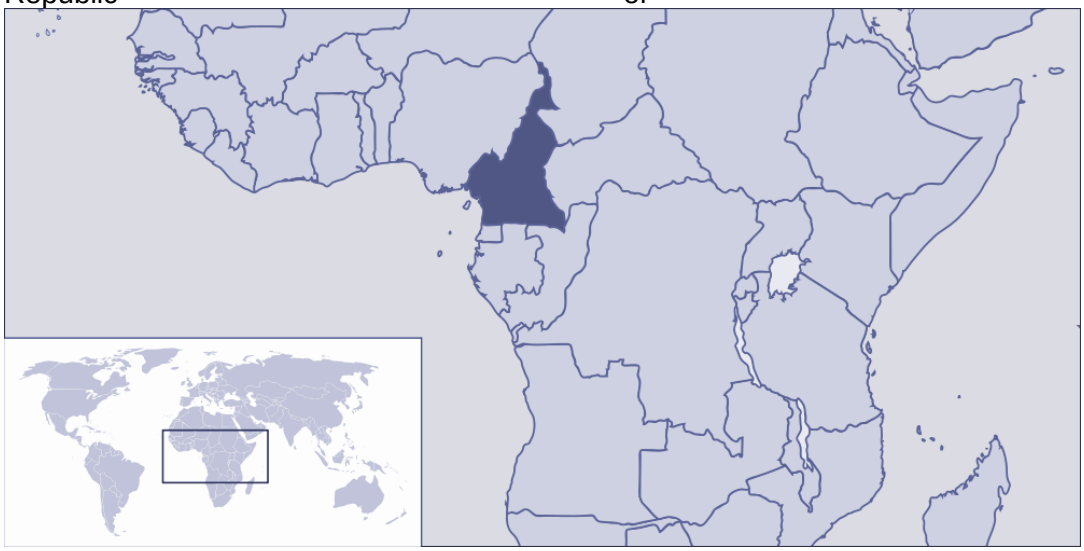
[1]See this Ashden study: http://www.ashden.org/files/reports/D.light%20case%20study.pdf

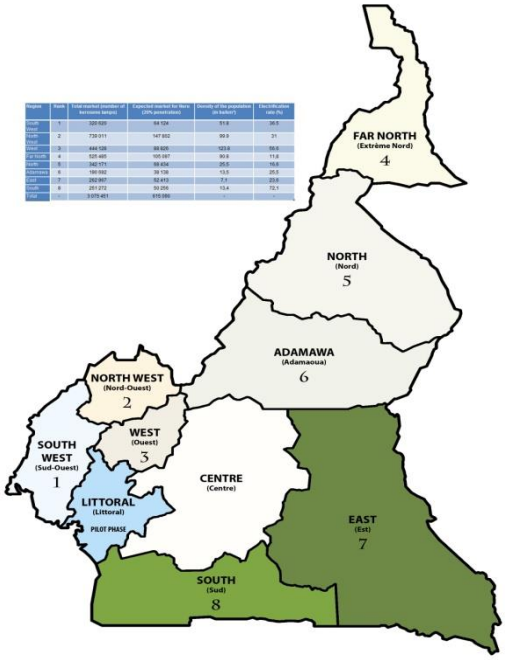
A.2.1. Host Party

Republic of Cameroon



A.2.2. Region/State/Province etc.

The project activity targets all area of the country where electricity is not available



A.2.3. City/Town/Community etc.

The project activity target all area of the country where electricity is not available

A.2.4. Physical/Geographical location

The project activity targets all area of the country where electricity is not available.

The geographical coordinates[2] of the 8 points 1 to 8 indicated on the map of Cameroon on Paragraph A.2.2. above are (The city is indicated in bracket):

[2]All geographical coordinates are from www.thegpscoordinates.com.

Point 1 (Kumba) :	4.6333N, 9.4499E
Point 2 (Kumbo) :	6.2095N, 10.6859E
Point 3 (Dschang) :	5.4499N, 10.0666E
Point 4 (Maroua) :	10.5823N, 14.3275E
Point 5 (Garoua) :	9.2999N, 13.3999E
Point 6 (Ngaoundere) :	7.3239, 13.5836E
Point 7 (Bertoua) :	4.5754N, 13.6846E
Point 8 (Ambam) :	2.3840N, 11.2663E

A.3. Technologies/measures

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The technology to be deployed consists of any solar lanterns and any solar lighting kits certified Lighting Global and meeting the minimum requirements of the methodology AMS-III.AR Version 5

Example of a solar lantern to be distributed as part of this project's activities[3]:

Example of solar kit to be distributed as part of this project's activities[4]

[3] This solar lantern is a Renew it (www.renewit.com) product certified Lighting Global (https://www.lightingglobal.org/wp-content/uploads/2016/02/LG-SSS_ri-g3l.pdf)

[4] This solar kit is a Renew it (www.renewit.com) product certified Lighting Global

Characteristics	Solar Lighting kits	Solar lanterns
Lighting details	-LED -Six LEDs in each of 3 light bulbs and one LED in the flash light with a transparent cover. -Colour characteristics including CRI Main Light 85; Flashlight 83; CCT "Cool" (5000-7000 K) -Lumen maintenance characterized by 100% of the original output remaining after 2,000 hours run time -Wide distribution type	-LED -15 LEDs on PCB with a frosted cover inside the lantern -Colour characteristics including CRI 76; CCT "Cool" (5000-7000 K) - Lumen maintenance characterized by 98% of the original output remains after 2,000 hours run time -Omnidirectional distribution type
Battery details	-Easily replaceable with common tools -Main Unit and Radio: Lithium Ion -Flashlight: Lithium Iron Phosphate -Main Unit: 4 x 18650 -Main Unit 8600 mAh; Flashlight 550 mAh; Radio 990 mAh - Nominal voltage: 3.7 V	- Easily replaceable with common tools - Lithium-ion - 2x 18650 cylindrical cells - 3900 mAh - Nominal voltage: 3.7 V
Solar details	-Polycrystalline silicon -10 watts	-Polycrystalline silicon -3.0 watts

For each solar lighting kit distributed under this project activity, the number of lighting lamps will be counted as number of project activity lamps distributed. For example, for this lighting kit of 3 lamps from Renew it, 3 project activity lamps will be recorded.

Solar lanterns and solar kits are better than Kerosene lamps in Cameroon because:

- They emit no carbon dioxide into the environment, compared to Kerosene lanterns that emit a default value of 0.092 ton of carbon dioxide per year into the atmosphere, as per the methodology AMS-III.AR version 5 in used here.
- Kerosene lanterns produce 6 lux of light intensity at best compared to +50 lux for Lighting Global Certified lanterns and kits.

A.4. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Republic of CAMEROON (Host)	Private entity: S2 Services Sarl	NO
Sweden	Public entity: Swedish Energy Agency[5]	NO

A.5. Public funding of project activity

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S2 Services SARL hereby confirms that so far no public funding has been used for the project and there is no intention of doing that in the future.

A.6. History of project activity

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1. We Confirm that:
   (a) The proposed CDM project activity is neither registered as a CDM project activity nor included as a component project activity (CPA) in a registered CDM programme of activities (PoA);
   (b) The proposed CDM project activity is not a project activity that has been deregistered.

2. We Declare that the following statement are not true:
   (a) The proposed CDM project activity was a CPA that has been excluded from a registered CDM PoA;
   (b) A registered CDM project activity or a CPA under a registered CDM PoA whose crediting period has or has not expired (hereinafter referred to as former project) exists in the same geographical location as the proposed CDM project activity.

A.7. Debundling

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In line with paragraph 10 of the Guidelines on Assessment of Debundling for SSC Project Activities (EB 54, Annex 13, version 03.1), the PDD is exempted from performing a debundling check because the emission reductions achieved by each independent subsystem (i.e. each LED based lighting system) is not larger than 1% of the threshold defined by the methodology used: the threshold for AMS III.AR is 60,000 tCO2/year and 1% of 60,000 tCO2/year equals 600 tCO2/year. The emissions per project lamp equal 0.092 tCO2 per year, which is far below the threshold of 600 tCO2/year.

SECTION B. Application of selected methodologies and standardized baselines

B.1. Reference to methodologies and standardized baselines

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Approved small-scale baseline methodology AMSIII.AR.: *"Substituting fossil fuel based lighting with LED/CFL lighting systems --- Version 5.0"*[6]

[5]ERPA signed between S2 the project owner and Swedish Energy Agency on July 9, 2014

[6]http://cdm.unfccc.int/methodologies/DB/MKEEXEFMC9BG9WPQOUDTJA70B4VG07/view.html

B.2. Applicability of methodologies and standardized baselines

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The AMS-III.AR.: *"Substituting fossil fuel based lighting with LED/CFL lighting systems --- Version 5.0"* is eligible for the proposed project activity as within the project activities, the Kerosene fuelled lamps (fossil fuel based lighting) are substituted by the solar lanterns and solar lighting kits (LED).

The table below shows how relevant requirements of the selected methodology AMS-III.AR. Version 5 as far as this project activity is concerned:

Para	Methodology Requirement	Proposed Project Activity (PPA)
3	This methodology is applicable only to project lamps whose batteries are charged using one of the following options:3 (a) Charged by a renewable energy system included as part of the project lamp (e.g. a photovoltaic system or mechanical system such as a hand crank charger); (b)Charged by a standalone distributed generation system (e.g. a diesel generator set) or a mini-grid, i.e. that is not connected to a national or regional grid; (c) Charged by a grid that is connected to regional/national grid	The solar lanterns and lighting kits batteries are charged as described above in this same section by a photovoltaic system (solar panel), thus justifying the option 3(a) of the methodology used. (b), Not applicable as there is not mini-grid or generator are involved (c), Not applicable as there is no regional/national grid in the project locations
4.	At a minimum project lamps shall be certified by their manufacturer to have a rated average life of at least: (a) 5,000 hours for Option 1, paragraph 17; (b) 10,000 hours for Option 2, paragraph 18.	Option 4 (b) is used. And it refers to paragraph 18. Paragraph 18 (b) says "... *As an alternative to long-term measurement of light output over the full lifetime of the lamp, a shortened measurement period of 2,000 hours may be chosen. If a 2,000 hour test period is used, the relative luminous flux shall not decrease by more than 15 per cent during the 2,000 hours of continuous operation...*"[7] Lighting Global has certified that the lumen maintenance remains at 98% and 100% after 2000 hours respectively for the solar lantern and solar kit, which is far below the 15%

[7] Full text of paragraph 18 (b) reads: "At a minimum, project lamps must be certified by their manufacturer to have a useful operational life of 10,000 hours. Within this time span, the relative luminous flux shall not decrease by more than 30 per cent as per equation (1). Such claims shall be confirmed by a third-party testing organization using an applicable standard and testing protocol. As an alternative to long-term measurement of light output over the full lifetime of the lamp, a shortened measurement period of 2,000 hours may be chosen. If a 2,000 hour test period is used, the relative luminous flux shall not decrease by more than 15 per cent during the 2,000 hours of continuous operation. If the average life value is not available ex ante, it shall be made available for verification."

		recommended by the methodology, and this justify the selection of this Option 4 (b).[8]
5	Rated average life is the life certified by the manufacturer or responsible vendor as being the time at which the lamp's initial light output will decline by no more than 30%. In addition, for project lamps charged using Option 3(c) as provided for in paragraph 3 above, the manufacturer shall certify that the battery-charging-circuit efficiency of the project lamps, at the time of the purchase, is at least 50%. For project lamps charged under option indicated in paragraph 3(b), if the mini-grid or distributed generation system is not entirely powered by renewable energy generation unit(s), the manufacturer shall certify that the project lamp's battery charging circuit efficiency, at the time of purchase, is at least 50%.	As indicated in the eligibility criteria above (paragraph 4 of the methodology), Lighting Global has certified that the light output after 2000 hours is 98% and 100% respectively for the solar lantern ans solar lighting kit. Rated average life is thus 10000 hours as demonstrated in Paragraph 4 (4b) above. Options 3(b) and 3(c) are not applicable for this project activity
6	Project lamps shall meet warranty requirements of the Lighting Global Minimum Quality Standard. The project lamps shall have a warranty of a minimum of one year from the time the end-user takes ownership or begins using the lamp. At a minimum, the warranty shall cover free replacement or repair of any failed lamps, batteries, and where applicable solar panels. The warranty shall be clearly communicated and supported through the supply chain and available to end-users of the project lamps during the warranty period. In a situation where the project lamps are distributed through intermediaries, the one year warranty shall commence from the time that the project lamps are distributed to end-users. The full warranty terms shall be available in writing, in a regionally appropriate language and included with each unit. .	The solar lanterns and lighting kits are sold with a one year warranty card to the users. The warranty card has the serial number of the lamp., The one year warranty starts when the user gets the lamp and fill in the given warranty card in two copies. One copy is kept by the user and the other one by us. The one year warranty covers any damage to the lamp and replacement (no repair and free of charge) is done directly by the VLE on site who collects the damaged light and give new light to end-user. That light is later collected by our field staff and send back to the headquarter that will follow the procedure described in the "Batteries disposal plan" Each solar lantern and lighting kit comes in a box that contains also a warranty card where the warranty is clearly explained to the end user (although the entrepreneur is also trained to explain the warranty to end users during distribution of lights). The warranty card in the French speaking part of Cameroon is in French and in the English speaking part is in English.

[8] See certification Lighting Global attached as "LG-SSS_nuru-nl3800 v2" (paragraph "Lighting details")

7	Project lamps shall meet or exceed the following minimum performance characteristics, which should be proven by third-party test results: (a) **Light Output:** luminous flux of 25 lumens or illuminance of 50 lux over an area ≥0.1 m^2 when suspended at a distance of 0.75 meters or self-supported. The light output over a 2,000 hour lumen maintenance test should not decline by more than 15% (b) **Run Time and Battery Capacity:** Daily Burn Time (DBT) shall meet the following requirements: (i) DBT shall be equal to or greater than 4 hours; For charging Option 3(a) with solar PV, the DBT is defined by the Solar Run Time for the project lamp (as determined per paragraph 9(g)) (ii) For other technologies in option 3(a) the DBT is defined based on typical expected patterns of use. (iii) For charging Options 3(b) and 3(c): a. The maximum claimed DBT shall be less than or equal to the typical capabilities of the regional or local energy system at delivering reliable power sufficient for recharging; b. The autonomous (full battery) run-time of the project lamps shall be equal to or greater than 200 per cent of the DBT of the project lamps; c. The project lamp shall be fully recharged from a discharged state after eight hours of charging.	(a)) Luminous flux is more than 25 lumens (+67 lumens for solar lantern and 320 lumens for each lamp of the solar lighting kit)[9] (b) (i) The DBT is greater than 4 hours (5.4 hours and 7.7 respectively for lantern and kit)[10] (b) (ii) and (b) (iii) do not apply here since charging Option selected is 3(a) -

[9]See Lighting Global Certification provided to the DOE

[10]See Lighting Global Certification provided to the DOE

8	The project design document shall explain the proposed distribution method of the project lamps. It shall also explain how the proposed project activity will: (a) Ensure that the replaced baseline lamps are those that directly consume fossil fuel. This can be done through documentation of the common practice of fuel usage for lighting in the project region (e.g. based on representative sample surveys, official data or peer reviewed literature) that demonstrates that fossil fuel is a commonly used fuel for lighting; (b) Encourage the consumers, targeted by the project activity, to use the project lamps and discourage hoarding; (c) Eliminate potential double counting of emission reductions that could occur, for example, if more than one entity (e.g. lamp manufacturers, suppliers of solar and/or battery equipment, etc.) claims credit for emission reductions for the project lamps. At a minimum, project lamps shall be marked as CDM project lamps; (d) Ensure compliance with prevailing regulations pertaining to the use and disposal of batteries.	As mentioned is section A1, the project activity consist of solar lanterns and lighting kits. The lamps are sold to retailers including Village Level Entrepreneurs (VLE) who sell them back to end-users with a 1-year warranty covering manufacturing defects. (a)294 [11] household surveys [12] were conducted by S2 in 4 regions, aggregating on the result of other existing surveys in the country, plus the data provided by the report of the National Institute of Statistics on Kerosene lamps use in household. (b) Naturally, since the project lamps are cheaper and of better quality than kerosene lamps that they are replacing, consumers, once they acquire solar lanterns and lighting kits will adapt those without further encouragement. But, Village Level Entrepreneurs (VLEs) that sell lamps ~~and recharges~~ are trained to continuously encourage consumers on the importance of using solar lanterns and lighting kits. And since VLEs are incentivized by the margin they get, they will continue to do their work of encouraging households to use the lights. And there are field staffs permanently working to support VLEs in their daily activities, to ensure more lamps are sold and most importantly are recharged. Also, solar lanterns and lighting kits are not distributed free of charge, and households that are rural poor will not buy unnecessary lamps and hoard. At the same time, VLEs are trained to present the product very well to households that they buy only number of lights ne (c) All project lamps will have unique serial number for their unique identification and so avoid double counting. (d)The battery used are Lithium-Ion , the best available in the market in term of environmental impact. These are set to be recycled at their end of lifetime. We will collect old lights and

		give new light free of charge to end users. Old lights will be sent to the manufacturer for recycling. In Cameroon however, there is no law or regulation making compulsory the collection and handling of batteries from end users after end of use. Our action to recycle batteries is totally voluntary.
9	The project design document shall include the minimum requirements for the design specifications of project lamps including the following specifications: (a) Lamp wattage (in Watts) and luminous flux output (in lumens); (b) Rated lamp life (in hours); (c) Where applicable, the type and rated capacity of the renewable energy equipment used for battery-charging (in Watts); (d) Type (e.g. NiMH, Lead-Acid, Li-ion), and rated capacity of the batteries (in Ampere hours); (e) Type of charge controller (e.g. active or passive); (f) Autonomous time and DBT; (g) Solar Run Times(s) (SRT) for products with solar energy charging systems. If regional solar data are available, the maximum, minimum and average estimated	(a) Wattage: 3W and 10W respectively to lanterns and kits[13] Illumination: 170 and 320 lumens for high setting and 67 and 320 lumens for low setting respectively for lanterns and kits[14] (b) Rated lamp lifetime: 10 000 hours as demonstrated in Paragraph 4 (4.b) above. (c) not applicable. (d) The batteries used are: : Lithium-ion of 3900mAh and 8600mAh respectively for lantern and kit (e) The charge controller is passive (f) The Autonomous Time (or maximum possible burn time) of solar lantern in 7.9 hours for high setting and 17 hours for low setting; and 11 hours for solar kit. The DBT is greater than 4 hours (5.4 hours and 7.7 respectively for lantern and kit)[15].

[11] See attached spreadsheet "111107_S2_ Baseline Survey - Potential Customers_ Cameroon_Analysis Sloan" that was used to analyse the result of the survey. Physical questionnaires were presented to the DOE during site visit

[12]Supporting document handed to the DOE, survey reports and INS report.

[13]See LG certification

[14]See LG certification

[15]See Lighting Global Certification provided to the DOE

	SRT values for each month of a typical year shall be provided. If regional solar data are not available the standard solar day (5 kWh/m^2) shall be used to estimate SRT; (h) Where applicable, the amount of time to fully charge the product using mechanical means or a centralized charging system (e.g. the national grid); (i) Physical protection against environmental factors (e.g. rain, heat, insect ingress).	(g)) Solar Run Times are 5.4 and 11 hours for high and low settings of the solar lantern and 7.7 hours for solar kit (h) Not applicable, since the lamps are charged with solar and not using mechanical or centralized charging systems (i) For the solar lantern, LG certification indicate that it complies with IEC 60598-2-4:1997 and IEC 60598-1:2008 and that it has passed the durability tests (Drop test, switch and connector cycling, strain relief test, physical ingress protection test, and protection from occasional rain) For the solar kit, LG certification indicate that it complies with IEC 60950-1:2005 and that it has passed the durability tests (Switch and connector cycling, strain relief test, physical ingress protection test. Water ingress protection not tested for Main Lights; meant for indoor use only.)
10	Measures are limited to those that result in emissions reductions of less than or equal to 60 kt CO_2 equivalent annually.	At no point of the crediting period the ER value will cross the small scale threshold of 60 KtCO2e

The project activity qualifies as Type III and is small-scale because average annual emission reductions are below 60 KtCO2e.

B.3. Project boundary, sources and greenhouse gases (GHGs)

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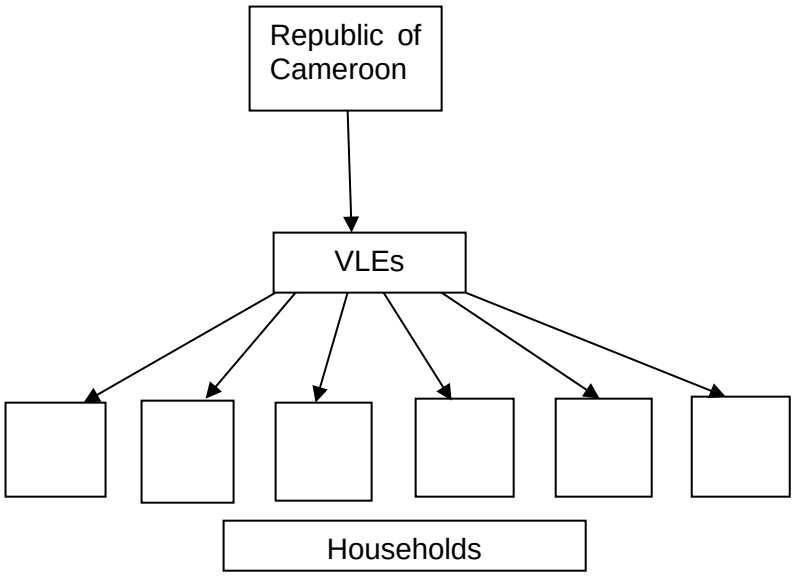
1. As per Methodology AMS-III.AR version 5, the project boundary includes the project lamps as well as the charging systems, as follows:

(a) If the project lamps are charged by a renewable energy system, then the project boundary includes the physical, geographical site of the renewable energy system;

Based on the above guidance, the project boundary consists of the the solar lanterns and lighting kits sold and distributed by the local entrepreneurs to households The project boundary is schematically described in the following figure:



Source		GHG	Included?	Justification/Explanation
Baseline	Use of kerosene lanterns for lighting	CO_2	Yes	Kerosene lanterns are used in the baseline and emit carbon dioxide
		CH_4	No	No CH4 and N2O emissions are involved in the burning of kerosene in the baseline
		N_2O	No	
Project activity	Use of solar lanterns and lighting kits	CO_2	No	Solar energy used, so no CO2, CH4 and N2O emissions are involved
		CH_4	No	
		N_2O	No	

B.4. Establishment and description of baseline scenario

>>According to methodology AMS-III.AR. Version 5, the energy baseline comprises fuel based lamps only. This is the case in regards to the baseline for this project where the solar lanterns and lighting kits are to be used instead of Kerosene lamps in rural area of Cameroon.
According to the National Institute of Statistics of Cameroon, over 3.5 [16]million Kerosene lamps are used in rural area for lighting purposes in 2004.
The majority of rural population, the target of S2 Services Sarl for this project activity[17], uses exclusively Kerosene lanterns for lighting. Rainbow Environment, a Cameroon based consultant has done a set of studies in rural villages of Cameroon. In Banguem, a village with 716 households, 79 where surveyed and it resulted that 88.6% use Kerosene lanterns as primary lighting source[18]. Same

[16]INS Enquête GPL 2004, data base extracts

[17]The Nuruligths will exclusively be distributed in rural area where there is no electricity.

[18]See Banguem Study by Rainbow Environment on pages 12 and 13.

survey was applied to 79 households in Djoum and 78.5% of the population was using principally Kerosene lanterns for lighting[19].

For the baseline study of this project activity, we S2 Services Sarl, conducted a survey exclusively in rural areas of Cameroon where 294 households were surveyed. It resulted that 100% of households had at least one Kerosene lantern.
With the project targeting exclusively rural area of Cameroon and planning to distribute 660,000 solar lanterns and lighting kits , the baseline is clearly Kerosene lanterns.

B.5. Demonstration of additionality

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For the additionality of the small scale project, the methodological tool: DEMONSTRATION OF ADDITIONALITY OF SMALL-SCALE PROJECT ACTIVITIES (Version 10.0)
According to paragraph 11(c) of the tool:

"Documentation of barriers, as per paragraph 1 above, is not required for the positive list of technologies and project activity types that are defined as automatically additional for project sizes up to and including the small-scale CDM thresholds (e.g. installed capacity up to 15 MW). The positive list comprises of:

Project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises and where the size of each unit is no larger than 5% of the small-scale CDM thresholds;"

That is applicable under the proposed project activity because of the following:

- This is a type III project with threshold limit of 60 $ktCO_2$
- The project consists of isolated units where the users of lamps are households
- Each unit of the project activity results in emission reduction of 0.092 tCO_2

As per the paragraph provided above, each unit of the project activity is less than 5% of the type III small-scale CDM threshold and therefore the project is additional.

B.6. Estimation of emission reductions

B.6.1. Explanation of methodological choices

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The methodology for calculation used is option 2

Project solar lanterns and lighting kits are assumed to operate for up to seven years after distribution to end users, and thus emission reductions can be claimed for up to seven years per project lamp, if all of the following conditions are met:

a) At a minimum, project lamps must be certified by their manufacturer to have a useful life of 10,000 hours. Within this time span, the relative luminous flux shall not decrease by more than 30% as per equation (1). Such claims shall be confirmed by a third-party testing organization using an applicable standard and testing protocol. As an alternative to long-term measurement of light output over the full lifetime of the lamp, a shortened measurement period of 2,000 hours may be chosen. If a 2,000 hour test period is used, the relative luminous flux shall not decrease by more than 15% during the 2,000 hours of continuous operation. As per the principles indicated in AMS-II.J "Demand-side activities for efficient lighting technologies", if the average life value is not available ex ante, it shall be made available for verification.

[19]See Djoum Study by Rainbow Environment on page 10

Baseline emissions calculations:

According to the selected methodology AMS-III.AR.version5, Paragraph 21, the baseline emission for one Kerosene lantern distributed will be calculated using the following formula:

$$BE_y = DV \times GF_y \times DB_y$$ Equation (3)

Where:

BE_y = Baseline emissions per project lamp in year *y* (t CO_2e)

GF_y = Grid Factor in year *y*,
- Equal to 1.0 when charging option defined in paragraph 3(a) is used;[7]
- Equal to 1.0 if the project activity is for off-grid households/communities (defined as no grid access or less than 12 hours grid availability per day on an annual average basis);
- Otherwise it is equal to 1.0 minus (the fraction of time grid is available to the target households and communities/users in the region of project activity)

DB_y = Dynamic Baseline Factor (change in baseline fuel, fuel use rate, and/or utilization during crediting period) in year *y*. Calculated as either:
Option 1: default of 1.0 in the absence of relevant information;
Option 2: value of 1.0+FFg where *FFg* is the documented national growth rate of kerosene fuel use in lighting from the preceding years (use the most recent available data for a three or five years average (fraction))

$$DV = FUR \times O \times U \times EF \div 1000 \times LF \times n \times NTG$$ Equation (2)

Where:

DV = Lamp Emission Factor (default is 0.092 t CO_2e per project lamp)

FUR = Fuel use rate (0.03 liters/hour)

O = Utilization rate (3.5 hours/day)

U = Annual utilization (365 days/year)

EF = Fuel emissions factor (2.4 $kgCO_2$/liter)

LF = Leakage factor (1.0)

n = Number of fuel-based lamps replaced per project lamp (1.0)

NTG = Net-to-gross adjustment factor (1.0)

Project emissions

According to the methodology AMS-III.AR. version 5, there are no project emissions, because the charging source is a renewable energy system (see Paragraphs 23 and 3(a) of this methodology AMS-III.AR. version 5)

Leakage emissions

The methodology AMS-III.AR. version 5 does not mention leakage emissions, so they are considered to be zero.

Emissions reductions:

Emissions reductions are calculated as follow (see Paragraph 26 and equation 5 for this AMS-III.AR. version 5 methodology):

$$ER_{y=} \sum_{i,j} N_{i,j} \times \left(BE_{y,i} - PE_{y,i,j}\right) \times \left(OF_{y,i,j}\right)$$ Equation (5)

Where:

ER_y	=	Emission reductions in year *y* (t CO_2e)
$N_{i,j}$	=	Number of project lamps distributed to end users of type *i* with charging method *j*
$OF_{y,i,j}$	=	Percentage of project lamps distributed to end users that are operating and in service in year *y*, for each lamp type *i* and charging method *j*. Assumed to be equal to 100% for years 1, 2 and 3, and equal to the value determined in paragraph 28, for years 4, 5, 6 and 7[8]

B.6.2. Data and parameters fixed ex ante

(Copy this table for each piece of data or parameter.)

Data/Parameter	DV
Data unit	tCO_{2e}
Description	Default annual baseline emission factor for the project lamp
Source of data	AMS-III.AR. Version 5
Value(s) applied	0.092
Choice of data or measurement methods and procedures	Default value
Purpose of data	Calculation of the baseline emissions
Additional comment	

Data/Parameter	GF_Y
Data unit	Dimensionless
Description	Grid factor in year y
Source of data	AMS-III.AR. Version 5
Value(s) applied	1
Choice of data or measurement methods and procedures	Default value (lamp charging option 2(a) as per the methodology)
Purpose of data	Calculation of the baseline emissions
Additional comment	

Data/Parameter	DB_Y
Data unit	Dimensionless
Description	Dynamic baseline factor in year y
Source of data	AMS-III.AR. Version 5
Value(s) applied	1
Choice of data or measurement methods and procedures	Default value as there is not enough information available over the last 5 years for a proper calculation
Purpose of data	Calculation of the baseline emissions
Additional comment	

B.6.3. Ex ante calculation of emission reductions

>>

As explained in B.6.1, project and leakage emissions are all zero.

The baseline emission for one Kerosene lantern replaced is calculated using the formula:

$$BE_y = DV \times GF_y \times DB_y$$

Parameter	Value	Comments
GF	1	since the charging source is a solar panel (meeting paragraph 3(a) requirements for this methodology AMS-III.AR. version 5)
DB	1	Default value (Option 1 for DB calculation is selected as it suits the purpose of this project)
DV	0.092	Default value fixed by this methodology AMS-III.AR. version 5

The emission reductions are calculated using the formula:

$$ER_{y=}\sum_{i,j} N_{i,j} \times \left(BE_{y,i} - PE_{y,i,j}\right) \times \left(OF_{y,i,j}\right)$$

Equation (5)

Where:

ER_y	=	Emission reductions in year *y* (t CO_2e)
$N_{i,j}$	=	Number of project lamps distributed to end users of type *i* with charging method *j*
$OF_{y,i,j}$	=	Percentage of project lamps distributed to end users that are operating and in service in year *y*, for each lamp type *i* and charging method *j*. Assumed to be equal to 100% for years 1, 2 and 3, and equal to the value determined in paragraph 28, for years 4, 5, 6 and 7[8]

The following table give the value N (number of lamps) and the $OF_{y,i,j}$(the number of operating lamp in a given year);
According to the methodology, $OF_{y,i,j}$ this value is 100% for the 3 first years and then ex-post estimations are used for the percentage of operating lights for the following years 4, 5, 6 and 7. We estimate that after the third year, 5%[20] of lights will fail and this will apply to years 4, 5, 6 and 7 as allowed by the methodology (Paragraph 30). After year 7, we just cancel out all lights, since we can claim emissions just for 7 years.

Based on the above, the following table present the lamps operating per year ($N_{i,j}$):

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Lights sold	60,000	100,000	150,000	150,000	100,000	100,000	-	-	-	-
Cumulative light solds	60,000	160,000	310,000	460,000	560,000	660,000	660,000	660,000	660,000	660,000
Operating Lamps										
Year 1	100%	100%	100%	95%	95%	95%	95%			
Year 2		100%	100%	100%	95%	95%	95%	95%		
Year 3			100%	100%	100%	95%	95%	95%	95%	
Year 4				100%	100%	100%	95%	95%	95%	95%
Year 5					100%	100%	100%	95%	95%	95%
Year 6						100%	100%	100%	95%	95%
Year 7							100%	100%	100%	95%
Year 8								100%	100%	100%
Year 9									100%	100%
Year 10										100%
Total										
Year 1	60,000	60,000	60,000	57,000	57,000	57,000	57,000	-	-	-
Year 2		100,000	100,000	100,000	95,000	95,000	95,000	95,000	-	-
Year 3			150,000	150,000	150,000	142,500	142,500	142,500	142,500	-
Year 4				150,000	150,000	150,000	142,500	142,500	142,500	142,500
Year 5					100,000	100,000	100,000	95,000	95,000	95,000
Year 6						100,000	100,000	100,000	95,000	95,000
Year 7							-	-	-	-
Year 8								-	-	-
Year 9									-	-
Year 10										-
Total Operating Lamps	60,000	160,000	310,000	457,000	552,000	644,500	637,000	575,000	475,000	332,500

Based on the operating lamps above, the CERs estimations are presented in the table below:

[20]Since the project is new, this value is just a rule-of-thumb estimation for ex ante calculations. For ex-post calculations, a monitoring survey will be conducted during the third year to determine the real value to be used.

Emission Reduction	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	5,520	14,720	28,520	42,044	50,784	59,294	58,604	52,900	43,700	30,590
Total for 10 years	386,676	tCO2e								
Average over 10 years	38,668	tCO2e/Y								

B.6.4. Summary of ex ante estimates of emission reductions

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
Year 1	5,520	0	0	5,520
Year 2	14,720	0	0	14,720
Year 3	28,520	0	0	28,520
Year 4	42,044	0	0	42,044
Year 5	50,784	0	0	50,784
Year 6	59,294	0	0	59,294
Year 7	58,604	0	0	58,604
Year 8	52,900	0	0	52,900
Year 9	43,700	0	0	43,700
Year 10	30,590	0	0	30,590
Total	386,676	0	0	386,676
Total number of crediting years	10			
Annual average over the crediting period	38,668	0	0	38,668

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

(Copy this table for each piece of data or parameter.)

Data/Parameter	Ni,j
Data unit	Number of lights
Description	Number of Nurulights distributed to end users, i, charging, j
Source of data	S2 – Nuru Sales Database
Value(s) applied	<table><tr><th></th><th>Year 1</th><th>Year 2</th><th>Year 3</th><th>Year 4</th><th>Year 5</th><th>Year 6</th><th>Year 7</th><th>Year 8</th><th>Year 9</th><th>Year 10</th></tr><tr><td>Lights sold</td><td>60,000</td><td>100,000</td><td>150,000</td><td>150,000</td><td>100,000</td><td>100,000</td><td>-</td><td>-</td><td>-</td><td>-</td></tr><tr><td>Cumulative light solds</td><td>60,000</td><td>160,000</td><td>310,000</td><td>460,000</td><td>560,000</td><td>660,000</td><td>660,000</td><td>660,000</td><td>660,000</td><td>660,000</td></tr></table>
Measurement methods and procedures	The data will be recorded in a web based sales and inventory tool used by S2 Services SARL. The data will consist of unique number, number of units sold, to whom and where. The data will be manually recorded at site and then uploaded in the web based tool at the head office of S2 Services SARL in Douala.

Monitoring frequency	The data will be produced monthly and aggregated on yearly basis.
QA/QC procedures	The management of the project will check on a regular basis if digital and manual data match each other and together match the ordered and received equipment. If there is a mismatch, then actions will be taken on time to correct. The data will be kept both manually and electronically throughout the crediting period plus two more years then after.
Purpose of data	Calculation of baseline emission
Additional comment	

Data/Parameter	OFi,j,y
Data unit	%
Description	Percentage of project lamps distributed to end-users that are operating and in service in year y, for each lamp type i and charging method j. Assumed to be equal to 100% for years 1, 2 and 3, and equal to the value determined in paragraph 30, for the years 4, 5, 6 and 7
Source of data	Ex post monitoring household surveys done on the 3rd year
Value(s) applied	100% operating for first three years, 95% for years 4th to 6th and 0% for 7th year
Measurement methods and procedures	based on survey and sampling as provided below
Monitoring frequency	Yearly after the 3rd year of the project running
QA/QC procedures	Surveyors will be constantly trained to reduce potential mistakes during the sampling. Also the management of S2 will go regular field visit to verify the data taken by surveyors by physically checking surveyed lights if they are still in operation.
Purpose of data	Calculation of baseline emissions
Additional comment	

B.7.2. Sampling plan

>>

Objective: The objective of the sampling is to determine the percentage of lamps that are still operational during each year of the crediting with a 90/10 confidence/precision (as per methodology AMS-III.AR) from the 4th year after the light has been distributed

Field Measurement Objectives and Data to be collected: A survey will be carried out using a closed questionnaire. The questionnaire will be carried out once per verification period. In addition to the questionnaire, the surveyors will also physically check whether the household is in possession of the lamps and whether the lamps works.
The following questionnaire will be used for the survey:

Household information	▪ Name of household ▪ Location ▪ Mobile phone

Information on Nuru Light	▪ Serial Number ▪ Entrepreneur (Name and Location) ▪ Date of purchase (Warranty Card) or approximate date if not available
Physical check of Nuru Light	▪ Is the household in possession of one or more solar lamps? (Y/N) – *picture required* ▪ Does the solar lamp work? (Y/N) – *picture required*
Operational check of Nuru Light	▪ Is the household still using the lamp (lantern of kit)? ▪ Is the household now electrified and electricity is working permanently? ▪

Target Population: The Target Population will be rural households in Cameroon that have purchased lanterns and or kits and that have already used them for more than 3 years.

The **Sampling Frame** will consist of the sales records that are kept by the entrepreneurs with information on the households that have purchased lanterns and or kits .

The sampling will be made using the following table:

MONITORING SAMPLING *Sample No.*	*Entrepreneur ID*	*Entrepreneur Name*	*Serial N° of Nuru Light*	*Household Name*	*Household Location (Physical Address)*	*Mobile Number (if available)*	*Delivery date to households*
1							
2							
3							
...							
100							

The **Sample Method** selected based on the "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities" (EB 75, Annex 8) is **Simple random sampling** method**.** The "Standard for sampling and surveys for CDM project activities and programme of activities" (EB 69, Annex 4) recommends the use of **simple random sampling** if there is homogeneity in the population to be sampled, and it's the case for this project activity.
A random sample of yearly group of users of solar lanterns and kits that have been in used for more than 3 years will be taken every year.

Sample Size

The **sample size** is calculated using formula (1) of the "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities" (on paragraph 48)

$$n \geq \frac{1.645^2 N \times p(1-p)}{(N-1) \times 0.1^2 \times p^2 + 1.645^2 p(1-p)}$$

Where:

Parameter	Value	Unit	Comment
n	To be calculated	Number	The sample size to be calculated
N		Number	Total number of solar lanterns and kits in the population to be sampled. Will be taken from records
Proportion	0.95		Is the rule-of-thumb estimated proportion of lanterns and kits still in operation in the 4th, 5th, 6th and 7th year as indicated also in paragraph B.6.3. . The technology supplier does not have a real estimate since the technology is new in the market. For ex post calculations real value from survey will be taken.
Confidence	1,645	-	Is the constant representing the 90% confidence required by the Methodology
Precision	0.1	-	Is the 10% relative precision required by the Methodology

With the above parameters, the minimum sample size will be estimated each year. If the calculation returns a value less than 100, then at least a sample of 100 will be taken since the methodology request a minimum sample of 100 (see Paragraph 31 of the AMS-III.AR).

Procedures for Administering Data Collection and Minimizing Non-Sampling Errors
Independent surveyors will be trained (one per region of the project implementation). The training will cover the following topics:

- The purpose and discussion of the questionnaire
- How to contact the households
- The non-response procedures
- The Timeframe

Procedures to administer data collections:

(a) Each trained surveyor will receive enough questionnaires with some extra questionnaire for the interviews, a list of households to be interviewed, a camera and spare batteries for the camera.
(b) Surveys will be carried out face-to-face in English/French, or local dialect when necessary
(c) The surveyor will first check whether the household is in possession of a lantern or/and a kit and whether it works.
(d) Next the surveyor will carry out the short questionnaire as prepared by S2.
(e) The surveyor translates the questionnaire (if necessary) and returns both copies to S2.

Procedures for non-response:

- If a household cannot be found according to the contact data from the sample list or if it is found that the data was erroneous, the household is deleted from the sample list.
- If a household cannot be contacted due to temporary absence of all household members over age 12, the household will be visited a second time. If the household is also absent during the second visit, the household will be deleted from the sample list.
- In case less than the minimum required sample size is achieved, the project will do new sample and survey additional households until the minimum households is reached.

Quality assurance and quality control:

- The sample will be generated automatically from a random selection of the entrepreneurs and the households that are recorded in our online application and book keeping (Excel table).
- Surveys will be carried out by independent persons that are not employed by S2 or do not have a direct stake within the company S2.
- Responses by households will be double-checked by the survey team by reviewing the sales records of the entrepreneurs.

Data analysis

- Data analysis will be carried out by S2
- All underlying data will be kept both in hardcopy and electronically at S2 Services Sarl's offices for the entirety of the crediting period.

Implementation

Party	**Role**
Training	S2 Services Sarl
Sampling	S2 Services Sarl with the supervision of an independent institution
Surveys	Independent surveyors / University or institute like the Cameroon National Institute of Statistics
Analysis	S2 Services Sarl

B.7.3. Other elements of monitoring plan

>>

Methodology Requirements	**Proposed Project Activity**
Para 28: Monitoring includes: (i) Recording of project lamp distribution data; and (ii) Where Option 2, paragraph 18 is chosen ex post monitoring surveys to determine percentage of project lamps distributed to end-users that are operating and in service in year *y*.	As mentioned in the earlier sections, all the lanterns and kits have a unique serial number When a solar lantern and or lighting kit is sold, for warranty and project management measure, all the customer data are recorded on the warranty card and a copy is kept with S2. See section B.7.2 for the sampling plan and survey details
Para 29: During project activity implementation, the following data are to be recorded: (a) Number of project lamps distributed to end-users under the project activity, identified by the type of project lamps (lamp wattage, battery	Any solar lantern and solar lighting kit meeting minimum LG requirements can be distributed under this project activity, as far as each product has all necessary information on it (like the serial number) all lanterns and kits have a unique serial number, which links the lamp and the owner (household) during its purchase when the

type, charging method, the date of distribution);[21] (b) Data to unambiguously identify each recipient of a project lamp, for all the project lamps distributed that will claim emission reductions for up to seven years, as per Option 2, paragraph 18.	warranty card is filled in two copies, and the sales record are made. As stated above, all the lamps have a unique serial number. At the purchase (even by a third party[22]), the warranty card is field in two copies and each project lamps is then directly linked to its recipient[23]. As we have a bundle of entrepreneurs and lamps around them in a selected community, identifying the recipient using the combination serial number entrepreneurs' sales record will be well achievable. The sales records will also include the date when the household s receive the lamps.
Para 30: For project lamps that will claim emission reductions for up to seven years, ex post monitoring surveys to determine percentage of project lamps[24] distributed to end users that are operating and in service will be conducted during the third year of the crediting period. While the percentage of project lamps that are operating and in service can be assumed to equal 100 per cent in year 1, 2, and 3, the result of ex post monitoring survey undertaken during the third year shall be used in years 4, 5, 6 and 7, as per paragraph 26. Only project lamps with a unique project marking (per paragraphs 18(f) or 33) can be counted as operating and in service. While project lamps replaced as part of a regular maintenance or warranty program can be counted as operating, project lamps cannot be replaced as part of the survey process and then counted as operating. **The above ex post monitoring sampling surveys shall be conducted for each batch of project lamps. Alternatively, the result of**	Within the project scenario, identifying operating lamps will just be done by checking if the lamp is still operational, and if the household is not connected to grid electricity that works permanently

[21] Or a conservative estimation thereof based on distribution records. In the case of project activities which do not involve direct distribution of project lamps to end-users, but instead involve distribution of project lamps through intermediaries, the average number of days between the date on which project lamps are delivered to intermediaries and the date on which the project lamps are distributed from the intermediaries to end-users can be determined using either survey methods or by using a default value of 120 days. The survey methods may either be of a census of intermediaries (if the number of intermediaries is equal to less than 50) or using sampling methods in accordance with the "Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities". However, the date of delivery of project lamps to all intermediaries shall be directly recorded with no recourse to sampling.

[22] In our marketing strategy, people or groups could sponsor households in targeted area in buying one or more NURU lights for them.

[23] The recipient is here the responsible of the household. It is important to note that one VLE is set to control around 100 lamps, which is in our case not more than 35 households considering that a household can have more than one NURU Light just as it happens with the Kerosene lanterns.

[24] If project lamps are distributed with different charging methods, per paragraph 2(a), 2(b) and/or 2(c), then the percentage operating in year 3 should be determined per each category of charging method, see equation (5).

a sampling survey of the first batch may be used as a proxy to subsequent batches (e.g. the operating rate in year 4 for the project lamps installed in year 1 could be used for the operating rate in year 5 for the project lamps installed in year 2).	
Para 31: The following survey principles shall be followed for activities related to determining number of project lamps in service and operating under the project: (a) The sampling size is determined by minimum 90 per cent confidence interval and the 10 per cent maximum error margin; the size of the sample shall be no less than 100; (b) Sampling must be statistically robust and relevant, i.e. the survey has a random distribution and is representative of the target population (size, location); (c) The method to select respondents for interviews is random; (d) The survey is conducted by site visits; (e) Only persons over age 12 are interviewed; (f) The PDD must contain the design details of the survey.	All these survey principles will be followed

SECTION C. Start date, crediting period type and duration

C.1. Start date of project activity

>>
15/09/2016[25]

C.2. Expected operational lifetime of project activity

>>
20 years[26] and 00 month

C.3. Crediting period of project activity

C.3.1. Type of crediting period

>>
Fixed Crediting Period

C.3.2. Start date of crediting period

>>
15/07/2016 or Registration date (the latest one of the dates)

[25]Date expected to release purchase order for lamps and PowerCycle.

[26]That is based on the lifetime of the light of 30 000 hours **(30 000 / 4(hours per day) / 365 days per year = 20 years)**

C.3.3. Duration of crediting period

>>
10 years and 00 month

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

>>
An analysis of the environmental impacts of the project activity is not required by the Host Party[27]

D.2. Environmental impact assessment

>>

SECTION E. Local stakeholder consultation

E.1. Modalities for local stakeholder consultation

>>
For the Project NURU which will be implemented in the whole country following the project boundary definition given earlier in the PDD, it was not possible to make several stakeholder consultation meetings.
A single on was organised instead.
On February 18th2013, a public invitation was sent to the whole country using the daily newspaper "MUTATION" in both French and English language.
An email invitation was sent to the network of the nongovernmental associations ACAMEE (Cameroonian Association of Environmental Evaluation) and Light4All an association fighting for the supply of good quality lighting solutions in rural areas.
Other invitations were sent to about 18 bodies including government representatives (Health, Environment and Sustainable Development, Urban Development, Forestry, etc. ...), NGOs, the DNA office, the UNFCCC Regional Support Centre of Lome in Togo, university (teachers and students) and importantly NURU technology users (village level entrepreneurs, and lamps owners) coming from the pilot site.

The meeting was held in Douala with an attendance of about 44 persons including the organisation staff (5 persons).

During the meeting, the presentation of the technology and the project on all its aspects was held, a demonstration of light charging (full recharge of 5 lamps), pedal activation using the mobile payment technology and the manual recharge.

The attendance list and the summary of comments are provided in annex A

E.2. Summary of comments received

>>
The comments were generally positive about the idea, the business model qualified as innovative and there was a general interest from many to bring the project in their own region after the pilot region.
In that regards, we had discussions about the way forward in term of implementing the project in the next location.

[27]The national bylaw of 2005 No 0070/MINEP of 22 April 2005 indicate project activities that need to undergo environmental impact assessment.

We did receive a few comments about the technical specifications of the products. We were able to answer not only with the test results certificates but also with the demonstration. The best answers to such concerns came from the users and VLE present during the meeting as they spoke from experience.

"Thank you Nuru, I was using my Kerosene lantern with 8 litres of Kerosene per month x 500 XAF/L for a total of 4000 XAF of expenses per month. With my two Nuru lamps that I recharge three time a month each, I only spend 200 XAF / Recharge x3 x2 lamps = 1200 XAF per month for lighting" ***from Mr. Ndoe Adalbert, household in Missole II, pilot phase location***

The representative of the DNA office was present and reacted to some questions about the CDM process by explaining the process in simple terms and stating the role of the DNA office in Cameroon, and encouraging people to follow S2 example and try to follow the CDM process with their projects. From the users and VLE of the pilot site, we had some the following points to address:

- There is no device showing the level of the charge
- The user rely on the entrepreneur and there is still some distance to go to charge the lamps
- The lighting problem is solve with the Nuru lamps but people still need to go far away to charge phones
- The mobile payment system is not always available to all
- What is the maintenance schedule on the pedal and who performs it?
- Will other similar meetings be organised in other places to inform people about the project?
- What is next after the pilot phase, what are the requirements to be an entrepreneur?

E.3. Consideration of comments received

>>

	Questions / Comments of Participants	Answer or Reaction of S2
1	There is no device showing the level of the charge	One of the challenges of developing the Nuru Light is to keep the price down and make it affordable to Kerosenelamps users. Adding a sort of energy meter would increase the price. But in general as users will confirm, before going off, the lamps will start blinking and that would mean that the battery needs to be recharges soon. In that case, if the lamp was used in a higher level, one can used it in the lower one to have it for some more time without blinking.
2	The users rely on the entrepreneur and there is still some distance to go to charge the lamps	Yes indeed. Just like the Kerosene lamps users have to go and buy some Kerosene, the Nuru lamps users will go to the recharging point. The pedals are generally disposed to people with a fix position like small shops or kiosk owners. S2 owns the pedal and that means that if there are complaints from users or if the sales records show that a pedal is not being used, the pedal can be claimed back by S2 and disposed to a more available person in the neighbourhood.
3	The lighting problem is solve with the Nuru lamps but people still need to go far away to charge phones	Yes indeed. Nuru has developed a phone charging kit and some samples will be soon available in Cameroon. It is being tested in Rwanda. The kits will be used to charge the phone using the Nuru Light battery. The consequence will be that the lamp will be discharged sooner which is logical.
4	The mobile payment system is not always available to all	S2 is dealing with that issue. So far the alternative is the manual generation of pedal unit activation codes.
5	What is the maintenance schedule on the pedal and who performs it?	The equipment is very robust and do not need a scheduled maintenance except on the pedal as the VLE is responsible of it. It a separate part that can be replaced if damaged and that is at the charge of the VLE. For the rest of the equipment, if there is problem, S2 will have to repair or to change the

		pedal. Without an operating pedal, no recharge is possible; it is to S2 best interest to make sure that the pedals are all working well.
6	Will other similar meetings be organised in other places to inform people about the project?	Yes we will, but this is more a formal one to receive comments and reactions from the public. In order to implement the project at a particular location in the country, we will hold more than on meeting; one to inform the local authorities and then one for the populations in the area, and more than one to train the future village level entrepreneurs. This was the steps used in Missole for the pilot phase and it turned out to be a success in term of communication process.
7	What is next after the pilot phase, what are the requirements to be an entrepreneur?	Now that the pilot phase is completed, we will use our rollout plan to go to the next location. During the market research, we have identified based on selected criteria (such as the Kerosene lamps usage, the population density, the closeness to Douala, NGOs and partners available etc...) a rollout map. The map is available and can be shared with people who believed that their regions or a region that they know needs NURU. Entrepreneurs are selected through recommendation of local representative, their availability, their current activity etc... We usually preferred those will a fixed location and a small economic activity.

SECTION F. Approval and authorization

>>

The Letter of Approval has been granted and is available

Appendix 1. Contact information of project participants

Organization name	S2 Services Sarl
Country	CAMEROON
Address	PO BOX 12218
Telephone	+237 679 52 61 20 / +237 243 17 75 58
Fax	
E-mail	info@s2-gmbh.com
Website	www.s2-gmbh.com
Contact person	NDONGSOK Durando

Organization name	Swedish Energy Agency
Country	SWEDEN
Address	Energimyndigheten, Box 310
Telephone	+46 165 44 20 00
Fax	+46 165 44 22 64
E-mail	backoffice@swedishenergyagency.se
Website	www.swedishenergyagency.se
Contact person	HANSEN OLA

Appendix 2. Affirmation regarding public funding

The Project has not received public funding

Appendix 3. Applicability of methodologies and standardized baselines

Not applicable

Appendix 4. Further background information on ex ante calculation of emission reductions

Not applicable

Appendix 5. Further background information on monitoring plan

Not applicable

Appendix 6. Summary report of comments received from local stakeholders

Not applicable

Appendix 7. Summary of post-registration changes

Summary of changes:
The changes include:
Replacement of Nuru technology that contains 2 main components:

(i) The Nuru lights

(ii) The PowerCycle that is a mechanical system powered by human pedaling that recharge Nuru light periodically (end-users bring their Nuru lights to a trained village level entrepreneur (VLE) and pay a fee to get their light recharged)

The Nuru technology is replaced by stand-alone solar lanterns and solar lighting kits.
The main reason for this change is that investors approached do not understand the Nuru technology and prefer solar systems that are more spread in Africa. The PP has been looking for investors for over 3 years and got the same remarks and that is why the change are made now. Also, the usage of solar systems is easier and more practical to end-users that are totally independent once they acquire their solutions, unlike the Nuru technology that continuously depend on the availability of VLEs.
The PP has already an ERPA with Swedish Energy Agency that has also agreed with the change to be made. Swedish Energy Agency also believes that the project will have more chances in securing funding with solar technology used.

Distribution plan:
Entrepreneurs will be identified and selected based on location, local experience, capacity (i.e. management and financial capacity) to implement the activities (i.e. selling project solar lanterns and solar lighting kits), credit history and membership of groups (e.g. cooperatives and microfinance organized lending groups).
Entrepreneurs can be any person willing to sell project's products, such as individuals, NGOs, Associations, Cooperative, small shop owners in rural area. The staff of S2 available in the field will provide training to prospective entrepreneurs. The training sessions will cover all the necessary information for the entrepreneurs to successfully operate their own micro franchises, taking into account the specific needs of each entrepreneur.
The solar lanterns and solar lighting kits will be bought in cash by end users through S2 trained entrepreneurs, or directly from S2's staff, in cash or using Pay As You Go systems whereby end users pay periodically a small amount of money against energy credits.

Type of changes:
Changes are classified as *"Change to project design*", because the technology is completely changed

Proposed or actual changes to the registered CDM project activity on the following criteria:

#	*Criteria*	*Changes Yes/No*
a	*The applicability and application of the applied methodologies and, where applicable, the applied standardized baselines, with which the project activity has been registered*	*No* *Applicability of the methodology with the new changes is still exactly the same with the initial technology*

b	*The compliance of the monitoring plan with the applied methodologies and, where applicable, the applied standardized baselines*	*No* *The methodology and the monitoring of the project have not changed*
c	*The level of accuracy and completeness in the monitoring of the project activity compared with the requirements contained in the registered monitoring plan*	*No* *No change in the initial monitoring plan*
d	*The additionality of the project activity*	*No* *The additionality is demonstrated exactly the same way*
e	*The scale of the project activity*	*No,* *project remains small scale*

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Document information

Version	*Date*	*Description*
10.1	28 June 2017	Revision to make editorial improvement.
10.0	7 June 2017	Revision to: • Improve consistency with the “CDM project standard for project activities” and with the PoA-DD and CPA-DD forms; • Make editorial improvement.
09.0	24 May 2017	Revision to: • Ensure consistency with the “CDM project standard for project activities” (CDM-EB93-A04-STAN) (version 01.0); • Incorporate the “Project design document form for small-scale CDM project activities” (CDM-SSC-PDD-FORM); • Make editorial improvement.
08.0	22 July 2016	EB 90, Annex 1 Revision to include provisions related to automatically additional project activities.
07.0	15 April 2016	Revision to ensure consistency with the “Standard: Applicability of sectoral scopes” (CDM-EB88-A04-STAN) (version 01.0).
06.0	9 March 2015	Revision to: • Include provisions related to statement on erroneous inclusion of a CPA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Provisions related to the Host Party; • Make editorial improvement.
05.0	25 June 2014	Revision to: • Include the Attachment: Instructions for filling out the project design document form for CDM project activities (these instructions supersede the "Guidelines for completing the project design document form" (Version 01.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the project activity in B.7.4 and Appendix 1; • Change the reference number from F-CDM-PDD to CDM-PDD-FORM; • Make editorial improvement.
04.1	11 April 2012	Editorial revision to change version 02 line in history box from Annex 06 to Annex 06b.

Version	*Date*	*Description*
04.0	13 March 2012	Revision required to ensure consistency with the “Guidelines for completing the project design document form for CDM project activities” (EB 66, Annex 8).
03.0	26 July 2006	EB 25, Annex 15
02.0	14 June 2004	EB 14, Annex 06b
01.0	03 August 2002	EB 05, Paragraph 12 Initial adoption.

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