

Gold standard for the global goals
Monitoring report



June 2017, version 1

Title of the project	The Cameroon Heat Retention Cooker Project
Gold Standard project id	GS5444
Version number of the monitoring report	4.0
Completion date of the monitoring report	06/05/2020
Date of project design certification	08/08/2017
Start date of crediting period	08/08/2015
Duration of this monitoring period	MP2, (01/12/2018) to (30/11/2019)
Duration of previous monitoring period	(08/08/2015) to (30/11/2018)
Project representative(s)	Mr. Jean Claude Tsafack
Host Country	The Republic of Cameroon
Certification pathway (activity certification/impact certification)	Impact Certification
SDG Contributions targeted (as per approved PDD)	1 – SDG 13: Climate Action 2 – SDG 7: Affordable and Clean Energy 3 – SDG 1: No Poverty
Gold Standard statement/product certification sought (GSVER/ADALYs/RECs etc.)	GS VER
Selected methodology(ies)	Gold Standard Methodology: Technologies and Practices to Displace Decentralized Thermal Energy Consumption, Version 2.0 (in the following: TPDDTEC methodology)
Estimated amount of annual average certified SDG impact (as per approved PDD)	8,077 t CO ₂ e (SDG 13 Climate Action) 2,044 Wonder cookers (SDG 7 Affordable and Clean Energy) 134,143,632 FCFA (SDG 1 No Poverty)
Total amount of certified SDG impact (as per approved methodology) achieved in this monitoring period	10,000 t CO ₂ e (SDG 13 Climate Action) 849 t CO ₂ e for 01/12/2018 – 31/12/2018 9,151 t CO ₂ e for 01/01/2019 – 30/11/2019 3,597 Wonder cookers (SDG 7 Affordable and Clean Energy) 200,208,237 FCFA (SDG 1 No Poverty)

SECTION A. Description of project

A.1. Purpose and general description of project

>> (Provide a brief summary of the detailed description given in section B.1 including purpose of the project, brief description of the installed technology and equipment and relevant dates for the project (e.g. construction start/end, commissioning, continued operation periods, etc.)

The goal of the project is to alleviate energy poverty, to improve the health and the lifestyle of the poor and to reduce the deforestation, and therefore protect the natural ecosystem, of Cameroon's South-West, West and Littoral regions through the subsidized dissemination of Heat Retention Cookers (HRCs) to rural and peri-urban households who rely on fuelwood as a primary source of cooking energy.

The working mechanism of heat retaining cooking is simple. The pot containing the food is brought to the boiling point. The temperature accumulated by the pot and its contents at the boiling point is enough to continue and end the cooking process in an insulated environment. The initial type of HRC technology that is being used is the "Wonder Cooker" (WC). Wonder Cookers are bags made of cotton fabric that establish the insulated environment through the use of small polystyrene beads sewn into compartments of the bag.

Figure 2: "Wonder Cooker" of the 1st generation, body and lid



Figure 1: Wonder Cooker test with users during field trials



The owner and implementer of the project is the Cameroonian NGO Pro Climate International (PCI). PCI will produce, sell and distribute heat retaining cooking bags at a subsidized price to rural and peri-urban

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households of the project region who rely on fuelwood as their primary source of cooking energy. The goal is to distribute about 1,600 bags per year over a period of 4 years. The buyer of the GS VERs to be generated by the project is the German development agency Brot für die Welt (BfdW, "Bread for the World"), who will pay a share of the purchase price upfront to facilitate the production and distribution of the wonder cookers as well as PCI's operations related to the project activity.

A tabular overview of the history and the milestones of the project is presented in *Table 1* below.

Table 1: History and milestones of the project activity

Date	Milestone	Description
04/2015	Start of the pilot project	Funded by Brot für die Welt (BfdW, "Bread for the World") and assisted by carbon consultant Bridge Builders PCI kicks off the pilot phase of the carbon project. The pilot project includes the following activities: <ul style="list-style-type: none"> • Training of seamstresses on sewing the bags • Producing 480 pilot-bags • Training staff on monitoring and marketing of the cooking bags • Identifying pilot communities and women groups • Promoting and training selected women groups on heat retaining cooking methods, selling and distributing the wonder cooker bags • Conducting of a baseline survey by PCI's research partner University of Buea • Designing a monitoring database • Organizing and implementing a monitoring campaign to assess the impact after the new technology had been introduced, including carbon saving potential of the heat retaining cooking bags and their lifetime/long-term usage • Preparing and submitting the actual business plan for scale-up, including (Gold Standard) carbon project design by PCI's carbon consultant Bridge Builders
07-11/2015	Distribution of approx. 480 HRC bags	PCI distributes approx. 480 HRC bags under the pilot phase.
22/06/2016	Carbon project design finalized	Bridge Builders, the carbon consultant of the project, finalizes the carbon project design based on the monitored emission reductions of the 480 bags of the pilot phase. Based on this document PCI and BfdW are in a position to decide whether the project should be registered as GS CDM or GS VER. (Retroactive) emission reductions for the 480 HRC bags of the pilot phase are an integral part of the calculations of the GS VER scenario.
13/10/2016	Initiation of GS VER registration	Based on the findings of the carbon project design by Bridge Builders, BfdW and PCI agree to move ahead with the registration of the project (pilot phase and scale-up) as a GS VER project (vs. the alternative option to pursue GS CDM registration). PCI then contracts Bridge Builders to write the PDD and manage the validation/registration process.
17/10/2016	Feasibility study/business plan for the scale-up phase	PCI submits the feasibility study/business plan for scaling up the carbon project from the pilot phase and finally registering it as a GS VER project to BfdW.

	submitted to BftW	
08/08/2017	GS registration	The project successfully passes GS internal validation and review and is registered as a GS VER project.
08/2017	ERPA signature	PCI and BfdW sign an Emission Reduction Purchase Agreement (ERPA) on the sale and purchase of GS VERs of the project
09/2017	Start of the implementation (scale-up phase) of the project	PCI starts with the production and dissemination of HRCs of the second generation Wondercooker design.
08/2018 – 11/2018	1. Monitoring conducted	PCI conducts the first Monitoring Campaign for the Monitoring Period “08/08/2015 – 30/11/2018”. Bridge Builder supports PCI with training and the writing of the Monitoring Report.
08/2019	1. Issuance of GS VERs	GS issues the first 11,472 GS VERs to PCI for the 1 st Monitoring Period.
08/2019 – 10/2019	2. Monitoring conducted	PCI conducts the first Monitoring Campaign for the Monitoring Period “01/12/2018 – 30/11/2019”.

A.2. Location of project

>> (Provide host country, state/province, city/town details along with GPS co-ordinates.)

Host country: The Republic of Cameroon

The project activity is located in the South-West, West and Littoral regions of Cameroon as shown in Figure 3 below. These administrative regions correspond to the mono-modal forestry (SW, LT) and high plateaus (W) ecological zones of Cameroon. The administrative boundaries of the three regions represent both the target area and the fuel production and collection area of the project activity.

Figure 3: Map of Cameroon with Project Area
(Source: Google Earth)



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The project activity is being implemented in households of all rural and peri-urban communities within the project area that are eligible according to the project's design, i.e. that use fuelwood as their primary source of cooking energy in the baseline.

The coordinates of Pro Climate International's main office, located in Buea Town, Opposite the Market are used to represent the physical location of the project activity:

Latitude: 4°9'49.18"N

Longitude: 9°14'18.60"E

A.3. Reference of applied methodology

>>(Indicate title and version number of the methodology.)

Gold Standard Methodology: Technologies and Practices to Displace Decentralized Thermal Energy Consumption, Version 2.0 (in the following: TPDDTEC methodology)

A.4. Crediting period of project

>> (Provide start date and length of the crediting period as given in approved PDD.)

Start date of crediting period: 08/08/2015

(22/07/2015 in the registered PDD. But since final registration only occurred on 08/08/2017 and retroactive crediting is limited to 2 years prior to registration, this is the actual start date of the crediting period)

Length of crediting period: 10 years

SECTION B. Implementation of project

B.1. Description of implemented project

>> (Provide information on the implementation status of the project during this monitoring period. Specify any deviations / delays compared to information in approved project.)

During the pilot phase of the project 480 Wonder cooker HRCs have been deployed in the period July to October 2015. The scale-up phase of the project has been under implementation since September 2017. Sales and deployment of the 2nd generation Wonder cooker HRC started on 27/09/2017. In the period September 2017 to November (end) 2019 PCI has sold and deployed a total of 3,883 Wonder cookers, which is higher than the sales target of 2,800 Wonder cookers for the 4th year of the crediting period as laid out in the registered PDD.

Deployment numbers

2015: 480 wonder cookers have been deployed

2016: 0 wonder cookers have been deployed

2017: 605 wonder cookers have been deployed

2018: 2202 wonder cookers have been deployed

2019: 1076 wonder cookers have been deployed¹

Total: 4363 wonder cookers have been deployed

The main reasons for this positive development are:

¹ This only refers to all wonder cookers deployed between January and 30/11/2019.

1. An exceptional effort of the project team
2. A strong demand for the Wonder cooker that exceeded the conservative estimates of the business plan (and PDD)
3. A head-start of Wonder cooker production by PCI that allowed to initiate Wonder cooker sales and deployment 2 months ahead of schedule compared to the business plan

The overwhelming success of the project is even more remarkable considering the volatile political and security situation in a large part of the project area, namely the Southwest region of Cameroon. Since late 2016, Cameroon's Anglophone regions have endured turmoil and violence in what has become a human rights crisis. This situation has been thoroughly researched and discussed in a report by Amnesty International that documents the human rights violations, including unlawful killings, destruction of private property, arbitrary arrests and torture committed by the Cameroonian security forces during military operations conducted in the Anglophone regions. It also documents how armed separatist groups calling for secession and embracing an armed struggle, carried out violent attacks against the Cameroonian security forces, state emblems, including schools, and ordinary people.²

B.2. Post-registration changes

B.2.1. Temporary deviations from Certified Key Project Information, Project Design Document, Monitoring & Reporting Plan, applied methodology or applied standardized baseline

>> (Indicate whether any temporary deviations have been applied during this monitoring period. If applied, provide a description of the deviation(s). Include the reasons for the deviation(s), how it deviates from the monitoring plan, applied methodology(ies) and/or applied approaches, the duration for which the deviation(s) is(are) applicable and justification on the conservativeness of the approach. Also indicate if prior approval from GS-TAC have been sought on the deviation.)

There have been no deviations from the monitoring plan, the methodology or any of the applied approaches.

However, the violent and dangerous climate in the project area also continued during the 2nd Monitoring Period and 2nd Monitoring Campaign. The situation as described in the Monitoring Report for the 1st Monitoring Period has not changed. Therefore, the ongoing Cameroonian crisis and conflict continued to hamper the proper execution of the monitoring campaign. The majority of the randomly selected households were located in the Southwest region, as PCI's offices are located in Buea, the capital of the Southwest region and this was the focus area of sales during the initial years of the scale-up phase of the project.

Besides those communities that are or have been hot spots of violence (e.g. those mentioned in the AI report) practically every community in the Southwest region has been turned into a conflict zone – at least temporarily – through the occasional presence of either rebel groups or armed forces of the government or both. In order to navigate this situation PCI had to rely on local knowledge, rumours and most importantly direct information from project households to perform the household visits of the monitoring campaign. The two major limitations encountered during monitoring were:

1. PCI's enumerators were not able to move freely because of ever shifting conflict zones. Proper planning and scheduling of household visits was difficult. Some households located in hot spots of violence or lasting conflict zones could not be visited at all.

² Amnesty International (2018): A turn for the worse: violence and human rights violations in anglophone Cameroon; Index: AFR 17/8481/2018; <https://www.amnesty.org/en/documents/afr17/8481/2018/en/> (last accessed 08/01/2019)

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2. Many families in (potential) conflict zones are leaving their homes temporarily. Very few abandon their house altogether and move away. But a lot of people are shifting temporarily to the homes of relatives or friends living nearby or even go into hiding in the jungle during times when they expect attacks by the army or rebel groups in their area.

Because of this situation the PCI enumerator team resorted to the following strategy for monitoring/visiting households in the Southwest region:

1. Before visiting a household from the sampling list, the enumerators would attempt to contact the household by phone. For those households that had provided an emergency contact, also these contacts were tried.
2. When the contact attempt was successful, the household was asked for guidance with regard to the security situation in their neighbourhood and the household visit was scheduled (many times at very short notice, due to the possibility of quick changes in the scenario).
3. After a minimum of three failed contact attempts at different times and days, when the households advised not to visit the area or when the family had left their home temporarily the team struck the household from the sampling list and moved on to the next household at the bottom of the list.

For households in the other two regions (Littoral and West) the usual approach of just visiting the household was followed. To increase the chance of finding people at home at the time of the visit households were also contacted by phone beforehand.

B.2.2. Corrections

>> *(Indicate whether any corrections to project information or parameters fixed at validation have been applied.)*

N/A

B.2.3. Changes to start date of crediting period

>> *(Indicate whether any changes to the start date of the crediting period have been approved by Gold Standard that is relevant for this monitoring period.)*

N/A

B.2.4. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

>> *(Indicate whether any permanent changes from the approved monitoring plan, applied methodologies or applied approaches have been approved by GS-TAC that is relevant for this monitoring period.)*

N/A

B.2.5. Changes to project design of approved project

>> *(Indicate whether any changes to the design of the project have been approved by GS-TAC that is relevant for this monitoring period.)*

N/A

SECTION C. Description of monitoring system applied by the project

A. Total Sales Record & B. Project Database

All relevant information of project households and HRCs deployed is collected by PCI during the sales process by means of a sales invoice/contract with carbon copy that includes a carbon waiver section regarding the concession of the right to generate carbon credits.

The hardcopy is then encoded electronically into the Project Database and afterwards stored in a fireproof cabinet.

The dataset collected and stored for each HRC includes:

1. HRC serial number (unique identifier)
2. Date of sale
3. Place of sale
4. HRC model
5. Name, telephone number (if available) and address of the buyer and/or user
6. Current stove technology/ies and cooking fuel/s of the buyer's/user's household

Only households whose reported primary cooking fuel is fuelwood are entered into the database/sales record.

Furthermore, PCI follows the master sample sampling approach indicated in the registered PDD (for a detailed description please refer to section D.3 below). Under this approach systematic sampling is applied at the sales/household registration level. In practice, this is implemented by "marking" and including every 5th buyer (as per invoice number) to the master sample of the project. For all households of the master sample additional measures are taken in order to increase the chance of finding them during monitoring. E.g., phone numbers and addresses are verified/tested on the spot or additional contact information of potential emergency contact persons is gathered. PCI also regularly performs data maintenance and quality controls on households in the master sample. Households are contacted via follow-up phone calls to detect incorrect or outdated contact details and update the households' records in the database.

In addition to the sales database, PCI also keeps full documentation regarding the production of HRCs and the sourcing of materials, including purchase invoices/receipts and an electronic production record and warehouse/production center log.

C. On-going Monitoring Studies

In the period August-November 2019 PCI hired enumerators and conducted the surveys in a combined, age-representative sample of 160 households that were randomly selected from the two age groups in the project database at the cut-off date 25/07/2019. A detailed description of the sampling approach, including drawing procedure, measurement/data-collection methods, statistical analysis and results is provided in section D.3 below.

The surveys conducted on the combined sample were:

a) Monitoring Survey (MS)

Information gathered:

1. User follow up
 - a. Update of address or location (if applicable)
 - b. Update of mobile telephone number (if applicable)

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2. End user characteristics
 - a. Number of people served by baseline and project technology
 - b. Typical project technology usage patterns and tasks
3. Project technology and fuels
 - a. Types of project and baseline technologies used and estimated frequency
 - b. Types of fuels used and estimated quantities
 - c. Sources of fuels; (purchased or hand-collected, etc.) and prices paid or effort made

b) Usage Survey

Through an interview with the primary cook and in-person observations, the enumerators determined whether the HRC was present in the household and actually in use. For this purpose, an HRC was determined to be “in use” (see definition below), if:

1. The household was found in the project area
2. The HRC was found in the household
3. A visual inspection of the HRC and the fireplace indicated “regular use” (proven by pictures with date stamp)
4. The primary cook reported a “regular use” of the HRC

c) Project Performance Field Test (FT) Update

An update of the Project Performance Field Test was not necessary during this Monitoring Period, since the parameter only has to be monitored on a biennial basis. Therefore, the value from the 1st Monitoring Period is used for this Monitoring Period and no Kitchen Performance Tests (KPTs) have been performed.

Additional Measures: Requirements and Guidelines for carrying out usage surveys for projects implementing improved cooking devices

Since the project uses the TPDDTEC methodology and the monitoring report is submitted after 01/07/2018 for verification the “GS Requirements and Guidelines for carrying out usage surveys for projects implementing improved cooking devices” (published 23/08/2017) is applied. However, based on the Internal Verification of the 1st Monitoring period performed by GS and the answer of the TAC, only Level A and B from the guidelines need to be demonstrated and have to be met.

A. Mandatory Monitoring Requirements

Step 1. Defining stove use and non-use

Prior to the survey “regular use” was defined as: *“at least four time per week”*

Reasoning for the “regular use” definition: Since HRCs are a complementary cooking device that is used in combination with the baseline 3-stone fire, it is not required (or common) that the HRC is used for every cooking activity. Using an HRC only every other time is not contradictory to high fuel wood savings, because it is mostly used and most impactful for hard-boiling foods like plantains, beans, kassawa, etc. that take a lot of time to cook and therefore also a lot of fuelwood.

Step 2. Household Usage Survey

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Only primary cooks were interviewed by the enumerators. This was marked on the questionnaires. For all 125 interviewed households the following tasks were performed:

- i. Kitchen observations – Photographs of the project stove and the kitchen were taken. The condition of the Wondercooker was observed and marked down by the enumerator (used/unused).
- ii. Interview with the primary cook – The primary cook was interviewed by means of a semi-structured questionnaire with regard to usage patterns, duration and frequency of use, stoves and energy sources/amounts used and seasonal trends.
- iii. Photos of the cooking area(s) – see above. All pictures clearly show the status of the Wondercooker and the kitchen and stoves used.
- iv. GPS coordinates – Date stamped and location specific photos of the household were taken.

Step 3. Verification checks

The project developer conducted verification checks with a total of 24 randomly selected households by phone at the end of October 2019. The information corroborated with the households was if the household was actually visited by the enumerators and the usage pattern, duration, frequency of use and seasonal trends reported. All 24 households confirmed the visit by the enumerators and corroborated the information collected.

B. Good Practice Monitoring Requirements

Field team training and supervision

In the framework of the second monitoring campaign to assess the Cameroon Heat Retention Cooker project, PCI organised a 4-days training workshop from 14th-17th August 2019 to train the team that would be involved in the collection and processing of information from the users' households. This training took place at CAFRAD Douala with an attendance of seven participants listed in the table below.

Names of participants

SN	Name of participants	Field of specialization	Gender	Function
1	Tsafack Jean-Claude	Dipl. Geographer/ Sustainable Management	Male	Project coordinator (Trainer)
2	Engongwe Jacqueline	MSc Environmental science	Female	Project assistant/Enumerator
3	Rohdof Lactem Yengeh	MSc Environmental science	Male	Project Officer/Enumerator
4	Agbor Kelly Monjowa Arika	BSc Environmental science	Female	Enumerator
5	Dimo Cedric Kwa	BSc Environmental science	Male	Enumerator
6	Efon Elad Constantine	Diploma Ecotourism	Male	Office assistant
7	Dahsong Njapang Clovies	MSc Accounting	Male	Accountant

The training started prior to fieldwork with the main objective of ensuring that all team members and specifically the field team have the capacity, knowledge and skills required to carry out the monitoring survey and to discuss the lessons learned from the previous monitoring. Specific objectives were to:

- Explain the rationale of the survey and enable field team to understand all the sections on the survey form.
- Enable field team to have a mastery on the usage of the field tools and a uniform application of the survey methodology.

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- Expose field team to cooking bags households for survey acquaintance
- Prepare data collectors to undertake and ensure good overall quality of data

Methodology

The training was organized in a theoretical and a practical session whereby the main tool used during the theoretical part was the "Monitoring and preparation of verification Handbook". The theoretical session consisted of an understanding of basic concept of the survey and sections in the survey questionnaire. This entailed going through the training handbook on how to fill in the household survey questionnaire as well as the introduction to the use of the various field tools such as a GPS device, measuring scale, camera, ropes etc.

Explanations were given regarding the sampling method and techniques to contact households on phone and interact with them later on physically during field visit. A lot of emphasis was laid on the use of local languages which is best understood by interviewees in the community as a tool of communication to facilitate data collection; and that it was also very necessary to explain questions that interviewee could not understand.

The practical session was meant to expose the field team to the reality in the field through an outdoor training on the use of tools such as the measuring scale, GPS device, camera, rope etc. In the end of this session a feedback session was organized resulting to corrections and amendments before the field work could effectively commence.

The Trainer

The training was conducted and supervised by Mr. Jean Claude Tsafack, project coordinator at PCI, who has a reliable experience on the implementation of improved wood fuels cook stoves projects. Further assistance in terms of the carbon component was given by Bridge Builders.

The Trainees

Except one participant, all trainees involved in this training are holder of at least a bachelor's degree in environmental sciences or a related field in order to ensure the quality of data collection and processing during the implementation of this project.

A test was administered to the participants in the end of the training to evaluate their capacity to carry out the field work. They successfully passed the test and certificates were awarded to testify the new competences acquired on the monitoring of the carbon project.

Moreover, the trainees already conducted the Monitoring for the first Monitoring Period. Hence, they already have had valuable experiences in the conduction of the interviews.

End-User Training and follow-up visits + Awareness campaign

The introduction of a new technology into any society is often faced with some mixed feelings. Being a new technology, the vulgarisation of the wonder cooker bag was also bound to face such challenges. In order to minimise these challenges and maximise the adoption of the technology by the society, Pro Climate International (PCI) is engaged in massive awareness raising and sensitisation campaign in the course of the implementation of the Wonder Cooker Bag Project.

Awareness and sensitization campaigns were and are carried out both amongst women groups and in public places in the project zones. During this exercise, women social groups in the project zones were contacted through their leaders using key people in communities. Programs were arranged for a PCI team to visited and sensitize the women groups about the Wonder Cooker Project and its benefits. Institutions where social women groups are present were also visited and the same exercise carried out. Besides,

public spaces such as markets were visited and cooking demonstration using the wonder cooking bag were done.

During this campaign, project objectives were made known to the groups and any local dish of their choices was cooked using the wonder cooking bags for women to see and understand its functionalities as well as formalities it takes to get the bags. At the end of this exercise, any woman who showed interest in the wonder cooking bag had to pay a token amount of 6,000 frs to possess one. For this monitoring period records of 11 of these awareness campaigns have been kept. Many smaller ad-hoc demonstrations/trainings have been conducted during the ongoing sales campaign.

Another routine in the promotion of the wonder cooking bag are follow-up visits to households that using the bag. The main purpose of this follow-up is to appreciate the usage of the bag by households and to clarify any worries and address difficulties that could be raised by users. Appointments are made through phone calls and households are visited based on their availability. In the present monitoring period, a total of 13 households were visited.

Following observation from the visit, it was understood that most of the households were already acquainted with the use of the bags. However, some worries were raised related to the cooking of certain delicate foods like rice and traditional dishes like koki and kwacoco. In a few instances the Wondercookers needed some sort of maintenance and fixing (e.g. rope cut)

C. Best practice requirements

Stove use monitoring

Heat retention cookers (HRCs) in general and Wondercookers (WC) in particular are not stoves, but complementary cooking devices and therefore the requirement cannot be applied to this project.

Furthermore, the use of a Continuous Stove Monitor (CSM) is not possible in a WC made of cotton fabric and insulation material, without either negatively affecting the usability or durability of the WC (e.g. sewing or sticking it to fabric of the inside of the bag, where pots are placed) or negating the functionality of the CSM (e.g. deploying it inside the insulation chamber of the bag).

It was further confirmed during the Internal Verification and via E-Mail by GS and the TAC that Level C of the guideline document is not mandatory to the project since it cannot be applied to the Wondercooker technology.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

(Copy this table for each piece of data and parameter)

Relevant SDG Indicator	13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity building to implement adaptation, mitigation and technology transfer, and development actions
Data/parameter:	P _{b,y}
Unit	kg/household/day
Description	Quantity of air-dry fuelwood consumed by households in the baseline scenario per day
Source of data	Nkwatoh (2016): Households Fuel wood Consumption in Rural and Sub-urban Households of the South-West, West and Littoral Regions of Cameroon

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Value(s) applied)	10.80
Choice of data or measurement methods and procedures	In line with section 4.C of the TPDDTEC methodology Option 1 for determining the baseline fuelwood consumption is chosen – a default value. The default value is chosen according to the provisions of footnote 24 under “Case of Single Sample Test”.
Purpose of data	Emission reduction calculation
Additional comments	n/a

Relevant SDG Indicator	13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity building to implement adaptation, mitigation and technology transfer, and development actions
Data/parameter:	$EF_{b,wood,CO_2} / EF_{p,wood,CO_2}$
Unit	tCO ₂ /TJ
Description	CO ₂ emission factor of wood fuel
Source of data	TPDDTEC methodology
Value(s) applied)	112
Choice of data or measurement methods and procedures	Methodology default value for wood/wood waste
Purpose of data	Emission reduction calculation
Additional comments	n/a

Relevant SDG Indicator	13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity building to implement adaptation, mitigation and technology transfer, and development actions
Data/parameter:	$EF_{b,wood,nonCO_2} / EF_{p,wood,nonCO_2}$
Unit	tCO ₂ /TJ
Description	Non-CO ₂ emission factor of wood fuel
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy, Table 2.5
Value(s) applied)	8.692 ((CH ₄ =0.3*GWP 25) + (N ₂ O=0.004*GWP 298))
Choice of data or measurement methods and procedures	IPCC default values
Purpose of data	Emission reduction calculation
Additional comments	n/a

Relevant SDG Indicator	13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity building to implement adaptation, mitigation and technology transfer, and development actions
Data/parameter:	$NCV_{b,wood} / NCV_{p,wood}$
Unit	TJ/ton
Description	Net calorific value of air-dry wood
Source of data	IPCC default for wood fuel
Value(s) applied)	0.015

Choice of data or measurement methods and procedures	As per TPDDTEC Equation 3
Purpose of data	Emission reduction calculation
Additional comments	n/a

Relevant SDG Indicator	1.2.1 Proportion of population living below the national poverty line, by sex and age
Data/parameter:	Average money saved from reduced consumption of fuelwood
Unit	FCFA/household/month
Description	Households who (partially) purchase their fuelwood for cooking do save money at the same rate at which they save fuelwood thanks to the new HRCs
Source of data	Baseline Survey (BS), first Monitoring Survey (MS)
Value(s) applied	5,469 FCFA/household/month (approx. 8.30 EUR)
Choice of data or measurement methods and procedures	The average monthly expenditure on the purchase of fuelwood found in a sample of 171 household interviewed during the baseline survey (BS) of the project was 7,971 FCFA (approx. 12.20 EUR). This is the current situation for all households who do not yet own an HRC. For the 480 households who were supplied with an HRC as part of the pilot phase of the project the average monthly expenditure on the purchase of fuelwood dropped to 2,502 FCFA (approx. 3.80 EUR), according to the monitoring survey (MS) conducted in the same sample of 171 households. Therefore, for those households who do save money from fuelwood purchases, the average saving can be estimated as 7,971 FCFA/month – 2,502 FCFA/month = 5,469 FCFA/month (approx. 8.30 EUR).
Purpose of data	Calculation of monetary savings from reduced consumption of Fuelwood
Additional comments	n/a

D.2. Data and parameters monitored

(Copy this table for each piece of data and parameter)

Relevant SDG Indicator	13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity building to implement adaptation, mitigation and technology transfer, and development actions
Data/parameter:	fNRBy
Unit	Fractional non-renewability
Description	Non-renewability status of woody biomass fuel in year y
Measured/calculated/default	Default/calculated
Source of data	CDM default value
Value(s) of monitored parameter	70%
Monitoring equipment	n/a
Measuring/reading/recording frequency:	The NRB value may be updated periodically, either in line with the respective updates of the CDM default value or through a dedicated NRB assessment as per the TPDDTEC methodology.

Calculation method (if applicable):	In line with the provisions of AMS II.G and the guidance of the CDM Executive Board (EB90) a default country-specific fNRB value of 70%, as approved by the Cameroonian DNA on September 22, 2014 shall be applied.
QA/QC procedures:	n/a
Purpose of data:	Emission reduction calculation
Additional comments:	n/a

Relevant SDG Indicator	13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity building to implement adaptation, mitigation and technology transfer, and development actions
Data/parameter:	$P_{p,y}$
Unit	kg/household/day
Description	Quantity of air-dry fuelwood consumed by households in the project scenario p per day in year y
Measured/calculated/default	Measured
Source of data	Project PFT update during the 1 st Monitoring Period
Value(s) of monitored parameter	2.19
Monitoring equipment	See section D.3 of Monitoring Report for MP1 for detailed explanation of survey methods and calculation of results.
Measuring/reading/recording frequency:	To be updated every two years
Calculation method (if applicable):	See section D.3 of Monitoring Report for MP1 for detailed explanation of survey methods and calculation of results.
QA/QC procedures:	All records will be stored electronically and on paper. All steps of the statistical analysis will be documented, so that they can be reproduced at any time.
Purpose of data:	Emission reduction calculation
Additional comments:	A single project fuel consumption parameter is weighted to be representative of the quantity of project technologies of each age being credited in a given project scenario.

Relevant SDG Indicator	13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity building to implement adaptation, mitigation and technology transfer, and development actions 7.1.2 Proportion of population with primary reliance on clean fuels and technology
Data/parameter:	$U_{p,y}$
Unit	Percentage
Description	Cumulative usage rate for HRCs in project scenario p during year y, based on cumulative installation rate and drop-off rate
Measured/calculated/default	Measured
Source of data	Usage survey
Value(s) of monitored parameter	92.66%

Monitoring equipment	Survey in a simple random, age-representative sample of project households. To be updated annually
Measuring/reading/recording frequency:	To be updated annually
Calculation method (if applicable):	See section D.3 below for detailed explanation of survey methods and calculation of results.
QA/QC procedures:	All records are stored electronically and on paper. All steps of the statistical analysis have been documented in this report and in the supporting Excel spreadsheet, so that they can be reproduced at any time.
Purpose of data:	Emission reduction calculation
Additional comments:	A single usage parameter is weighted to be representative of the quantity of project technologies of each age being credited in a given project scenario.

Relevant SDG Indicator	<p>13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity building to implement adaptation, mitigation and technology transfer, and development actions</p> <p>7.1.2 Proportion of population with primary reliance on clean fuels and technology</p>									
Data/parameter:	$N_{p,y}$									
Unit	Days									
Description	Project technology-days in the project database for project scenario p through year y									
Measured/calculated/default	Measured									
Source of data	Total sales record									
Value(s) of monitored parameter	<table border="1"> <thead> <tr> <th>Period y</th> <th>$N_{p,y}$ in period (days)</th> </tr> </thead> <tbody> <tr> <td>01/12/2018 – 31/12/2018</td> <td>81,518</td> </tr> <tr> <td>01/01/2019 – 30/11/2019</td> <td>1,129,844</td> </tr> <tr> <td>Total in monitoring period</td> <td>1,211,362</td> </tr> </tbody> </table>		Period y	$N_{p,y}$ in period (days)	01/12/2018 – 31/12/2018	81,518	01/01/2019 – 30/11/2019	1,129,844	Total in monitoring period	1,211,362
Period y	$N_{p,y}$ in period (days)									
01/12/2018 – 31/12/2018	81,518									
01/01/2019 – 30/11/2019	1,129,844									
Total in monitoring period	1,211,362									
Monitoring equipment	Sales invoices, Excel database									
Measuring/reading/recording frequency:	Continuously. PCI will continuously record the sales of HRCs, including date of sale, model/type and name and contact details (address, mobile phone where available) of users.									
Calculation method (if applicable):	The value for project technology-days in the project database has been established as the sum of the number of days of operation of HRCs from the 2 nd and 3 rd age group (i.e. Wondercookers of the 2 nd and 3 rd generation) in the monitoring period 01/12/2018 – 30/11/2019.									
QA/QC procedures:	All sales records have been stored electronically and on paper.									
Purpose of data:	Emission reduction calculation									
Additional comments:	There is only one project scenario and only one type of HRC (the “Wondercooker”) that has been deployed in during and prior to the current monitoring period. Therefore, no differentiation of the sales record by scenario is required for this monitoring period.									

Relevant SDG Indicator	13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity building to implement adaptation, mitigation and technology transfer, and development actions
Data/parameter:	LE _{p,y}
Unit	tCO2e per year
Description	Leakage in project scenario p during year y
Measured/calculated/default	Measured/calculated
Source of data	Leakage assessment
Value(s) of monitored parameter	0
Monitoring equipment	n/a
Measuring/reading/recording frequency:	To be updated every two years per the provisions of section II.6 of the TPDDTEC methodology.
Calculation method (if applicable):	<p>“To be updated every two years per the provisions of section II.6 of the TPDDTEC methodology. Where appropriate, elements regarding leakage may be included in the yearly monitoring survey.”</p> <p>The leakage assessment and discussion from the PDD has been updated based on the findings in the last two years, see section D.3. for a detailed discussion. Based on the assessment the leakage value is considered as 0.</p>
QA/QC procedures:	In cases where survey methods are used: All records will be stored electronically and on paper. All steps of the statistical analysis will be documented, so that they can be reproduced at any time.
Purpose of data:	Emission reduction calculation
Additional comments:	Aggregate leakage can be assessed for multiple project scenarios, if appropriate.

Relevant SDG Indicator	1.2.1 Proportion of population living below the national poverty line, by sex and age
Data/parameter:	Total monetary amount saved from reduced consumption of fuelwood (NHH,M)
Unit	FCFA
Description	Total amount of fuelwood expenditures saved by all users thanks to the HRC in the monitoring period.
Measured/calculated/default	Measured
Source of data	Monitoring Survey (MS)
Value(s) of monitored parameter	200,208,237 FCFA
Monitoring equipment	Questionnaire
Measuring/reading/recording frequency:	To be updated annually

Calculation method (if applicable):	<p>As part of the annual Monitoring Survey (MS) users in the sample will be asked whether they save money on their fuelwood expenditures since adoption of the HRC (Yes or No). The total number of users who do save money from fuelwood expenditures thanks to the HRC are then established through the percentage of households that report that they do save money with the HRC during the Monitoring Survey (MS), multiplied with the number of technology-days ($N_{p,y}$) and adjusted by the actual monitored usage rate ($U_{p,y}$). For this number of households/technology-days monthly monetary savings from reduced consumption of fuelwood can then be assumed to be at least 5,469 FCFA per household and month (ex-ante parameter "Average money saved from reduced consumption of fuelwood"), i.e. $5,469 \text{ FCFA} \times 12 \text{ months} / 365 \text{ days} = 179.8 \text{ FCFA/HH/day}$.</p> <p>Calculation: $99.20\% * 1,211,402 * 92.66\% * 179.8 = 200,208,237 \text{ FCFA}$</p> <p>Thus, the total monetary amount saved from reduced consumption of fuelwood is about 200 million FCFA (about 305 k €). This means that every household saved up to 79€ in the Monitoring Period.</p>
QA/QC procedures:	All records will be stored electronically and on paper. All steps of the statistical analysis will be documented, so that they can be reproduced at any time.
Purpose of data:	Calculation of monetary savings from reduced consumption of Fuelwood
Additional comments:	

D.3. Implementation of sampling plan

>> (If data and parameters monitored described in section D.2 above are determined by a sampling approach, provide a description on how project participants implemented the sampling plan and surveys for those data and parameters according to the approved PDD.)

Drawing of the random sample for combined monitoring

For the measurement/determination of the parameters $U_{p,y}$ (usage rate of HRCs) and for the update of the Monitoring Survey (MS) a sampling approach was followed. $P_{p,y}$ (fuelwood consumption by households in the project scenario) only requires a biennial monitoring. Hence, monitored values from the first Monitoring Campaign were taken for this present Monitoring Period.

In order to minimize the monitoring effort, the other **two monitoring surveys were performed on the same sample**. Furthermore, to increase the response rate of the surveys the "master sample" approach described in the PDD was used, consisting of the following two steps:

1. Random drawing of a master sample during the sales process through systematic sampling
 → During sales every 5th household (as per invoice number) was selected and marked for the master sample.
2. A combined, age-representative sample was drawn randomly from the master sample at the cut-off date for monitoring (25/07/2019).

As per the requirements for usage surveys of the TPDDTEC methodology the following boundary conditions were considered for the random drawing of the sample in step 2:

- a. "a usage parameter is required that is weighted to be representative of the quantity of project technologies of each age being credited"

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- b. *"The minimum total sample size is 100, with at least 30 samples for project technologies of each age being credited"*
- c. *"To ensure conservativeness, participants in a usage survey with technologies in the first year of use (age0-1) must have technologies that have been in use on average longer than 0.5 years. For technologies in the second year of use (age1-2), the usage survey must be conducted with technologies that have been in use on average at least 1.5 years, and so on."*

Ad a.: The master sample was stratified into three age groups. However, all 480 Wonder cookers that were distributed in the period July-October 2015 during the pilot phase of the project and belonging to age group 1 were no longer considered for the Monitoring Period because of their respective age.

The master sample of age group 2 consisted of 478 of the 2,399 2nd generation Wonder cookers that were distributed under the scale-up phase of the project from 27/09/2017 – 26/09/2018. The master sample of age group 3 consisted of 225 of the 1121 3rd generation Wonder cookers that were distributed under the scale-up phase of the project between 27/09/2018 until the cut off date on 25/07/2019.

Ad b.: To ensure that the required minimum sample sizes would be achieved oversampling was applied and random samples of 109 and 51 households respectively were drawn for AG2 and AG3.

Ad c.: For each age group the date was determined where Wonder cookers have been in use on average longer than 0.5 years. Only master sample households of an age group that were on average in use longer than 0.5 years at the end of the Monitoring Period were considered for the random drawing of the monitoring sample. The respective deployment dates of the two age groups were 27/03/2018 (AG2) and 27/03/2019 (AG3).

The sample was drawn using Microsoft Excel and the procedure applied was as follows:

1. Ordering the 3,520 records of the sales database for Age Group 2 and Age Group 3 at the cut-off date 25/07/2019 (see Ad a. above) randomly using Excels rand() function
2. Selection (filtering) of all 703 households of the master sample (478 AG2 + 225 AG3)
3. Drawing of AG2 sample
 - a. Selection of all 478 AG2 master sample households
 - b. Selection of the 225 AG2 master sample households with a deployment date prior to 27/03/2018
 - c. Selection of the first 109 records from the top of the (randomly ordered!) list
4. Drawing of AG3 sample
 - a. Selection of all 225 AG3 master sample households
 - b. Selection of the 154 AG3 master sample households with a deployment date prior to 27/03/2019
 - c. Selection of the first 51 records from the top of the (randomly ordered!) list

A recording of the random drawing is available for verification by the auditor.

Fieldwork

Fieldwork was conducted in the period 23/08/2019 to 08/10/2019. The tense security situation in a large part of the project area (Southwest region) had to be observed and had an influence on the overall timeframe of the conduction of the Monitoring efforts. The field team consisted of 4 enumerators, 2 permanent staff of PCI and 2 interns hired temporarily for the survey.

To preserve the randomness of the sample the enumerators of the field team approached households strictly in the order of the sampling list of each age group. I.e., "back-up" households at the bottom of the list were only approached after unsuccessful visits/contact attempts with households from the top of the

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respective list. Exceptions were only made for logistical reasons, e.g. when a household from the bottom of the list would be a neighbour of a household from the top and could conveniently be monitored along with the latter one. However, the monitoring results of such households would only be considered if and when they were actually deemed to be a monitoring household after failed visits/contact attempts with a respective number of households from the top of the list.

During the household visit the following routine was followed by the enumerators:

Equipment

- 1 questionnaire
- 1 digital camera (or smartphone with camera)

Household Visit

1. Administration of questionnaire, including the following sections:
 - a. Household information
 - b. Wondercooker usage
 - c. Monitoring Survey (MS)
2. Taking of a picture of the kitchen/cooking place, showing:
 - a. The kitchen/cooking place
 - b. The Wondercooker
 - c. The main stove(s) of the household
 - d. A date stamp

Finally, all questionnaires were encoded electronically into Excel and statistical analysis as per the requirements of the TPDDTEC methodology and registered PDD was performed.

Results of statistical analysis: Usage Survey, measurement of $U_{p,y}$

Out of 160 sampled a total of 125 could be surveyed. In 121 of these 125 households the Wondercooker was found and was "in use" according to the definition of Usage as at least 4 times a week. Usage frequencies and household numbers are shown in Table 2.

Table 2: Wondercooker usage, reported by the main cook

Age Group	No. of cooking with WC per week	% of HHs	No. of HHs	Total No. of HHs (%)
2	2	1.15%	1	87 (70%)
	3	0%	0	
	4	19.54%	17	
	5	32.18%	28	
	6	16.09%	14	
	7	31.03%	27	
3	2	2.63%	1	38 (30%)
	3	5.26%	2	
	4	21.05%	8	

	5	26.32%	10
	6	7.89%	3
	7	36.84%	14

Of the 35 households that could not be surveyed 9 were located in a conflict zone and could not be reached, 1 was located in a conflict zone but was not at home, 20 were not at home at the time of the visit and 5 could be reached over the phone but had moved out of the project area.

A breakdown of the results of the usage survey for each age group is presented in Table 3 below.

Table 3: Summary of usage survey results

		Age Group 2	Age Group 3	Total
Contacting attempted		109	51	160
Surveyed (visited and interviewed)		87	38	125
Result	Wondercooker found and in use (according to definition)	86	35	121
	Wondercooker not found or not in use (according to definition)	1	3	4
Not surveyed		22	13	35
Because	Conflict zone: not reachable on phone	7	2	9
	Conflict zone: reachable on phone, but not at home	1	-	1
	Visited but not at home	10	10	20
	Reachable on phone or visited, but temporarily displaced	4	1	5
Considered for usage rate		91	39	130
In use		86	35	121
Not in use		5	4	9
Usage rate		94.51%	89.74%	93.08 %

Households that could not be monitored – either due to being located in a conflict zone or because nobody was at home at the time of the visit – have to be excluded from the analysis. On the other hand, households that have moved out of the project area have to be counted as “non-usage” cases. Hence, the respective usage rates for age groups 2 and 3 in the monitoring period are 94.51 % and 89.74%.

Finally, for comparison we also calculate the age-representative usage rate for the total population of HRCs operational in the monitoring period. Then, the usage rates have to be weighted by the number of devices of each age group in operation in the monitoring period. For this purpose, we are calculating with the 2,399 Wondercookers of AG2 that were deployed by the 26.09.2018 vs. the 1,121 Wondercookers of AG3 that had been deployed by the cut-off date for the drawing of the monitoring survey (25/07/2019). The 363 additional Wondercookers deployed between 25/07/2019 and 30/11/2019 can conservatively be considered to belong to AG3 in this Monitoring Period.

The age-representative usage rate of the HRC population operational in the monitoring period is then 92.66%.

Table 4: Age-representative usage rate

	Age Group 2	Age Group 3	Total
No. of households/devices in DB	2,399	1,484	3,883
Usage rate	94.51%	89.74%	

No. of devices in use	2,267	1,331	3,598
Weighted Average usage rate			92,66%

The weighted average usage rate of 92.66% is used as the official value for $U_{p,y}$.

Results of statistical analysis: Monitoring Survey (MS) Update

The tables below summarize the results of the monitoring survey, including brief discussions where appropriate. Unless specified otherwise, e.g. where only results of a subset of relevant respondents are analysed, the results represent the responses of the 125 households that were found at home and interviewed in the course of the combined monitoring campaign.

For 10 households either the address or other contact details (i.e. mobile phone number) were incorrect and were updated.

HH address or phone number needs update?	
No	115
Yes	10
Grand Total	125

The average household size amongst respondents was 6.7 persons.

Number of people living in the household	
Children (0 - 14 y)	2.4
Women (15 - 59 y)	2.4
Men (15 - 59 y)	1.7
Women (> 59 y)	0.2
Men (> 59 y)	0.1
Total	6.7

All Wondercookers were found to be in use according to the visual inspection of the enumerators. Only one WC of age group 2 was found to be in a rather bad state, but it was still usable.

Condition of the WC			
	AG2	AG3	All
b. Used - in good condition	86	38	124
c. Used - in bad condition, but still usable	1	0	1
Grand Total	87	38	125

121 respondents use their Wondercooker regularly based on the applied definition of this monitoring period which is at least 4 times per week. The average usage frequency is 5.5 times per week.

How often do you use the WC per week?	
2	1.6%
3	1.6%
4	20.0%

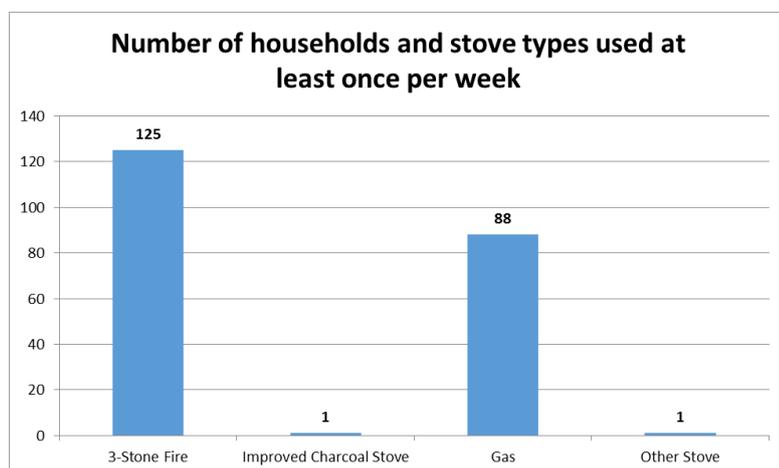
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5	30.4%
6	13.6%
7	32.8%
Grand Total	100%

Nobody reported a different usage pattern for rainy or dry season.

Different usage in DRY or RAINY season?	
No	100%
Grand Total	100%

By design HRCs are used in combination with a baseline cooking technology/stove. The primary cooking device of all households is the 3-stone fire, with an average usage frequency of 5.18 times per week. Furthermore, many households use a gas stove a secondary cooking device that complements the 3-stone fire, mostly for warming up food. 69.6% of all interviewed households use gas as a supplementary cooking fuel and the average usage frequency is 2.9 times per week.



Average usage frequency (per week) amongst users of the respective technologies	
3-stone fire	5.18
Improved charcoal stove	2
Gas stove	2.53
Other	1

Not surprisingly the main fuel used by households is fuelwood. The average self-reported amount is 56.6 kg/week. The average expenditure for fuelwood is 656 FCFA/week.

	No. of users	Amount	Expenditure
Fuelwood	125	56.6 kg/week	656 CFA/week
Gas	88	10 l/week	2.008 CFA/month
Charcoal	1	40 l bucket /month	2.500 CFA/month
Sawdust/ Woodwaste	1	100 kg/week	200 CFA/week

The comparison with the 1,840 CFA/week average expenditures on fuelwood by households in the baseline survey shows the huge positive financial impact that the Wondercooker has for households and corresponds with almost 100% of those households who (partially) buy fuelwood reporting that the Wondercooker helps them saving money. Overall, 78.4% are purchasing their fuelwood and only 16.8% are purely collecting it from the forest. A share of 4.8% of all interviewed households reported that they collect and buy firewood. At the same time almost all users (99.2%) report that they are saving time with the Wondercooker. Only one user that is collecting firewood indicated that he/she is not saving money.

Buy or collect FW?		Are you saving MONEY with the WC?	
		No	Yes
50/50 (6)	4.8%	0%	100%
Buy (98)	78.4%	0%	100%
Collect (21)	16.8%	4.76%	95.24%
Grand Total	100%	1.59%	98.41%

In terms of cooking habits, the main dishes that households cook in their Wondercooker are beans, plantains, corn chaff (corn and bean porridge) and rice. I.e., the WCs are most useful for hard-boiling food. Especially beans normally take more than 2 hours to cook and under normal circumstances their preparation takes a lot of fuelwood and time. With the WC the cooking time is still the same but the time on the fire is reduced to 15 minutes, leading to huge fuelwood and time savings.

Leakage Assessment

Potential sources of leakage	Discussion	Leakage risk
a) The displaced baseline technologies are reused outside the project boundary in place of lower emitting technology or in a manner suggesting more usage than would have occurred in the absence of the project.	The project does not displace the baseline technologies. Monitoring Results for MP1 and MP2 confirm this. The technology works in combination with the baseline technology.	Very Low
b) Non-project users who previously used lower emitting energy sources use the non-renewable biomass or fossil fuels saved under the project activity.	Monitoring Results of MP1 and MP2 show that the alternative cooking technology to the 3-stone fire and improved wood cook stoves targeted by the project activity is mainly gas. As found in the BS the reason for households to cook on gas is not a scarcity of fuelwood but rather a general preference for these cleaner, more convenient technologies. However, gas is expensive and this is the reason why poorer households cook with fuelwood.	Very low

	<p>The additional availability of fuelwood (through the savings achieved with the HRC technology) has hence not lead to a switch from gas stoves back to 3-stone fire or improved cook stoves as it does not affect the financial situation of gas stove users at all.</p>	
<p>c) The project significantly impacts the NRB fraction within an area where other CDM or VER project activities account for NRB fraction in their baseline scenario.</p>	<p>In this Monitoring Period the project achieved fuelwood savings of 9,665 tons. For rural areas of the South-West, West and Littoral regions only Atyi et. al. (2016) estimate the annual fuelwood consumption by households and the annual fuelwood logging for sale at 852,602 tons/year and 392,000 tons/year respectively, that is a total of 1,244,602 tons/year.³ Considering the project's fuelwood savings of 9,665 tons, this would make up a share of 0.78% of the overall consumption of 1,244,602 tons/year. Further, other major types of consumption of wood like construction, carpentry or export are not considered in the number of 1,244,602 tons/year and thus the overall consumption number would even be higher. Therefore, it can be argued that those fuelwood savings generated by the project will not have a significant impact on the fNRB value and the calculation of ER savings of any other carbon project.</p>	
<p>d) The project population compensates for loss of the space heating</p>	<p>As shown in the PDD households do not use space heating at all in the tropical,</p>	<p>Very low</p>

³ Atyi et. al. (2016): Economic and social importance of fuelwood in Cameroon, www.cifor.org/publications/pdf_files/.../AEbaa-Atyi1602.pdf

effect of inefficient technology by adopting some other form of heating or by retaining some use of inefficient technology.	equatorial climate of the three regions covered by the project activity. This situation has not changed in the last two years of the crediting period.	
e) By virtue of promotion and marketing of a new technology with high efficiency, the project stimulates substitution within households who commonly used a technology with relatively lower emissions, in cases where such a trend is not eligible as an evolving baseline.	The project only contributes to a reduction of the high-emitting baseline technology as the Wondercookers do reduce the consumption of fuelwood. As an option households might only increase the usage of low-emitting technologies like gas or kerosene due to the money and time savings achieved through the reduced fuelwood consumption. This impact can then however be seen as positive in a climate perspective.	Very low

SECTION E. Calculation of SDG outcomes

E.1. Calculation of baseline value or estimation of baseline situation of each SDG outcome

>> (Provide details of equations and approaches used to calculate/estimate baseline values.)

SDG 13: Climate Action

Baseline emission calculations are conducted as follows:

$$BE_{b,y} = B_{b,y} * \left((f_{NRB,y} * EF_{b,wood,CO_2}) + EF_{b,wood,nonCO_2} \right) * NCV_{b,wood} \quad (3)$$

Where:

$BE_{b,y}$	Emissions for baseline scenario b during the year y in tCO ₂ e
$B_{b,y}$	Quantity of fuelwood consumed in baseline scenario b during year y, in tons, as per by-default factor
$f_{NRB,y}$	Fraction of biomass used during year y for the considered scenario that can be established as non-renewable biomass
$NCV_{b,wood}$	Net calorific value of fuelwood (IPCC default of 0.015 TJ/ton)
$EF_{b,wood,CO_2}$	CO ₂ emission factor of fuelwood (IPCC default of 112 tCO ₂ /TJ)
$EF_{b,wood,nonCO_2}$	Non-CO ₂ emission factor of fuelwood (IPCC default of 8.692 tCO ₂ e/TJ)

$B_{b,y}$ shall be calculated according to the following formula:

$$B_{b,y} = N_{p,y} * P_{b,y} \quad (4)$$

Where:

$N_{p,y}$	Project technology-days in the project database for project scenario p through year y
$P_{b,y}$	Quantity of fuelwood consumed by a household in baseline scenario b per day, in tons, as per by-default factor.

SDG 7: Affordable and Clean Energy

No additional baseline calculations applicable. See section E.3. for further information.

SDG 1: No Poverty

No additional baseline calculations applicable. See section E.3. for further information.

E.2. Calculation of project value or estimation of project situation of each SDG outcome

>> (Provide details of equations and approaches used to calculate/estimate project values.)

SDG 13: Climate Action

Project emission calculations are conducted as follows:

$$PE_{p,y} = B_{p,y} * \left((f_{NRB,y} * EF_{p,wood,CO2}) + EF_{p,wood,nonCO2} \right) * NCV_{p,wood} \quad (5)$$

Where:

$PE_{p,y}$	Emissions for project scenario p during the year y in tCO ₂ e
$B_{p,y}$	Quantity of fuelwood consumed in project scenario p during year y, in tons, as derived from the statistical analysis conducted on the data collected during the project performance field test
$f_{NRB,y}$	Fraction of biomass used during year y for the considered scenario that can be established as non-renewable biomass
$NCV_{p,wood}$	Net calorific value of fuelwood (IPCC default of 0.015 TJ/ton)
$EF_{p,wood,CO2}$	CO ₂ emission factor of fuelwood (IPCC default of 112 tCO ₂ /TJ)
$EF_{p,wood,nonCO2}$	Non-CO ₂ emission factor of fuelwood (IPCC default of 8.6g2 tCO ₂ e/TJ)

$B_{p,y}$ shall be calculated according to the following formula:

$$B_{p,y} = N_{p,y} * \left((P_{p,y} * U_{p,y}) + (P_{b,y} * (1 - U_{p,y})) \right) \quad (6)$$

Where:

$N_{p,y}$	Project technology-days in the project database for project scenario p through year y
$P_{p,y}$	Quantity of fuelwood consumed by a household in project scenario p per day, in tons, as per project performance field test
$P_{b,y}$	Quantity of fuelwood consumed by a household in baseline scenario b per day, in tons, as per by-default factor
$U_{p,y}$	Cumulative usage rate for HRCs in project scenario p during year y, based on cumulative installation rate and drop-off rate

SDG 7: Affordable and Clean Energy

No additional project calculations applicable. See section E.3. for further information.

SDG 1: No Poverty

No additional project calculations applicable. See section E.3. for further information.

E.3. Calculation of net benefits as difference of baseline and project values or direct calculation for each SDG outcome

>>

SDG 13: Climate Action

The overall GHG reductions achieved by the project activity are then calculated as follows:

$$ER_y = \sum BE_{b,y} - \sum PE_{p,y} - \sum LE_{p,y} \quad (7)$$

Where:

ER_y	Emission reduction for total project activity in year y (tCO ₂ e/yr)
$BE_{b,y}$	Emissions for baseline scenario b during the year y in tCO ₂ e
$PE_{p,y}$	Emissions for project scenario p during the year y in tCO ₂ e
$LE_{p,y}$	Leakage for project scenario p during the year y in tCO ₂ e

Table 5 below provides an overview of the input values for formulas (3), (4), (5) and (6) above:

Table 5: Summary of ex-ante and ex-post values

Parameters	Values as per sections D.1 and D.2	Unit
$P_{p,y,M1}$	2.19	kg wood/HH/day
$P_{p,y,M0}$	3.4687	kg wood/HH/day
$P_{b,y}$	10.8	kg wood/HH/day
$fNRB_y$	70%	
$U_{p,y}$	92.66%	
$LE_{p,y}$	0	tCO ₂ e
$NCV_{b,wood} / NCV_{p,wood}$	0.015	TJ/t wood
$EF_{b,wood,nonCO_2} / EF_{p,wood,nonCO_2}$	8.692	tCO ₂ e/TJ
$EF_{b,wood,CO_2} / EF_{p,wood,CO_2}$	112	tCO ₂ /TJ

Table 6 summarizes the baseline and project fuelwood consumption, baseline and project emissions, as well as the resulting overall emission reductions of the project in the monitoring period, calculated as per formulas (3), (4), (5) and (6) with the input values of Table 6 and the number of project technology days $N_{p,y}$ in the respective periods.

Table 6: Baseline and project fuelwood consumption, baseline and project emissions, emission reductions

		01/12/18 - 31/12/18	01/01/19 - 30/11/19	Total
$N_{p,y}$	Days	81,518	1,129,844	1,211,362

B _{b,y}	t wood	880	12,202	13,083
BE _{b,y}	tCO ₂ e	1,150	15,941	17,091
B _{p,y}	t wood	230	3,188	3,418
PE _{p,y}	tCO ₂ e	301	4,165	4,466
ER _y	tCO ₂ e	849	11,776	12,625
ER _{y capped}	tCO ₂ e	849	9,151	10,000

SDG 7: Affordable and Clean Energy

Indicator	Monitoring parameter	Proposed approach	Equation/calculation
7.1.2 Proportion of population with primary reliance on clean fuels and technology	Number of Heat Retention Cookers (HRCs) in use	PCI will continuously record the sales of HRCs, including date of sale, model/type and name and contact details (address, mobile phone where available) of users. Additionally, every year PCI will perform a survey in a simple random, age-representative sample of project households to determine the "usage rate" of HRCs.	The total number of HRCs in use in the project scenario shall be established as the product of the number of HRCs in the sales record (monitoring parameter N _{p,y}) and the usage rate (monitoring parameter U _{p,y}). Calculation: Number of HRCs in use = N _{p,y} x U _{p,y} Number of HRCs in use = 3,883 x 0.9266 Number of HRCs in use= 3,597

SDG 1: No Poverty

Indicator	Monitoring parameter (see section C.1 for details)	Proposed approach	Equation/calculation
1.2.1 Proportion of population living below the national poverty line, by sex and age	Total monetary amount saved from reduced consumption of fuelwood	The average monthly expenditure on the purchase of fuelwood found in a sample of 171 household interviewed during the baseline survey (BS) of the project was 7,971 FCFA (approx. 12.20 EUR). This is the current situation for all households who do not yet own an HRC. For the 480 households who were supplied with an HRC as part of the pilot	The total number of users who save money from fuelwood expenditures thanks to the HRC are established through the percentage of households that report that they do save money with the HRC during the Monitoring Survey (MS), multiplied with the number of technology-days (N _{p,y}) and adjusted by the actual monitored usage rate (U _{p,y}). For this number of households/technology-days monthly monetary savings from reduced consumption of fuelwood can then be assumed to be at least 5,469 FCFA per household and month (ex-ante

		<p>phase of the project the average monthly expenditure on the purchase of fuelwood dropped to 2,502 FCFA (approx. 3.80 EUR), according to the monitoring survey (MS) conducted in the same sample of 171 households. Therefore, for those households who do save money from fuelwood purchases, the average saving can be estimated as $7,971 \text{ FCFA/month} - 2,502 \text{ FCFA/month} = 5,469 \text{ FCFA/month}$ (approx. 8.30 EUR).</p>	<p>parameter "Average money saved from reduced consumption of fuelwood"), i.e. $5,469 \text{ FCFA} \times 12 \text{ months} / 365 \text{ days} = 179.8 \text{ FCFA/HH/day}$.</p> <p>Calculation: $99.20\% \times 1,211,402 \times 92.66\% \times 179.8 = \mathbf{200,208,237 \text{ FCFA}}$</p> <p>Thus, the total monetary amount saved from reduced consumption of fuelwood is about 200 million FCFA (about 305 k €). This means that every household saved up to 79€ in the Monitoring Period.</p>
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E.4. Summary of ex-post values of each SDG outcome for the current monitoring period

Item	Baseline estimate	Project estimate	Net benefit
SDG 13 Climate Action	17,091	6,242	10,000 ⁴
SDG 7 Affordable and Clean Energy	N/A	N/A	3,597 Wondercookers
SDG 1 No Poverty	N/A	N/A	200,208,237 FCFA

E.5. Comparison of actual value of outcomes with estimates in approved PDD

Item	Values estimated in ex ante calculation of approved PDD	Actual values achieved during this monitoring period
SDG 13 Climate Action	8,077 tCO ₂ e ⁵	10,000 tCO ₂ e
SDG 7 Affordable and Clean Energy	2,044 Wondercookers ⁶	3,597 Wondercookers
SDG 1 No Poverty	134,143,632 ⁷	200,208,237 FCFA

E.6. Remarks on difference from estimated value in approved PDD

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The overperformance of the project compared to the PDD estimate can be attributed to a list of positive effects in terms of the project implementation. Those effects are summarized below:

1. 28% higher sales and deployment of HRCs compared to the conservative estimate from the business plan and the PDD. This has an effect on the contributions to SDG 13 and SDG 7.
2. A usage rate of 92.66% compared to the conservative estimate of 80%-64% from the PDD that was based on another project by the same implementer, but with a different technology (ICS). This has an impact on the higher emission savings achieved as contribution towards SDG 13.
3. A lower measured mean fuelwood consumption of 2.19 kg/HH/day compared to 3.47

⁴ The total emissions savings are higher than 10,000 tCO₂e but capped at 10,000 tCO₂e due to the GS micro-scale requirements.

⁵ Calculation based on the estimate of one month for year 3 and 11 months of year 4 as described in the PDD

⁶ Calculation based on 2,800 Wondercookers deployed and a usage rate of 73% as described and estimated in the PDD for Year 4.

⁷ Calculation based on 2,044 Wondercookers in use and a monthly saving of 5,469FCFA per household as described in the PDD.

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kg/HH/day from the initial Project PFT. This has an impact on the higher emission savings achieved as contribution towards SDG 13. There are at least three possible explanations for the higher savings achieved by users during this second Project PFT:

- a. The increased quality of training and instruction for buyers/users of the Wondercooker.
- b. The 2nd generation of Wondercookers was disseminated in a more condensed way, i.e. selling larger numbers of HRCs in fewer areas. Hence, it is more likely for users to know each other and share experiences to improve the efficiency and effectiveness of the Wondercooker usage.
- c. Many households in the project area use a combination of cookstoves: 3-stone fire and gas stoves. The clearly preferred technology of people are gas stoves, but their use is constrained by the budget of the household, as gas is expensive. During the last two monitoring surveys it has been observed that the HRCs enable users to shift more towards cooking with gas in their household energy mix. I.e., a household that purchases fuelwood saves a substantial amount of money by saving fuelwood with the HRC. These savings are then "re-invested" in purchasing gas, which in turn leads to even less usage of fuelwood. In other words, the HRCs help people to climb up on the energy ladder and the fuelwood saving effect of the HRC is therefore amplified.

SECTION F. Stakeholder inputs and legal disputes

F.1. List all inputs/grievances which have been received for the project during the monitoring period together with their respective answers/actions

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Date	Comment by Stakeholder	Answers and Actions by Project Representative
January 2019	I tried to boil beans in the Wonder cooker, but it did not get ready and it wasn't working well.	The user needs additional training on the proper usage of the Wonder cooker. The training was provided by the team of PCI in the respective household.
January 2019	People outside of the project region express interest in purchasing a Wonder cooker. Is this possible?	The distribution of Wonder cookers is currently only limited to the regions of Littoral, South-West and West. However, it is assessed whether an extension of the project to other regions would be feasible in the future.
April 2019	I tried to prepare Jollof Rice in the Wonder cooker, but it did not work well.	The user needs additional training on the proper usage of the Wonder cooker. The training was provided by the team of PCI in the respective household.
May 2019	I would like to receive a Wonder cooker bigger in size.	The Wonder cooker are produced in sizes for an average African household size. There are no other sizes available.
September 2019	The rope of the Wonder cooker is cut and needs fixing.	The rope needs to be replaced. The team of PCI fixed and exchanged the rope in the respective Wonder cooker.

F.2. List all inputs/grievances from previous monitoring period where follow up action is to be verified in this monitoring period

>> No inputs/grievances from previous monitoring periods were submitted where follow up action is to be verified in the monitoring period.

F.3. Provide details of any legal contest or dispute that has arisen with the project during the monitoring period

>> No legal contest nor dispute has arisen with the project during this monitoring period.