ONIL STOVES —GUATEMALA – USPANTÁN

Document Prepared by

C-Quest Capital Malaysia Limited

Project Title	ONIL STOVES —GUATEMALA – USPANTÁN
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CONTENTS

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

A summary description of the implementation status of the technologies/ measures (eg, plant, equipment, process, or management or conservation measure) included in the project.

The project involves the distribution and installation of ONIL Stoves for use by households in Guatemala. Before the adoption of the ONIL Stove, households in Guatemala used inefficient, conventional open fire. The ONIL Stove is a fuel-efficient stove that reduces the amount of firewood required by households by up to 58%, compared to the baseline, and results in lower emissions based on its construction. A single ONIL Stove will save 9.01 tons of CO_2e per year (ex-ante estimation).

The project was included as the first CPA under CDM PoA entitled "ONIL Stoves — Guatemala – Uspantán" (CDM PoA reference number - 8480, CPA reference number – 8480-0001).[1]

The first ONIL Stove was installed on 11-January-2010. Till the end of monitoring period, a total of 11,132 ONIL Stoves was reported installed under the project.

All the data recorded during stove registration process was captured via hard copy of registration card. The information collected is then transferred to a project database.

The relevant implementation dates (eg, dates of construction, commissioning, and continued operation periods).

CDM CPA inclusion

Date of CPA inclusion into PoA	19-December-2012

Installation of ICS

Date of first ICS installed	11-January-2010
Date of last ICS installed in the database	11-August-2012

Survey prior to monitoring period

Survey dates for parameters $n_{y,i}$ and SS_y	01-February-2017 to 28-March-2017
Testing dates for parameter $\eta_{new,y,i}$	28-February-2017 to 16-March-2017

Survey dates for parameters $n_{y,j}$ and SS_y	08-June-2018 to 11-June-2018
Testing dates for parameter $\eta_{new,y,i}$	15-June-2018 to 28-June-2018

[1] https://cdm.unfccc.int/UserManagement/FileStorage/6M3UGFJRC8TBWP4DKQA2Y9ZXS0IH1L

Survey dates for parameters $N_{y,i,j}$ and μ_y	01-October-2020 to 31-October-2020
Testing dates for parameter $\eta_{new,y,i}$	29-September-2020 to 03-November-2020

Survey data used in the current MP:

Survey dates for parameters $N_{y,i,j}$ and μ_y	01-October-2020 to 31-October-2020
Testing dates for parameter $\eta_{new,y,i}$	03-November-2022 to 11-November-2022

The total GHG emission reductions or removals generated in this monitoring period.

The project results in a total emission reduction of 90,392 tCO_2e over the monitoring period of 01-October-2021 to 30-September-2022.

Audit Type	Period	Program	VVB Name	Number of years
Verification	19-December-2010 to 31-July-2017	VCS Verification	Carbon Check (India) Private Ltd.	6.6
Verification	01-August-2017 to 31-July-2018	VCS Verification	Carbon Check (India) Private Ltd.	1
Verification	01-August-2018 to 31-August-2020	VCS Verification	Earthood Services Private Ltd.	1
Verification	01-September-2020 to 19-December-2020	VCS Verification	Earthood Services Private Ltd.	0.3
Validation	10-December-2021	2nd RCP VCS Validation	KBS Certification Services Pvt Ltd	-
Verification	20-December-2020 to 30-September-2021	VCS Verification	Earthood Services Private Ltd.	0.8
Verification	01-October-2021 to 30-	VCS Verification	KBS Certification Services Pvt	1

	September-2022		Ltd	
Total	-	-	-	10.7

1.2 Sectoral Scope and Project Type

The project is categorized under type/category as below:

a) Sectoral scope: 03 - Energy demand

b) Type: I – Energy efficiency improvement projects

The project is not a grouped project.

1.3 Project Proponent

Organization name	HELPS International Incorporated
Contact person	Mr. Richard Grinnell
Title	Director of Stove Project and Vice President of International Development
Address	Calzada Atanasio Tzul 21-00 Zona 12, Complejo Empresarial El Cortijo II, Bodega 517, Guatemala.
Telephone	011(502) 2428-6600
Email	richardgrinnell@helpsinternational.com

Organization name	C-Quest Capital LLC
Contact person	Isabel Alegre
Title	Managing Director
Address	1015 18th Street NW Suite 730 Washington, DC 20036 United States of America
Telephone	+1 (202) 416-2400
Email	ialegre@cquestcapital.com

1.4 Other Entities Involved in the Project

Other entities are not involved in the development of the project.

1.5 Project Start Date

The start date of this project is 11-January-2010, which is the date when ONIL stoves were first delivered (implementation) after the POA and its first CPA were published for Global Stakeholder Consultation at the UNFCCC website.[2]

1.6 Project Crediting Period

First Crediting Period: 20-December-2010 to 19-December-2020, ten years, renewable twice, but not extending beyond 13-December-2034 when the maximum CDM crediting period expires[3]

Second Crediting Period: 20-December-2020 to 19-December-2030.

1.7 Project Location

The location boundary of the project is Guatemala region. The CPA boundaries equal Guatemala's borders. The geographic coordinates for Guatemala, the CPA boundary, are: Northernmost point N 17° 48.744894' W 89° 9.902344 (Reserva de la Biosfera Calakmul), Westernmost point: N 14° 32.202449' W 92° 13.483887; Southernmost point: N 13° 45.280865'W 90° 7.910156 (Carretera del Litoral); Easternmost point: N 15° 43.469738' W 88° 13.872070(Carretera 13).

However, geographic boundaries of the project location under the two VCS projects (1720 and 1721) are identified based on the unique stove IDs corresponding to which GPS locations of the households receiving the stoves are noted. Each ICS registered under the project is identified by a unique combination of barcode, end-user ID, customer name, serial number and geographic location based on GPS coordinates.

[2] As per paragraph 3.19.7 of VCS Standard Version 4.0, "for projects registered under the CDM as a Program of Activities (PoA), each Component Project Activity (CPA) shall be registered with the VCS Program as a separate project accompanied by its associated Program of Activities Design Document… The project start date for such projects is the date on which the first activity under the Program of Activities began reducing or removing GHG emissions. Where the project start date is before 8 March 2011, validation shall be completed within four years of the project start date; (in this case, validation refers to validation of the first CPA under the associated PoA)".

[3] At the time of registration of this project under VCS, the applicable version of VCS standard was version 3.7 and in accordance with the VCS standard version 3.7 paragraph 3.8.1 that states "For non-AFOLU projects and ALM projects focusing exclusively on reducing N2O, CH4 and/or fossil-derived CO2 emissions, the project crediting period shall be a maximum of ten years which may be renewed at most twice." Paragraph 3.8.3 of the standard mentions "Projects registered under other GHG programs are not eligible for VCU issuance beyond the end of the total project crediting period under those programs. For example, a CDM project with a seven year twice renewable project crediting period is not eligible for VCU issuance beyond the end of those 21 years".

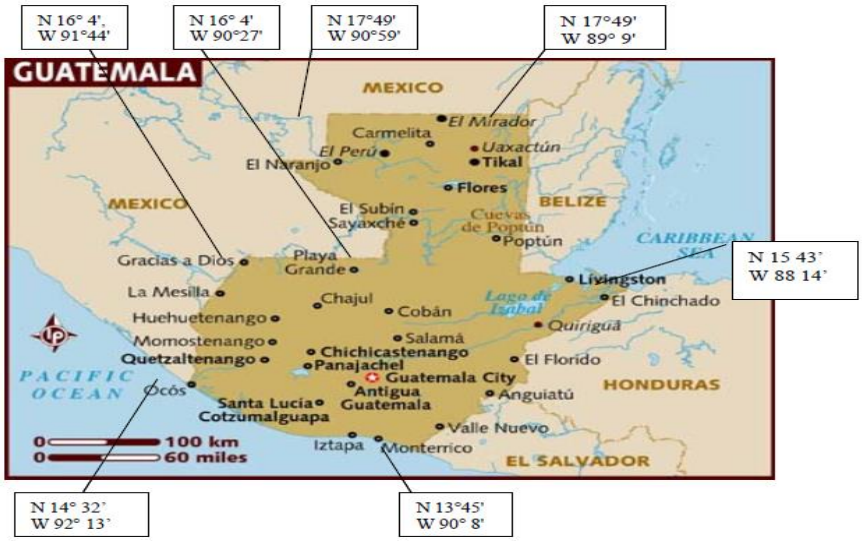


Figure 1. Map of Guatemala, Uspantán CPA[4]

1.8 Title and Reference of Methodology

VMR0006: Methodology for Installation of High Efficiency Firewood Cookstoves, Version 1.1[5].

1.9 Participation under other GHG Programs

"ONIL Stoves —Guatemala – Uspantán" is registered as a Small-Scale Component Project Activity under the Clean Development Mechanism (CDM) and under the Programme of Activities "Distribution of ONIL Stoves – Guatemala" (Ref. PoA 8480).[6]

This project was transitioned from CDM to VCS program without taking any deviations and the carbon credits for this project are being claimed only under the VCS program for the current monitoring period which ensures the prevention of double counting.

The project has not been submitted for validation/certification under any other GHG or environmentally related program or mechanism except CDM, so it is not eligible to create another form of GHG-related environmental credit other than CERs and VCUs. However, no issuances of CERs were received under CDM as the project has been registered as a fresh project under the VCS program. Further, the VCUs for this project are being claimed only under the VCS program for the current monitoring period.

[4] www.lonelyplanet.com/maps/central-america/guatemala/map_of_guatemala.jpg
[5] https://verra.org/methodology/vmr0006-methodology-for-installation-of-high-efficiency-firewood-cookstoves/
[6] CDM document can be accessed through: https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/NQIZR3S1J58FLTHUKMB2X6PY07CE49/view (PoA) and https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/Q158GU3XA9MFE0H2Z6OI4JTNDL7WRP/view (CPA 001)

Evidence has also been provided to the VVB that the emissions reductions arising from this program are not double counted under the CDM and VCS, considering the issuance under VCS for the current monitoring period.

1.10 Other Forms of Credit and Supply Chain (Scope 3) Emissions

- **Emission Trading Programs and Other Binding Limits**: The project is not included in an emissions trading program or any other mechanism that includes GHG allowance trading.
- **Other Forms of Environmental Credit**: The project has not sought or received another form of GHG-related credit, including renewable energy certificates.
- **Supply Chain (Scope 3) Emissions**: As per Section 3.23.9 of the VCS Standard, v4.4, the "producer(s) or retailer(s) of the impacted good or service are known but not involved in the project or do not have a website". The current project has multiple PPs as indicated in section 1.3 of the MR. For the current project HELPS International, one of the PP, itself is involved in the manufacturing and distribution of the ONIL stoves at the project locations and hence the VCUs rights also are shared by the PP. A clear communication about the VCU generation, and their rights have been maintained among both the PPs of this project. A copy of mail explaining this communication has been provided in the appendix section of the MR.

1.11 Sustainable Development Contributions

The following are contributions of the project to sustainable development:

Environmental sustainability

(i) The project reduces the use of non-renewable biomass:

The adoption of higher efficient ONIL Stove has resulted in reduction in the quantity of fuel wood consumed by the households to meet their daily cooking needs. When compared to firewood consumption by conventional open fires, the ONIL Stove on average reduces firewood consumption by 58 percent. Since a very high proportion of fuel wood comes from non-renewable sources, this translates directly into reduced emission reductions from non-renewable extraction of wood.

(ii) The project also supports the objectives of national climate change policies and programs.

The Programa Nacional de Cambio Climatico (PNCC) within the Environment Ministry of Guatemala is in charge of assessing the risks of climate change and recommending policies to reduce country's vulnerabilities. The project is in line with the PNCC's aim of generating projects within Guatemala that promote forest management, a critical and vulnerable sector identified by the Program. By installing improved cook stoves, households reduce firewood consumption, thus helping maintain forest stocks within the country.

Economic Sustainability

(i) The project reduces household expenditures:

This project will contribute significantly to Guatemala's economic sustainability through the more efficient use of firewood. The use of the ONIL Stoves will reduce firewood consumption by approximately 58 percent from baseline consumption, thereby reducing household expenditures significantly. By installing improved cook stoves, these households would save on expenditures related to firewood purchases along with saving time that is spent in gathering firewood, which would allow them to engage in other income generating activities. These savings would help in improving the living conditions of the households in Guatemala.

(ii) The project results in creation of new jobs and development of new skill sets:

The ONIL Stove distribution program, the project relies on community organizers to facilitate demonstrations and organize training sessions. As these community organizers increase their knowledge about stoves, they often become professional installers and help maintain the stoves in their community. As uptake of stove technologies spreads, it will allow for expansion of manufacturing facilities to meet increased demand, thus generating more employment opportunities within the country.

Social Sustainability

(iii) The project helps to improve health conditions:

There are very tangible and significant health benefits associated with the switch in technology from conventional open fires to improved cook stoves. Traditional cooking methods involve conventional open fires that result in the emissions of local pollutants such as carbon monoxide and particulate matter in often poorly ventilated rooms, which lead to respiratory problems. In addition, conventional open fires are frequent causes of burns and other injuries. Switching from conventional open fires to ONIL Stoves reduces the incidence of such injuries and health problems.

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1	4.3	Project specific indicator: Number of individuals who received any informal training	Increase	Vocational training and project related training with respect to successful implementation of a programme, appropriate methods of conducting surveys, carrying out maintenance activities etc. in addition to issues related to climate change was provided to 5 individuals associated with the project.	Contribute to increasing vocational and relevant skills of at least 5 local individuals (with a focus on targeting women and youth) by providing non-formal education and training on issues related to climate change, with specific skill building in operations and surveying activities related to stove distribution and its monitoring under VCS
2	7.1	7.1.2 Proportion of population with primary reliance on clean fuels and technology	Increase	Increasing access to clean cooking technology by distributing a set of project stoves in 11,132 households.	Increase access to clean cooking technology with project stoves installations in approximately 11,132 households under the project lifecycle
4	13.0	Project Specific indicator: Reduction in emissions as compared to baseline scenario (open fire)	Increase	Total emission reduction in the current monitoring period is 90,392 tCO_2 eq.	Total GHG avoidance over project lifetime is expected to be 1,002,870 t CO_2 eq.

5	15.3	15.2.1 Progress towards sustainable forest management by increasing above ground biomass in forests	Decrease	The project has resulted in saving 4.036 tons of non-renewable biomass per stove per annum.	Contribute an estimated reduction of deforestation of 5.0569 tons of woody biomass, per stove, per year, from forests surrounding the communities and reducing pressure on forest reserves.

2 SAFEGUARDS

2.1 No Net Harm

The project involves the distribution and installation of ONIL certified improved cook stoves to households in Guatemala which currently use mostly traditional open fire for cooking. The activities under the proposed project promote improved cook stoves that result in reduced fuel consumption and emissions due to cooking and heating water in homes. The ICS used in this project have characteristics that improve the efficiency of combustion and thermal transfer to the pot compared with three-stone fires or traditional pot support. Furthermore, traditional cooking methods involve open fires that result in the emissions of local pollutants such as carbon monoxide and particulate matter in often poorly ventilated rooms, which lead to respiratory problems. In addition, open fires are frequent causes of burns and other injuries. Switching from fireplaces to ICS reduces the incidence of such injuries and health problems. Therefore, the ONIL Stove installed under this project presents positive environmental impacts wherever they are applied, and no negative environmental impacts have been identified.

2.2 Local Stakeholder Consultation

The local stakeholder consultation was done at PoA level, prior to the registration of the PoA. The first stakeholder meeting for the POA was conducted in Agua Blanca, Quetzaltenango on 15 December 2009. A series of similar meetings followed this. The outcomes from the local stakeholder consultation are available in Section F of the PoA-DD[7].

PP conducted regular spot checks to observe that project ICS were being used properly and to get feedback from stakeholders on ICS usage and its benefits. Also, registration card contains contact details of local PP representative through which ICS users can contact PP for any concerns /comments on the project or project ICS. If any stove part is damaged or missing, then PP representatives immediately arrange for replacement of missing/damaged parts. PP has also developed a medium of constant connect with the end-users through a helpline number which is provided to all the beneficiaries. The end-users can directly contact the PP in case they have any concerns regarding the project stoves, their functioning or any replacements required. A proper record of the issues received via helpline number is maintained by the PP and regular follow ups are conducted till the time the end-user is satisfied and the grievances are resolved. In addition, regular and timely spot checks (monitoring) is conducted by the PP to understand the issues and get the feedback of end-users about the project stoves. It is relevant to highlight that during this MP no negative comment received during the ongoing communications with stakeholders during this monitoring period.

[7] CDM: Distribution of ONIL Stoves—Gusureatemala (unfccc.int)

2.3 AFOLU-Specific Safeguards

This section is not applicable as the project is non-AFOLU.

3 IMPLEMENTATION STATUS

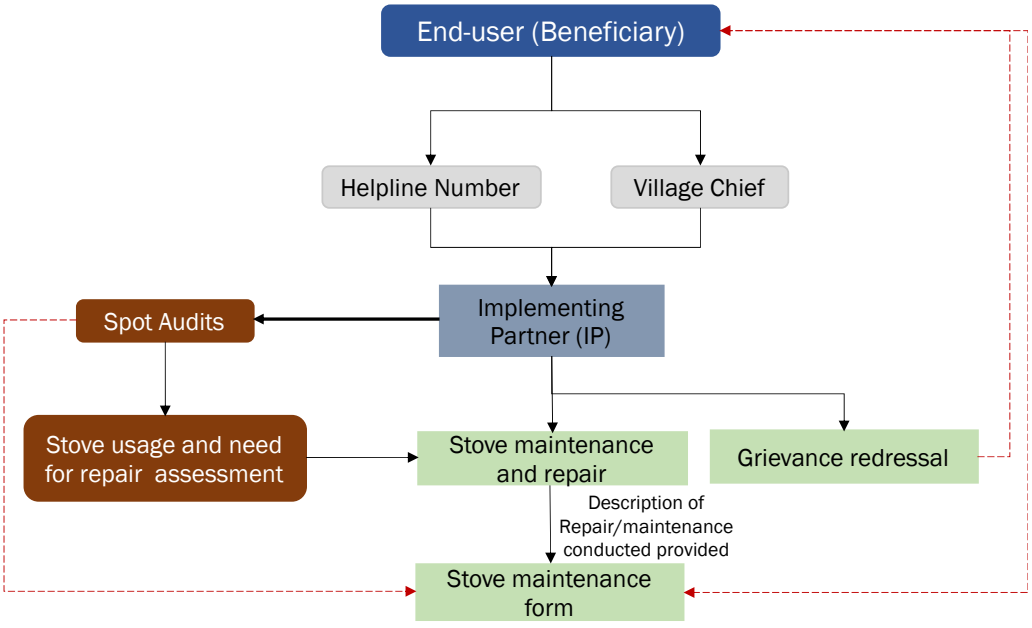
3.1 Implementation Status of the Project Activity

Implementation status of the project activity has already been described under section 1.1 while the process adopted to maintain the project stoves at the project location has been provided in the following paragraphs.

Maintenance and upkeep of installed ICS

A preventive approach of 'need-based repair' and 'random spot checks' is adopted to maintain the stoves that have been distributed under this project is optimised by the PP to ensure the longevity of the distributed stoves. The rationale of adopting this approach is that all the beneficiaries were thoroughly trained regarding the usage and maintenance of the stoves. They are properly trained with all the specific details to maintain the stoves which surely ensures proper and high usage of the stoves in the project region.

In addition to regular random spot checks, a stove audit and grievance redressal mechanism has been developed in the project area. A two-way channel for all the beneficiaries to get their stoves repaired and report any of their grievances and challenges associated with the stove usage has been developed as represented in the following figure.



Information about the availability of a proper communication channel and the details of the contact information is extensively provided to the end-users and posters with all the

relevant information is displayed at the major gathering points like schools, municipality offices, central points of villages etc. within the project area to ensure proper dissemination of information. The implementing partner of this project visits the beneficiaries and undertakes the repair work which is formally recorded in a form that captures the details of materials used in repairing the stoves and an undertaking by the end-user to continue usage of the stoves based on the instructions provided by the IP staff.

3.2 Deviations

3.2.1 Methodology Deviations

This project did not apply any methodology deviations.

3.2.2 Project Description Deviations

Sampling method: The sampling method applied in the registered monitoring plan is multi-stage sampling. Multi-stage sampling is a sophisticated method which is not easy to be implemented and the data analysis is difficult. Given that the population being studied is relatively homogeneous with respect to the parameter being studied, therefore simple random sampling was chosen to replace the existing sampling method from first VCS verification. The deviation in the sampling method does not impact the applicability of the methodology, additionality, or appropriateness of the baseline scenario as indicated in section 3.20.2 (2) of the VCS standard version 4.4. Considering the homogenous nature of the population under the project, the sampling approach has been revised and complies to the indicated clause in the VCS standard 4.4. The detailed description of the approach adopted for sampling using simple random approach has been elaborately presented in the next section of the MR.

Applied Methodology: applied methodology in the registered project activity is AMS II.G, version 3. VCS methodology VMR0006 “Methodology for Installation of High Efficiency Firewood Cookstoves” Version 01 has now approved under VERRA for this type of projects. PP has switched from the registered methodology AMS II.G to VCS methodology VMR0006. There is no negative impact on conservativeness of quantification of GHG emission reduction as a result of deviation.

3.3 Grouped Projects

The project is not grouped project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	B_{old}
Data unit	Tonnes/year
Description	Annual quantity of woody biomass that would have been used in the household in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices
Source of data	Baseline surveys, ex-ante
Value applied	8.05
Justification of choice of data or description of measurement methods and procedures applied	The baseline survey assessed the average biomass usage per household per annum amongst users of traditional 3-stone fires or traditional pot support, according to interviews in Guatemala.
Purpose of Data	Calculation of baseline and project emissions
Comments	See CDM PoA-DD for more details on the baseline measurement

Data / Parameter	L
Data unit	Fraction
Description	Net to gross adjustment factor to account for leakage
Source of data	Paragraph 8.3 of the VMR 0006 methodology, version 1.1
Value applied	0.95
Justification of choice of data or description of measurement methods and procedures applied	A net to gross adjustment factor (0.95 default) is applied in order to adjust B_{old} to account for leakages as per paragraph 8.3 of the VMR 0006, version 1.1 methodology.
Purpose of Data	Calculation of leakage
Comments	No comments

Data / Parameter	η_{old}
Data unit	Fraction
Description	Efficiency of baseline stove
Source of data	Paragraph 9.2, of the VMR 0006 methodology, version 1.1, default
Value applied	0.10 (default for conventional open fires, as stated in the methodology)
Justification of choice	Provided as default value since replaced system is conventional

of data or description of measurement methods and procedures applied	open fire.
Purpose of Data	Calculation of baseline and project emissions
Comments	No comments

Data / Parameter	$\mathbf{f}_{NRB,y}$
Data unit	Fraction
Description	Fraction of non-renewable biomass saved by the project activity
Source of data	FAO, ex-ante, calculated
Value applied	0.7982
Justification of choice of data or description of measurement methods and procedures applied	For biomass savings to be calculated, the portion of biomass used that is renewable must be accounted for based on the methodology. The Guatemalan Institute of Forest publications give the number of hectares of reforested area. This area was multiplied by an expected growth volume of different types of forest (m^3/ha/yr) and multiplied by an average density of wood, which give the total demonstrably renewable biomass of all the reforested land. B_{old} is taken from the baseline survey and adjusted (B_{old}) to account for the quantity of fuel wood used by baseline stoves households that have ONIL and baseline stoves. B_{old}, is then multiplied by the estimated number of homes in Guatemala (1.746 million) that still use open fires to obtain an estimate of the total amount of fuel wood used in Guatemala ($B_{oldGuatemala}$). NRB is $B_{old,\ Guatemala}$ (excluding fuel wood used in baseline stoves) minus the DRB component . Then, **fNRB** = NRB/(NRB +DRB)
Purpose of Data	Calculation of baseline and project emissions
Comments	No comments

Data / Parameter	$NCV_{biomass}$
Data unit	TJ/t
Description	Net calorific value of non-renewable biomass that is substituted
Source of data	IPCC default value for fuel wood, ex-ante, VMR 0006 methodology, version 1.1.
Value applied	0.0156 TJ/tonne
Justification of choice of data or description	

of measurement methods and procedures applied	Default value that is provided in VMR 0006, version 1.1
Purpose of Data	Calculation of baseline and project emissions
Comments	No comments

Data / Parameter	$EF_{wf,CO2}$
Data unit	tCO_2/TJ
Description	CO2 emission factor for the use of wood fuel in baseline scenario
Source of data	IPCC default value, ex-ante, VMR 0006 methodology, version 1.1.
Value applied	112 tCO_2/TJ
Justification of choice of data or description of measurement methods and procedures applied	Default value that is provided in VMR 0006, version 1.1
Purpose of Data	Calculation of baseline and project emissions
Comments	No comments

Data / Parameter	$EF_{wf,non\ CO2}$
Data unit	tCO_2/TJ
Description	Non-CO_2 emission factor for the use of wood fuel in baseline scenario
Source of data	IPCC default value, ex-ante, VMR 0006 methodology, version 1.1.
Value applied	26.23 tCO_2/TJ
Justification of choice of data or description of measurement methods and procedures applied	Default value that is provided in VMR 0006, version 1.1
Purpose of Data	Calculation of baseline and project emissions
Comments	No comments

4.2 Data and Parameters Monitored

Data / Parameter	$\mathbf{N_{y,i,j}}$

Data unit	Quantity
Description	Number of ONIL Stoves in operation during the monitoring period as determined by the monitoring survey. This includes total number of stoves distributed/installed in the entire CPA.
Source of data	ONIL Stove registration data and data from monitoring surveys
Description of measurement methods and procedures to be applied	The percentage of stoves found to be still in operation based on the sampling plan in this monitoring period is applied to the total number of stoves distributed/installed in each CPA included in the sample (according to the ICS registration records in the monitoring database and the applicable sample frame). The proportion of sampled ICS found in operation in this monitoring period was applied to the total number of stoves for each CPA when calculating emission reductions.
Frequency of monitoring/recording	Data from Registration Cards was uploaded to database continuously to come up with the overall number of stoves installed under the CPA. Monitoring surveys captured the fraction of operational ONIL stoves.
Value monitored	10,868
Monitoring equipment	Monitoring surveys and registration card records loaded into CPA database
QA/QC procedures to be applied	Staff was trained to obtain unbiased and reliable survey data. Monitoring database was checked for errors. There were four cases in which the stoves were not considered in use despite users affirming using stoves: 1. When surveyors discovered, based on visual inspections or their observations that a stove was not in use. 2. When users had another type of improved cookstove along with the ONIL stove. The measure was taken to prevent double counting with other programs and to accurately estimate emissions reductions (as the presence of another improved cookstove may affect the baseline). 3. In cases where there was no prior use of three stone fires. In these cases, the firewood baseline would not be applicable. 4. When stoves were modified to operate as three stone fires (e.g., when insulating material and combustion chamber were removed).
Purpose of the data	Calculation of baseline and project emissions
Calculation method	10,868 = 0.9763 multiplied by 11,132 stoves eligible in the database. Note: The percentage of ONIL stove was found in operation from the survey is 97.63%.
Comments	Stoves that that were used along other types of improved

	cookstoves, or where the baseline was not applicable (because households were not using three-stone fires prior to the ONIL stove installation or because they were already using another type of improved cookstove) were considered as non-operational and discounted from the fraction of stoves that remain in operation. The removal of these stoves resulted in more conservative emissions reductions estimates.

Data / Parameter	$\eta_{new,i,j}$
Data unit	Fraction
Description	Efficiency of the ICS
Source of data	Efficiency tests conducted in monitoring period
Description of measurement methods and procedures to be applied	The Water Boiling Test (WBT) protocol used was the WBT version 4.2.4 published by the Global Alliance for Clean Cookstoves. The WBTs were conducted by trained staff. Stoves were tested at the place of installation (i.e., in stove user households) using firewood available in the same households. Each sampled stove was tested once for the cold start phase, hot start phase and simmer phase. The staff ensured the stoves were at room temperature before applying cold start tests. Each test used two aluminium pots with 2.5 litres of water in each. Testers supplied clean water to the households where tests were conducted. Pots were put in direct contact with fire by removing the metal rings around the stove burners. Boiling point temperatures used in calculations were adjusted based on altitude that was taken with GPS instruments. The calorific value of the different species of wood was taken from the literature, where available. When not available in the literature, a broader distinction was made between softwoods and hardwoods and average values of these types of woods were applied accordingly to the species of wood for which data was unavailable.
Frequency of monitoring/recording	Annually
Value monitored	

Vintage	Efficiency
4	0.2805
5	0.2794
6	0.2777
7	0.2789
8	0.2830
9	0.2817
10	0.2865
11	0.2849
12	0.2780
13	0.2728

Monitoring equipment	• Weighing scale • Digital thermometers • Digital moisture meter The tests were coordinated by the PP and undertaken following

<table>
<tr><td></td><td>WBT protocol 4.2.3 by a trained professional working for the PP/ Implementer.
For digital scale and moisture meters, there was no calibration frequency mentioned in the user manuals. Hence as per CDM EB 61, Annex 21, para 17 (c): (“Measuring equipment should be certified to national or IEC standards and calibrated according to the national standards and reference points or IEC standards and recalibrated at appropriate intervals according to manufacturer specifications, but at least once in three years”).
PP had calibrated this equipment in house as per manual before using the equipment at site.
For digital thermometers, the calibration frequency is annual as per product manual and had been followed.
The following equipment were used -
<table>
<tr><th>Equipment</th><th>Make/ Serial Number</th><th>Calibration date</th><th>Validity till</th></tr>
<tr><td>Digital scales</td><td>#267871-06
#267834-06</td><td>26/04/2021 – 13/05/2021</td><td>12/05/2024</td></tr>
<tr><td>Firewood moisture meters</td><td>23207
23209</td><td>26/04/2021 – 13/05/2021</td><td>12/05/2024</td></tr>
<tr><td>Digital thermometers</td><td>Fluke 51 II TRACEABLE</td><td>26/05/2022</td><td>25/05/2023</td></tr>
</table></td></tr>
<tr><td>QA/QC procedures to be applied</td><td>WBT version 4.2.4
A check was performed for outliers, but none were found (defined as those thermal efficiency values 3 standard deviations above or below the vintage sample mean, as per the CDM PoA-DD section I.7.2).</td></tr>
<tr><td>Purpose of the data</td><td>Calculation of project emissions</td></tr>
<tr><td>Calculation method</td><td>WBT version 4.2.4 calculation methods.</td></tr>
<tr><td>Comments</td><td>Due to COVID outbreak in 2021 and restrictions from local government authorities, PP was not able to conduct the WBTs in October 2021. The WBTs were conducted in November 2022 which is valid retroactively till November 2021. PP considered this value based on survey conducted in November 2022 for the whole monitoring period because the survey was conducted at the end of monitoring period and considering that stoves are older in 2022 than in 2021. Also, PP considered 95/10 confidence/precision values conservatively than the 90/10 required for annual surveys. Therefore, the WBT testing results considered for this monitoring period is conservative.</td></tr>
</table>

Data / Parameter	μ_y
Data unit	Fraction

Description	Adjustment to account for any continued use of pre-project devices during the year y
Source of data	ONIL Stove registration data and data from monitoring surveys.
Description of measurement methods and procedures to be applied	A survey asked for usage of baseline stoves as per the monitoring plan outlined in Section I.7.2 of the PoA-DD. μ_y was calculated in each monitoring period as follows: the number of sampled households with distributed ICS that also continue to use a baseline stove divided by the total number of surveyed samples.
Frequency of monitoring/recording	At least once every two years
Value monitored	0.0237
Monitoring equipment	Surveys
QA/QC procedures to be applied	Data for this parameter was collected using the same survey for the fraction of ny,j (appliances in operation) conducted by trained project staff members.
Purpose of the data	Calculation of baseline and project emissions
Calculation method	The number of households with operational ONIL stoves and continuing to use baseline stoves divided by the total number of surveyed households.
Comments	No comments

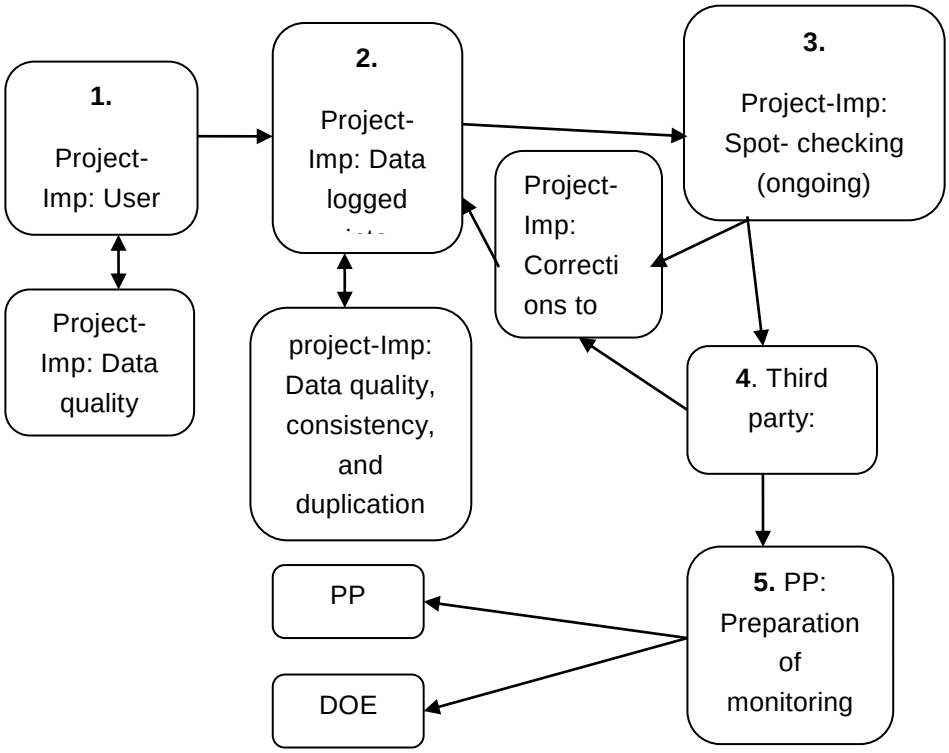
Data / Parameter	**$B_{old\ adjusted}$**
Data unit	Tonnes/year
Description	If baseline stoves continue to be used, adjustment ensures that fuel wood consumption of those stoves is excluded from Bold.
Source of data	Baseline survey, ex-ante; monitoring survey ex-post
Description of measurement methods and procedures to be applied	According to VMR0006 version 1.1, Where the project households continue to use baseline cookstoves along with improved cookstoves, B_{old} shall be adjusted ex-post based on the percentage of project households found to continue such practice. For such cases, the quantity of woody biomass saved due to implementation of improved cook stoves shall be calculated using an adjusted value to account for ex-post use of baseline stoves in addition to improved cookstove.
Frequency of monitoring/recording	At least once every two years
Value monitored	7.8592
Monitoring equipment	-

QA/QC procedures to be applied	Data for this parameter was collected using the same survey for the fraction of µy conducted by trained project staff members.
Purpose of the data	Calculation of baseline and project emissions
Calculation method	To be calculated using the formula below: $B_{old\_adjusted} = B_{old} \times (1 - \mu_y)$ $= 8.05 \times (1 - 0.0237)$ $= 7.8592$
Comments	No comments

4.3 Monitoring Plan

The project's monitoring system follows the monitoring plan described in section I.7.2 of the PoA-DD.

Organizational structure, responsibilities and competencies: To obtain the monitoring variables, the project implementer follows the steps, organizational structure and responsibilities in the flow chart below. Appendix 1 contains description of monitoring personnel competencies.



The PP coordinated, managed, and assisted HELPS international A.C. and monitoring third parties with each element of the monitoring plan. Details of the monitoring steps on the flowchart are the following:

HELPS international A.C.: User registered stove. HELPS International A.C. field personnel collected the information in the Registration Card from the users. Information was collected via a Registration Card filled by HELPS International A.C. staff and partner organizations. HELPS International A.C. staff double-checked the accuracy of the information and requested clarifications if needed.

HELPS international A.C.: Data logged into database. HELPS International A.C.'s trained staff inputted the information from the Registration Card into the database. HELPS International A.C. and CQC checked the database records and removed duplicates (this included completing the serial number, checking for name duplicates, etc...).

HELPS international A.C.: Spot-checks (ongoing). HELPS International A.C. visited locations in the field and reported updates to office either via telephone or forms. HELPS International A.C. personnel corrected the database and clearly marked stoves that were not installed, were given away, the end user died or left town, or had any other issues that made the stove no longer eligible to participate in the project. These stoves were excluded from the emission reduction calculations.

Third Parties: Monitoring. Third Parties followed the sampling plan outlined in the PoA-DD (Section I.7.2) and reported in section D.2 below.

PP Preparation of monitoring report. CQC prepared the final monitoring report and retained copies of the document.

Data measuring, recording Method and Implementation of Sampling Approaches

Steps 1, 2 and 3 captured end user information and populated the database, as well as provided database quality control.

Step 4 involves creating sampling surveys to capture data on continuous use of stove ($N_{y,i,j}$) and use of baseline systems along with ICS (μ_y) as well as stove thermal efficiency ($\eta_{new,i}$) as described in the table below.

Parameter	Description of Parameter	Sampling approach (outcome in brackets)
$N_{y,i,j}$	Proportion of ONIL Stoves still in operation	Visual inspection of the premises to see if ONIL stove is operational and in use. Interview with end user if required to verify that ONIL stove is still in use [Yes/No]
μ_y	Adjustment to account for any continued use of pre-project devices	Interview with end user and visual inspection to determine if a baseline (replaced) stove is still being used in addition to ONIL stove [Yes/No]
$\eta_{new,i}$	Thermal Efficiency of operational ONIL Stoves	ONIL Stoves were tested using WBTs [ONIL stove thermal efficiency]

Sampling captured information on monitoring variables with required confidence/precision[8] and used simple random sampling (as per of EB 69 Annex 5 Section E). The method involved the grouping of ONIL stoves by implementer and model and randomly selecting villages to sample. further the stoves within the selected municipalities were also randomly selected.

In projects 1720 and 1721, a sampling approach was employed where stoves from both projects were combined into a single database, from which a sample was subsequently selected. This sampling approach is justified based on the similarity of stove characteristics and alignment with previously adopted sampling approach.

[8] According to paragraph 22 of Methodology AMS-II.G version 03, 95/10 confidence/precision for annual and 95/5 for biennial sampling across CPAs. In case a single CPA is sampled, 90/10 confidence/precision for annual and 95/5 confidence/precision shall be required for biennial sampling.

Similar Stove Characteristics: The stoves used in projects 1720 and 1721 share common characteristics, such as design, efficiency, and fuel type. Therefore, combining the stoves from both projects at the initial sampling stage is justified on the grounds of their similarity and shared attributes. It is important to note that despite combining the stoves in the initial sampling stage, subsequent data analysis approach has ensured that the results are appropriately disaggregated and attributed to each project. This has ensured the accurate representation of each project's achieved emission reductions in the current monitoring period.

Consistency with previously approved approach under VCS verification: The approach of combining stoves and selecting a sample from a combined database is consistent with previous successful verifications of the subject project 1720 and 1721. This ensures comparability with previous project documents and promotes continuity in monitoring and verification activities and data analysis. By aligning with the accepted practice, the sampling approach enhances the robustness and reliability of the achieved emission reductions, facilitating effective comparison and evaluation of the stove performance across the project crediting period.

Since all stoves were of the same model and managed by the same project Implementer, no further stratification was needed to capture parameter $\mathbf{N_{y,l,i}}$ and $\boldsymbol{\mu_y}$ data. Stoves were divided into three Primary Sampling Units for $\boldsymbol{\eta_{new,i}}$ (stoves managed by same project Implementer, of the same model and vintage) given that multiple stove vintages were present. Each stove vintage was sampled separately using the simple random sampling method described below.

Step 5 involved monitoring analyses and accuracy and precision checks. The project implementer and PP scrutinized the monitoring data to confirm accuracy of results, analyzed the data, and estimated the resulting emissions reductions outlined in this monitoring report.

The following parameters were obtained though sampling:

1. $\mathbf{N_{y,l,i}}$: proportion of stoves in operation
2. $\boldsymbol{\mu_y}$: fraction of households that continue to use baseline systems (3-stone fires) along with ONIL stoves
3. $\boldsymbol{\eta_{new,i}}$: thermal efficiency of ONIL Stoves

Simple random sampling was used for all monitoring parameters in accordance with the Sampling Plan of section I.7.2 of the PoA-DD. The objective was to obtain reliable and unbiased estimates of the monitoring parameters. Reliability levels were set at 95% confidence and 5% precision as per AMS II.G version 3, paragraph 22 for biennial sampling.

A single homogeneous population (Primary Sampling Unit, as per PoA-DD) was considered for $N_{y,i,j}$ and μ_y (proportion parameters) since the project Implementer and stove

model (HELPS International A.C. and ONIL Stove respectively) were the same throughout the project. The sampling was carried out at PoA level which comprises of CPA 001 and CPA 002. Seven sampling populations (Primary Sampling Units) were considered for parameter $\eta_{new,i}$: stoves from Vintages 5 to 11. No other vintages were included in the PoA since these eight populations comprise the entire PoA.

For the stoves those age was under vintage 12 at the end of monitoring period, WBT was conducted in accordance with the guidelines of applied methodology VMR0006. 3 stoves were selected randomly and 3 WBT were conducted for each of the stove.

The following table summarizes the sample sizes and results.

Monitored Parameter	Sample size	Survey Results (%)	Precision achieved (%)
Proportion of stoves in operation ($N_{y,l,j}$)	253	97.63	1.91%
Baseline Stoves continued usage rate (μ_y)	253	2.37	1.91%

Monitored Parameter	Sample size	Test results	Precision achieved
Efficiency of Vintage 4 ONIL Stove vintage	18	0.2805	1.65%
Efficiency of Vintage 5 ONIL Stove vintage	18	0.2794	2.18%
Efficiency of Vintage 6 ONIL Stove vintage	18	0.2777	1.68%
Efficiency of Vintage 7 ONIL Stove vintage	18	0.2789	1.70%
Efficiency of Vintage 8 ONIL Stove vintage	18	0.2830	1.83%
Efficiency of Vintage 9 ONIL Stove vintage	18	0.2817	1.63%
Efficiency of Vintage 10 ONIL Stove vintage	18	0.2865	1.97%
Efficiency of Vintage 11 ONIL Stove vintage	18	0.2849	1.62%
Efficiency of Vintage 12 ONIL Stove vintage	18	0.2780	1.70%

Efficiency of Vintage 13 ONIL Stove vintage	18	0.2728	0.36%

Implementation and quality assurance and control and procedures used for handling any internal auditing performed and any non-conformities identified: PP trained monitoring personnel on monitoring procedures, including provisions for maximizing response rates, documenting out-of-population cases, refusals, and other sources of non-response. The monitoring survey included several questions to support the information on the key monitoring parameters. These included visual inspections to confirm stove use and presence of baseline stoves, comments by surveyors, check of randomly selected households against actual household information, and refusal tracking. These strategies aimed at minimizing surveyor or non-response biases. The questionnaire was piloted in the field prior to implementation.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The improved cookstove is introduced as energy efficiency measure in the project, therefore equations 1 and 2 of the methodology will be applied to calculate the net GHG emission reductions.

$$ER_y = \sum_i \sum_j ER_{y,i,j}$$

Where:

i	=	Indices for the situation where more than one type/model of improved cookstove is introduced to replace three-stone fire
J	=	Indices for the situation where there is more than one batch of improved cookstove of type i
ER_y	=	Emission reductions during year y in t CO_2e

$ER_{y,i,j}$ = Emission reductions by improved cookstove of type i and batch j during year y in t CO_2e

$$ER_{y,i,j} = B_{y,savings,i,j} \times NCV_{wood\ fuel} \times f_{NRB,y} \times \left(EF_{wf,CO2} + EF_{wf,non\ CO2}\right) \times N_{y,i,j} \times 0.95 \quad \text{Equation (2)}$$

Where:

$B_{y,savings,i,j}$ = Quantity of woody biomass that is saved in tonnes per improved cookstove of type i and batch j during year y

$f_{NRB,y}$ = Fraction of woody biomass that can be established as non-renewable biomass (f_{NRB})[9]

$NCV_{wood\ fuel}$ = Net calorific value of the non-renewable woody biomass that is substituted or reduced (IPCC default for wood fuel, 0.0156 TJ/tonne)[10]

$EF_{wf,CO2}$ = CO_2 emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 112 tCO_2/TJ)[11]

$EF_{wf,non\ CO2}$ = Non-CO_2 emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 26.23 tCO_2/TJ)[12]

$N_{y,i,j}$ = Number of improved cookstoves of type i and batch j operating during year y

0.95 = Discount factor to account for leakage

To calculate $B_{y,savings}$, we use Option 1 of the applied methodology[13]

$$B_{y,savings,i,j} = B_{old} \times \left(1 - \frac{\eta_{old}}{\eta_{new,i,j}}\right) \quad \text{Equation (3)}$$

[9] Default values endorsed by designated national authorities and approved by the Board are available at https://cdm.unfccc.int/DNA/fNRB/index.html
[10] 2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 1 Introduction
[11] 2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 2 Stationary Combustion
[12] 2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 2 Stationary Combustion
[13] Equation 3 of methodology VMR 0006

Where:

B_{old} Quantity of wood fuel used in the absence of the project activity in tonnes

η_{old} A default value of 0.10 may be optionally used if the replaced system is a three stone fire, or a conventional system with no improved combustion air supply or flue gas ventilation system, i.e., without a grate or a chimney.

$\eta_{new,l,j}$ Efficiency of the system being deployed as part of the project activity (fraction), as determined using the Water Boiling Test (WBT) protocol.

As some of the project households continue to use baseline cookstoves along with improved cookstoves, B_{old} has been adjusted ex-post based on the percentage of project households found to continue such practice according to the Equation 6 of applied methodology as follows:

$$B_{old,adjusted} = B_{old} \times (1 - \mu_y)$$

Where:

$B_{old,adjusted}$	=	Adjusted B_{old} to account the ex-post usage of firewood in baseline cookstove(s) by project households in addition to improved cookstove (in tonnes per device)
μ_y	=	Baseline stove usage factor to account for use of baseline cookstoves along with improved cookstoves.

η_{old} = 0.10

$\eta_{new,4}$= 0.2805

$\eta_{new,5}$= 0.2794

$\eta_{new,6}$= 0.2777

$\eta_{new,7}$= 0.2789

$\eta_{new,8}$= 0.2830

$\eta_{new,9}$= 0.2817

$\eta_{new,10}$= 0.2865

$\eta_{new,11}$= 0.2849

$\eta_{new,12}$= 0.2780

$\eta_{new,13}$= 0.2728

The full set of emission reductions calculation is provided in Excel spread sheet.

5.2 Project Emissions

The methodology does not account for project emissions separately, but instead quantifies net emission reductions achieved by the project.

5.3 Leakage

Leakage is considered as default 0.95 in accordance with methodology.

5.4 Net GHG Emission Reductions and Removals

Ex-post ER estimations:

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2021 (01-Oct-2021 to 31-Dec-2021)	22,867	0	0	22,867
2022 (01-Jan-2022 to 30-Sep-2022)	67,525	0	0	67,525
Total	**90,392**	**0**	**0**	**90,392**

Ex-ante ER estimations:

Net GHG emission reduction are estimated based on equation (2) and equation (3) presented in section 5.1. The ex-ante ER estimates have been conducted based on the following assumptions:

- Total number of stoves distributed throughout the project lifetime: 11,132.
- All the stoves were distributed within the first year of project implementation.
- All the project stoves will be operational throughout the project lifetime, i.e., for the entire 10-year period, i.e., $n_{y,i,j}$ = 100%
- The values of key parameters used in equation 2 for estimating ex-ante ER estimations are presented in the table below:

Parameters	Unit	Value	Source
Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass (f_{NRB})	%	79.82%	FAO data
Net Caloric Value of Biomass (NCV)	TJ/tonne	0.0156	IPCC Default Value

CO_2 emission factor for the use of wood fuel in baseline scenario	tCO2/TJ	112	IPCC Default Value
Non-CO_2 emission factor for the use of wood fuel in baseline scenario	tCO2/TJ	26.23	IPCC Default Value
Leakage Factor	%	95%	VMR 0006 Default
Annual quantity of woody biomass that would have been used in the absence of the project activity (B_{old})	tonnes/year	8.05	Baseline survey report Dec. 2018

Based on the above assumptions and equations, the total biomass saved per stove in different vintages and the estimated emission reductions per ICS is presented in the following tables:

Estimated Emission Reduction per ICS batch in Different Vintages	**Rounded value**
1st Year	**100,287**
2nd Year	**100,287**
3rd Year	**100,287**
4th Year	**100,287**
5th Year	**100,287**
6th Year	**100,287**
7th Year	**100,287**
8th Year	**100,287**
9th Year	**100,287**
10th Year	**100,287**
	1,002,870

Ex-ante estimation based on the stoves operational in the current MP

Total number of project stoves installed during the current MP: 11,132
ER estimates based on the installed stoves during the current MP = 100,287

Ex-post and Ex-ante ER estimations comparison:

Ex-ante emissions reductions/ removals (tCO_2e)	Achieved emissions reductions/ removals (tCO_2e)	Percent difference	Justification for the difference
Ex-ante estimates based on total stoves distributed under the project			
100,287	90,392	-9.9%	The achieved emissions reduction is 9.9% less than Ex-ante emission reduction. This can be attributed to: 1. Reduction in stove efficiency 2. Reduction in proportion of operational stove

APPENDIX 1: SCOPE 3 EMISSIONS STATEMENT

Distribution of ONIL Stoves - (Guatemala VCS Project 1721) - notice about double counting rules

Isaac Mera
To Jose Luis Loarca
Cc Tanya Sharma; Gaurav Vishvanath Pethakar

Reply | Reply All | Forward

Fri 10-03-2023 23:38

Distribution of ONIL Stoves - (Guatemala VCS Project 1721)

Dear Mr. Loarca,

This is to bring to your kind notice that **C-Quest Capital LLC** and **HELPS International Incorporated** are implementing a grouped project titled "ONIL STOVES —GUATEMALA – USPANTÁN" (VCS ID 1721). It involves distribution of improved cook stoves (ICS) to households in Guatemala. For this purpose, the PP, primarily **HELPS International A.C.** is only involved in manufacturing and procurement of **'ONIL stoves'**. **HELPS International A.C.** is responsible for the distribution of project stoves in Guatemala.

Verified Carbon Units (VCUs) may be issued for the greenhouse gas emission reductions and removals for which **C-Quest Capital LLC** and **HELPS International Incorporated** will be claiming carbon credits under VERRA. The ownership of these credits lies exclusively with **C-Quest Capital LLC** and **HELPS International Incorporated**.

This notice intends to apprise you about the project, to avoid any potential risk of double claiming of Scope 3 emissions under this grouped project.

Best regards,
Isaac Mera
Senior Operations Manager
Phone +1 802 598 0666 (EDT UTC-4:00)
E-mail imerachehin@cquestcapital.com
Website www.cquestcapital.com
CQuestCapital

Public Notice

https://cquestcapital.com/latest/public-notices/

Public Notice for VCS Project 1721

"ONIL Stoves – Guatemala – Uspantán"

This is to bring to your kind notice that C-Quest Capital LLC and HELPS International Incorporated are implementing a grouped project titled "ONIL Stoves – Guatemala – Uspantán" (VCS ID 1721). It involves distribution of improved cook stoves (ICS) to households in Guatemala. For this purpose, the PP, primarily HELPS International A.C. is only involved in manufacturing and procurement of 'ONIL stoves'. HELPS International A.C. is responsible for the distribution of project stoves in Guatemala.

Verified Carbon Units (VCUs) may be issued for the greenhouse gas emission reductions and removals for which C-Quest Capital LLC and HELPS International Incorporated will be claiming carbon credits under VERRA. The ownership of these credits lies exclusively with C-Quest Capital LLC and HELPS International Incorporated.

This notice intends to apprise you about the project, to avoid any potential risk of double claiming of Scope 3 emissions under this grouped project.