



**Monitoring report form for CDM programme of activities
(Version 02.0)**

MONITORING REPORT

Title of the PoA	Distribution of ONIL Stoves—Guatemala	
UNFCCC reference number of the PoA	8480	
Version numbers of the PoA-DD applicable to this monitoring report	07	
Version number of this monitoring report	01	
Completion date of this monitoring report	28/08/2018	
Monitoring period number	01	
Duration of this monitoring period	24/07/2018 – 31/08/2018 (both days inclusive)	
Monitoring report number for this monitoring period	01	
Coordinating/managing entity	HELPS International Incorporated	
Host Parties	Host Party of the PoA	Is this the host Party of a CPA covered in this monitoring report? (yes/no)
	Guatemala	Yes
Sectoral scopes	Sectoral scope 3: Energy demand	
Applied methodologies and standardized baselines	AMS-II.G: “Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass” (Version 03)	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by all CPAs covered in this monitoring report in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	NIL	756 tCO ₂ e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the CPA-DDs for the CPAs	4,570 tCO ₂ e	

covered in this monitoring report

PART I Monitoring of programme of activities (PoA)

SECTION A. Description of PoA

A.1. General description of PoA

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The programme of activities, Distribution of ONIL Stoves — Guatemala, involves the distribution of fuel-efficient, improved cook stoves (ICS) to households across the Republic of Guatemala (hereafter referred to as “Guatemala”) in households that currently use conventional open fire. The replacement of open fires with more efficient devices in households reduces the amount of fuel wood consumption through improved combustion efficiency, thus reducing the GHG emissions linked to non renewable biomass and incomplete combustion of fuel wood.¹

The ICS result in substantially reduced fuel consumption and emissions for conducting cooking and water heating tasks in homes. It improves the efficiency of combustion and thermal transfer to the pot compared with a traditional stove. They substantially reduce woodfuel consumption compared with a open fire.

The first ICS was distributed in July 2018. In the first monitoring period the PoA reduced 756 tCO_{2e}.

A.1.1. Corresponding generic component project activities (CPAs)

Title and reference number of the corresponding generic CPA	Version of the PoA-DD	Sectoral scopes	Applied methodologies and standardized baselines
ONIL Stoves—Guatemala – CPA XXX, 8480-XXXX	7	Sectoral Scope: 3, Energy Demand	AMS-II.G “Energy efficiency measures in thermal applications of non-renewable biomass” (version 3.0)

A.1.2. CPAs included in the PoA

Title and UNFCCC reference number of the CPA	Title and reference number of the corresponding generic CPA	Version of the PoA-DD	Crediting period type and duration	Covered in this monitoring report? (yes/no)
ONIL Stoves —Guatemala – Uspantán, 8480-0001	ONIL Stoves—Guatemala – CPA XXX, 8480-XXXX	7	Renewable 01/01/2013 – 31/12/2019 (both days inclusive)	No
ONIL Stoves —Guatemala – CPA 002, 8480-0002	ONIL Stoves—Guatemala – CPA XXX, 8480-XXXX	7	Renewable 19/04/2017 – 18/04/2024 (both days inclusive)	No
ONIL Stoves —Guatemala – CPA 003, 8480-0003	ONIL Stoves—Guatemala – CPA XXX, 8480-XXXX	7	Renewable 24/07/2018 – 23/07/2025 (both days inclusive)	Yes

A.2. Coordinating/managing entity

¹ FAO, Woodfuels and climate change mitigation. Case studies for Brazil, India and Mexico, Rome 2010, page 62. The document describes how and ICS in other parts of the world are effective reducing anthropogenic GHGs.

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HELPS International Incorporated

SECTION B. Implementation of PoA

B.1. Description of implemented PoA

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a) Definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies;

HELPS International as a CME to the PoA has managed the relevant activities prior and post registration of the PoA. The competency check on the new proposed CPA was conducted by CME to ensure that the CPA meets all requirements and eligibility criteria before inclusion in the PoA. The competency check was conducted by experienced staffs with CDM projects.

b) Records of arrangements for training and capacity development for personnel

Baseline Survey:

The Baseline Firewood Consumption Study was carried out during May 2012. The baseline report has been presented to validating DoE during the PoA registration process. The general guidance to complete the survey was intergrated into the questionnaire form.

ICS installation:

Till the end of the monitoring period, only one ICS model has been implemented under the PoA, which is ONIL Stove.

Monitoring:

The monitoring activities of the PoA comprises of the monitoring of the there parameters which are proportion of ICS still in operation ($n_{y,j}$), percentage of continued baseline stove use among ICS households in the database (SS_y) and thermal efficiency of operational ICS ($\eta_{new,y,i}$).

The first two parameters are to be monitored via visual inspection and interview/survey with the ICS end users. The third parameter is to measure the stove efficiency via Water Boiling Test (WBT).

c) Procedures for technical review of inclusion of CPAs

Prior to the inclusion of CPAs, a technical review was conducted by CME to ensure that

- i) the CPA meets each eligibility criteria of the PoA;
- ii) the stove model proposed for the CPA meets minimum thermal efficiency of 20% as required by the methodology. The thermal efficiency of the stove is justified with the Water Boiling Test (WBT) result;
- iii) the proposed data collection procedures by the CPA is in line with the methodology and SSC-PoA eligibility criteria;
- iv) Monitoring procedures proposed by the CPA conform with the monitoring plan in the PoA.

Once the CPA meets all the eligibility criteria of the PoA, the letter of approval for CPA inclusion is issued by CME and the CPA-DD is submitted to DoE for validation purposes and formal inclusion into the PoA.

d) A procedure to avoid double counting (e.g. to avoid the case of including a new CPA that has already been registered either as a CDM project activity or as a CPA of another SSC-PoA).

Each ICS registered under the PoA is identified by a unique combination of customer name and geographical location and serial number. In addition to that the GPS coordinates of the household is recorded during the registration process. With the combination of the parameters mentioned above, thus each ICS recorded in the project database will be unique.

The quality control and quality assurance procedures is always in place to avoid the double counting cases. As each CPA has its own database, using the functions available in Microsoft Excel, any duplicate within the CPA or between the CPAs can be easily identified and removed from database. In addition, each CPA was cross-checked with other CPAs in this SSC-PoA and with CPAs in any other SSC-PoA or in a CDM project activity operating in the country using the UNFCCC, the Gold Standard, and other relevant voluntary carbon schemes to ensure that the CPA is not included in any other SSC-PoA, CDM project activity or voluntary carbon project activity.

In the new ICS registration process, the confirmation below was obtained from the end user and acknowledgement was made in the registration card.

“During the distribution/ installation, the user shall confirm that

- a) he/she is a household,*
- b) the ICS is replacing a traditional 3 stone fire or port support,*
- c) their participation on the SSC-PoA and that CDM finance is being used to fund the ICS,*
- d) he/she did not previously own an ICS and*
- e) to transfer the rights of any emission reduction generated by the ICS to the CME.”*

e) Records and documentation control process for each CPA under the SSC-PoA

(i) There will be a record keeping system for each CPA under the SSC-PoA,

Till the end of this monitoring period, all the data recorded during ICS registration process was captured via electronic means where the handheld device (PDA) was used. Therefore no hard copy is available.

The following information is captured in the electronic copy of Registration Card which is in line with PoA requirements:

- Date of registration/installation
- Retailer/distributor information
- ICS serial number
- Stove model
- Name of ICS user
- Phone number of ICS user or household
- Address of ICS user or household (District, Traditional Authority, Village)
- GPS location of household
- Acknowledgement on transfer of carbon rights to CME and use of baseline stove

The information collected via PDA is then transferred to a server which serves as the electronic project database. The server is updated regularly and shared with the CME. The database is backed up by CME in Excel spreadsheet. Each CPA has its own database with number of registered ICSs.

Till the end of monitoring period, there is no report in the project database on the replacement of stove to the existing registered ICS user.

(ii) The SSC-CPA included in the SSC-PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity.

During the CPA inclusion process, it was confirmed that the CPAs 8480-0001, 8480-0002 and 8480-0003 are not the de-bundled component of any large scale activity.

(iii) The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the SSC-PoA;

f) **Measures for continuous improvements of the SSC-PoA management system**

CME will continue to review and improve the overall SSC-PoA management system. CME is generally satisfied with the overall performance of the CPA implementer and database maintenance.

B.2. Post-registration changes to PoA

B.2.1. Corrections

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N/A

B.2.2. Inclusion of monitoring plan

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N/A

B.2.3. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools

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N/A

B.2.4. Changes to programme design

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N/A

PART II Monitoring of CPAs

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SECTION C. Implementation of CPAs

C.1. Description of implemented CPAs

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- (a) Purpose of the specific-case CPA(s) and the measures taken for GHG emission reductions or net GHG removals by sinks;

The CPA 8480-0003 involves the promotion and installation of ONIL Stove in Guatemala for use by residential households. The ICS disseminated through this programme will replace the prevailing inefficient open fires or traditional pot support with stoves which combust wood more efficiently and improve thermal transfer to pots, hence saving fuel and lowering greenhouse gas emissions.

- (b) Description of the technology employed and installed equipment and/or infrastructure, including information requested by the eligibility criteria;

The ONIL Stove is a fuel-efficient stove that reduces the amount of firewood required by households by up to 58 percent, and results in lower emissions based on its construction and design. Since the efficiency of a traditional open fire is 10%² and the efficiency of an ONIL Stove is 24%³, the ONIL Stove is more efficient than the traditional open fire. Complete combustion and efficient energy transfer to pots and cooking surfaces ensures fast heating and fuel-efficiency. The fire is contained in the insulated combustion chamber,

² Default value for open fires as stated in AMS II.G methodology, version 3, "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass"

³ Note that at time of writing, no national nor international standard body (hence no certifying agent recognized by it) exists; hence the CME has opted to use the manufacturers' specification for the first CPA. Manufacturers can specify the efficiency of the ICS through WBTs conducted by independent third parties.

thus burning the oil vapor that is normally emitted as smoke. Energy is then efficiently transferred to cooking pots and surfaces. Insulation prevents the heat from being wasted heating the stove body. Hot gases that do not touch the cooking surface waste their energy but insulation lets all the hot gases come in contact with the cooking surfaces thereby transferring their energy to the pot and leaving only enough heat in the exhaust gases to provide a draft up the chimney. These technology improvements make the ONIL stove more efficient than a traditional open fire. The implemented CPAs under this PoA comprised of the ONIL “Plancha” Stove pictured below.



Figure 1: ONIL “Plancha” Stove made of concrete block with combustion chamber and griddle multi pot top

- (c) Relevant dates for the specific-case CPA(s) (e.g. construction, commissioning, continued operation periods, etc.);

Installation and Registration of ICS

CPA	8480-0003
Date of reception of the first stove	09/07/2018
Date of first ICS registered	03/08/2018
Date of last ICS registered in the database	19/08/2018
Total ICS working (till 30/08/2018)	3,582

First Monitoring Survey

CPA	8480-0003
Survey dates for parameters n_y and SS_y	07/08/2018 – 20/08/2018
Dates of WBT for parameter $\eta_{new,y,i}$	13/08/2018 – 17/08/2018

- (d) Total GHG emission reductions or net GHG removals by sinks achieved in this monitoring period for the specific-case CPA(s).

CPA	Emission reductions (t CO2e)
8480-0003	756

Each ICS registered under the PoA is identified by a unique identification number, along with combination of customer name and geographical location identified by geo co-ordinates to avoid the double counting.

C.2. Location of CPAs

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Each SSC-CPA will contain a delineated set of households in which ONIL Stoves have been installed within Guatemala. (CPA Implementer) will record names of end-users and the exact location in the SSC-CPA in the program database. End-user names and locations and stove identification numbers will be collected on stove purchase contracts. The sum of the location of these households as within Guatemala, will define the spatial boundary of the SSC-CPA.

The key geographic location of the applied measure (improved cook stoves) is determined using the database of unique stove IDs, the household addresses, GPS coordinates and owners’ names and national ID card numbers. These parameters uniquely identify the household. 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*).

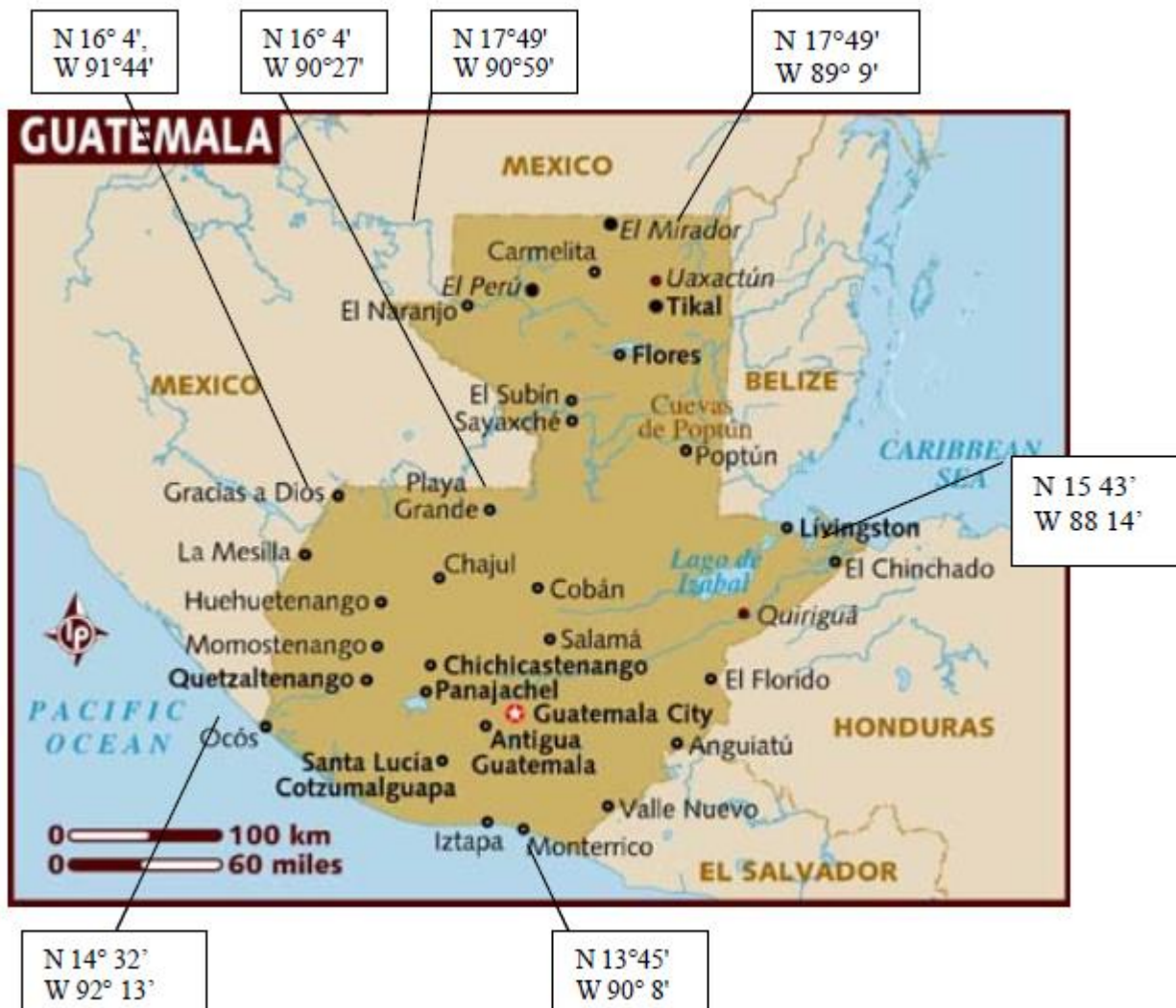


Figure 1. Map of Guatemala⁴

C.3. Post-registration changes to CPAs

C.3.1. Temporary deviations from the monitoring plans in the included CPA-DDs, applied methodologies or standardized baselines

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N/A

C.3.2. Corrections

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N/A

C.3.3. Changes to the start date of the crediting period

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⁴ www.lonelyplanet.com/maps/central-america/guatemala/map_of_guatemala.jpg

The request for change on start date of crediting period of CPA 8480-0003 was submitted to CDM Secretariat on 30/08/2018. The changes on start date of crediting period for this CPA is less than a year and not required prior approval from the Board.

The revised start date of the CPA is described in the table below.

No.	CDM Ref No. of CPA	Initial start date of crediting period	Revised start date proposed
1	8480-0003	06/08/2018	24/07/2018

C.3.4. Inclusion of monitoring plan

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N/A

C.3.5. Permanent changes to the included monitoring plans, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools

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N/A

C.3.6. Changes to project design

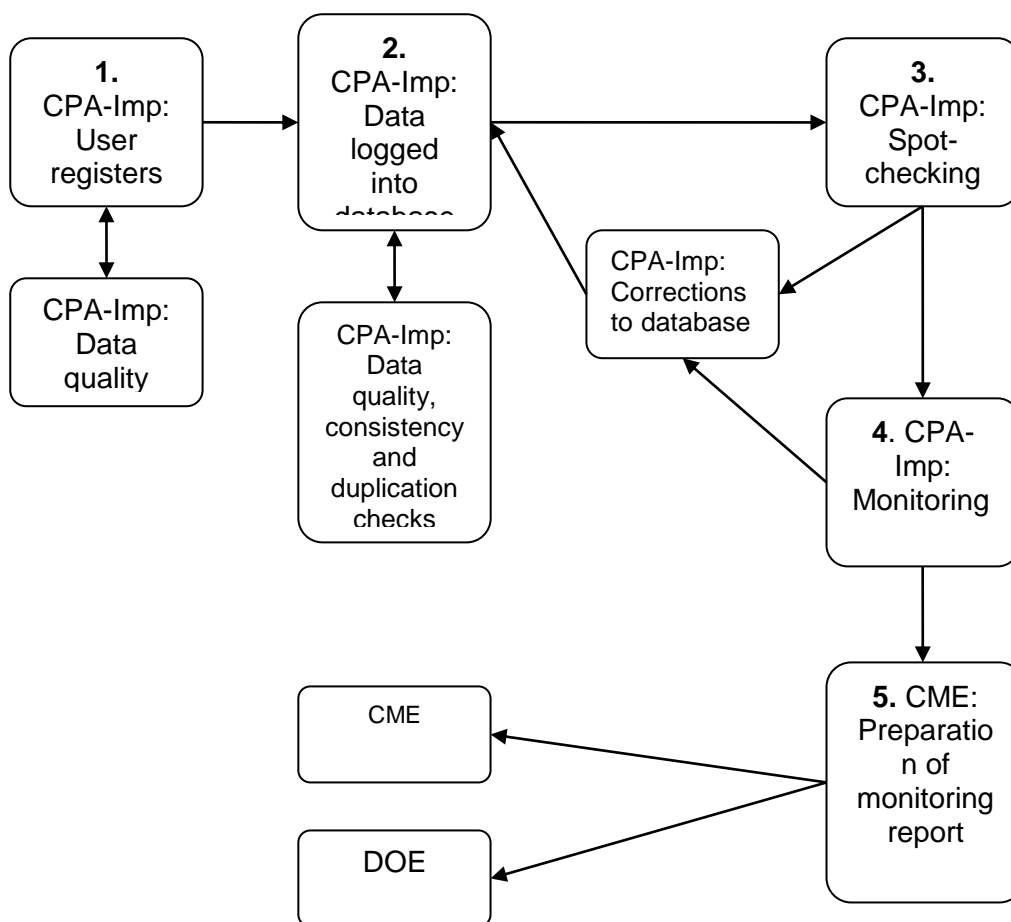
>>
N/A

SECTION D. Description of monitoring system of CPAs

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CPA 8480-0003 apply the same monitoring system. The monitoring system applied involves a number of key elements to ensure that the CME and CPA-Implementer have high-quality, unbiased and reliable information regarding the performance of the project in terms of implementation and outcomes, and for the purposes of calculating Certified Emission Reductions (CERs) following AMS II.G version 3.0 on the basis of the amount of non-renewable biomass saved by the ICS in the CPA.

The below flow-chart illustrates the roles and responsibilities of the parties during the implementation of the monitoring plan for the SSC-CPA. In the schematic, the CPA implementer is abbreviated to "CPA-Imp", and can be the CME or another party authorized by the CME.



Below is the description of the above steps on the flow-chart.

1. **CPA-Imp: User registers stove:** CPA implementer will collect/receive the necessary information requested on the Registration Card from the user. Means of collecting this information may be through a physical Registration Card filled by CPA-Imp staff, retailers, end-users or partner organization’s staff, or through the use of ICTs or SMS. CPA Implementers’ staff shall double check the accuracy of information provided, and request for field staff additional clarifications if needed;
2. **CPA-Imp: Data logged into database:** CPA implementer trained staff will input the data in the database either manually (if data collected from physical Registration Card) or this will be automatically input if data was collected using ICTs or SMS. CPA implementer staff shall double check the information included on the database and check for duplications. Any duplicate information shall be investigated and errors corrected or excluded from the database if it is a true duplicate entry.
3. **CPA-Imp: Spot- checking (ongoing):** CPA implementer field staff will continually randomly select households included in the database and visit them to cross-check the information on the database with the factual evidence in the field. Any inconsistencies found (e.g. change in the address of a user) will be updated on the database, and in the case ONIL Stoves are found to be no longer in use, they will be clearly marked as such and excluded from emission reductions calculations.
4. **CPA-Imp: Monitoring:** CPA implementer will follow the requirements as per POA-DD to collect the necessary information for a monitoring report.
5. **CME: Preparation of monitoring report:** the CPA implementers or the CME will prepare the final monitoring report to be provided to the verifier DOE for verification of emission reductions. A copy of the monitoring report will remain with the CME

SECTION E. Data and parameters

E.1. Data and parameters fixed ex ante

Data/parameter	<i>B_{old}</i>
Unit	Tonnes per annum
Description	Quantity of Biomass used in the absence of the project activity (per appliance)
Source of data	Baseline surveys, ex-ante
Value(s) applied	6.64
Choice of data or measurement methods and procedures	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
Additional comments	See CDM PoA-DD for more details on the baseline measurement

Data/parameter	<i>η_{old}</i>
Unit	Fraction
Description	Efficiency of the system being replaced
Source of data	Paragraph 6, Option 2 (b) of the AMS II.G methodology, version 3, default
Value(s) applied	0.10 (default for conventional open fires, as stated in the methodology)
Choice of data or measurement methods and procedures	Provided as default value since replaced system is conventional open fire.
Purpose of data	Calculation of baseline and project emissions
Additional comments	-

Data/parameter	<i>f_{NRB,y}</i>
Unit	Fraction
Description	Fraction of non-renewable biomass saved by the project activity
Source of data	FAO, ex-ante, calculated
Value(s) applied	0.913
Choice of data or measurement methods and procedures	<p>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 (m³/ha/yr) and multiplied by an average density of wood, which give the total demonstrably renewable biomass of all the reforested land.</p> <p>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}).</p> <p>NRB is B_{old,Guatemala} (excluding fuel wood used in baseline stoves) minus the DRB component . Then, fNRB = NRB/(NRB +DRB)</p>
Purpose of data	Calculation of baseline and project emissions

Additional comments	
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Data/parameter	$NCV_{biomass}$
Unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass that is substituted
Source of data	IPCC default
Value(s) applied	0.015
Choice of data or measurement methods and procedures	AMS II.G, version 5, paragraph 11
Purpose of data	Calculation of baseline emissions
Additional comments	-

Data/parameter	$EF_{projected_fossilfuel}$
Unit	tCO ₂ /TJ
Description	Emission factor for the substitution of non-renewable biomass by similar consumers
Source of data	IPCC default value for LPG, <i>ex-ante</i> , AMS II.G methodology, version 3.
Value(s) applied	81.6
Choice of data or measurement methods and procedures	Default value that is provided in AMS II.G, version 3
Purpose of data	Calculation of baseline and project emissions
Additional comments	-

Data/parameter	L
Unit	Fraction
Description	Leakage Adjustment Factor
Source of data	Default
Value(s) applied	0.95
Choice of data or measurement methods and procedures	A net to gross adjustment factor (0.95 default) is applied in order to adjust Bold to account for leakages as per paragraph 20 of the AMS II.G, version 3 methodology.
Purpose of data	Calculation of baseline emissions
Additional comments	-

E.2. Data and parameters monitored

Data/parameter	$n_{y,j}$
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.
Measured/calculated/default	Measured
Source of data	ONIL Stove registration data and data from monitoring surveys

Value(s) of monitored parameter	3,508
Monitoring equipment	Monitoring surveys and registration card records loaded into CPA database
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	<p>The percentage of stoves found to be still in operation based on the sampling plan in each monitoring period will be applied to the total number of stoves installed in the CPA (according to the ICS registration records in the monitoring database and the applicable sample frame). The proportion of sampled ICS found to be in operation during each monitoring period will be applied to the total number of stoves in the CPA when calculating emissions reductions.</p> <p>The percentage of stove found to be still in operation is 80.58%, thus the number of stoves still in operation is determined as below</p> <p>$3,582 \times 9793\% = 3,508$ units</p>
QA/QC procedures	The reliability calculation was conducted to ensure that the result obtained from the survey meets the precision required.
Purpose of data	Calculation of baseline emissions
Additional comments	

Data/parameter	$t_{y,j}$
Unit	Fraction
Description	Fraction of monitoring period the stove is in operation (days in operation/total days in monitoring period)
Measured/calculated/default	Calculated
Source of data	Project database and length of monitoring period
Value(s) of monitored parameter	0.54
Monitoring equipment	-
Measuring/reading/recording frequency	Measured continuously, recorded annually
Calculation method (if applicable)	The fraction will be calculated by dividing the number of days from the registration date of the stove, or the start date of the monitoring period (whichever is later) until the end of the monitoring period by the total number of days in the monitoring period.
QA/QC procedures	-
Purpose of data	Calculation of baseline emissions
Additional comments	

Data/parameter	$\eta_{new,y,i}$
Unit	Fraction
Description	Continuing efficiency of ICS
Measured/calculated/default	Measured
Source of data	Efficiency tests in each monitoring period
Value(s) of monitored parameter	Vintage 1: 0.2539

Monitoring equipment	The tests were coordinated by the CME and undertaken following WBT protocol 4.2.4 by a trained professional working for the CME or CPA Implementer or an experienced third party. Following equipments were used. <ul style="list-style-type: none"> •Digital scales •Firewood moisture meters •Digital thermometers •Thermocouples
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	The efficiency was determined for three phases, cold start, hot start and simmering and then averaged for each stove.
QA/QC procedures	The reliability calculation was conducted to ensure that the result obtained from the survey meets the precision required. The weighing scale is manufactured and tested as per applicable IS standard. User's manual of the weighing scale used for the project does not specify the calibration frequency. Hence as per 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") the weighing scale will be calibrated before completion of three years from the date of purchase. In user manual of the digital thermometer, it is clearly stated that "To ensure that the thermometer performs to its accuracy specifications, Fluke recommends that you calibrate the thermometer annually, starting one year after purchase". Same has been followed as QA/QC procedure of equipments. CME will calibrate the equipments as per the mentioned procedure or will purchase new equipments pre calibrated by the manufacturer prior to use in further WBT.
Purpose of data	Calculation of baseline emissions
Additional comments	

Data/parameter	SS_y
Unit	Percentage
Description	The fraction of ongoing baseline stove use within the population of in-use ONIL Stoves during a monitoring period.
Measured/calculated/default	Measured
Source of data	Project database and monitoring survey
Value(s) of monitored parameter	13.64%
Monitoring equipment	Monitoring survey
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	<p>As per PoA-DD, SS_y in each monitoring period is calculated as follows: the number of sampled households with in-use ICS that also continue to use a baseline stove divided by the total number of in-use ICS in the sample.</p> <p>As per Standard for sampling and surveys for CDM project activities and programme of activities, a proportion can describe either of the two possible scenarios of the success rate or the failure rate and project proponents may use the larger of the two proportions in the sample size calculation, which is p or (1-p).</p> <p>For the PoA, the two possible scenarios are continued-use and discontinued-use rates of baseline stoves. As the result of pilot study indicated that the discontinued-use rates of baseline stove is in higher proportion, thus the survey was conducted to study the discontinued-use rate of baseline stoves.</p> <p>For calculation of discontinued-use rate of baseline stoves, the same rule</p>

	<p>was applied where only sampled households with in-use ICS will be considered for data analysis.</p> <p>The continued-use rate of baseline stove will be calculated from $1 - p$, where p is the result obtained from the survey. $= 1 - 0.8636$ $= 0.1364$</p>
QA/QC procedures	<p>Data for this parameter was collected using the same survey for the parameter $n_{y,i}$ (in-use appliances) conducted by trained surveyors. Internal cross-checks by the CME or project implementer will be undertaken as QC.</p> <p>The reliability calculation was conducted to ensure that the result obtained from the survey meets the precision required.</p>
Purpose of data	Calculation of baseline emissions
Additional comments	-

Data/parameter	B_{old adjusted}
Unit	Tonnes/year
Description	If baseline stoves continue to be used, adjustment ensures that fuel wood consumption of those stoves is excluded from B _{old} .
Measured/calculated/default	Measured
Source of data	Baseline survey, <i>ex-ante</i> ; monitoring survey <i>ex-post</i>
Value(s) of monitored parameter	6.3942
Monitoring equipment	-
Measuring/reading/recording frequency	Once per monitoring period
Calculation method (if applicable)	<p>To be calculated using the formula below:</p> $B_{old_adjusted} = B_{old} - 0.31 * SS_y / 0.172$ $= 6.64 - 0.31 * 0.1364 / 0.172$ $= 6.3942$
QA/QC procedures	<p>II.G/Version 3, requires that monitoring ensures that (a) Either the replaced low efficiency appliances are disposed of and not used within the boundary or within the region; or (b) If baseline stoves continue to be used, monitoring shall ensure that the fuel-wood consumption of those stoves is prorated in B_{old}. Since HELPS International cannot require end users to dispose of stoves, option (b) is used and the wood used for any baselines stoves that continue to be in use was discounted from B_{old}.</p> <p>The secondary stove survey captured the number of households using a baseline stove in addition to the ONIL stove. The survey also recorded the amount of woody biomass consumed by baseline stoves in households with ONIL Stoves. This last metric is multiplied by the proportion of households using baseline and ONIL stoves and then subtracted from B_{old} to adjust the baseline woody biomass consumption.</p>
Purpose of data	Calculation of baseline and project emissions
Additional comments	-

E.3. Implementation of sampling plan

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A single sampling plan was carried out across all specific-case CPAs covered in this monitoring report.

(a) List of CPAs to which the single sampling was applied;

CPA of 8480-0003 was covered under the single sampling plan.

(b) **Description of implemented single sampling design;**

(i) Sampling Design:

Due to the large number of ICS envisioned to be distributed as part of the CPAs to be included in the SSC-PoA, it is not economically feasible to monitor each individual ICS unit distributed. Therefore, representative sampling will be undertaken as part of a SSC-PoA-wide Sampling Plan (by grouping and sampling across CPAs) that is designed in line with the requirements of the Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities version 04.1.

(ii) Objectives and Reliability Requirements:

The objective was to obtain an unbiased and reliable estimate of the proportion or mean value of the following parameters over the course of the crediting period, and with 95/10 confidence/precision for biennial sampling across CPAs.

Monitored Parameters:

Parameter	Description of Parameter
$n_{y,j}$	Proportion of ICS still in operation
SS_y	Percentage of continued baseline stove use among ICS households in the database
$\eta_{new,y,i}$	Thermal Efficiency of operational ICS

(iii) Target Population:

The target population for the three parameters stated above are all ICS recorded in the project database.

(iv) Sampling Frame:

The POA is open to different CPA Implementers and different models of ICS, which introduces variability to the target population. To ensure the homogeneity of the CPAs included for a single sampling plan, two sampling frames were defined for the three parameters above with parameters of $n_{y,j}$ and SS_y share the sampling frame.

(v) Sampling method:

Simple Random Sampling was applied and samples was randomly selected from the primary sampling units. To ensure a random selection of ICS, random number generators was applied.

To determine the parameters, sampling will involve the following approaches (outcome in brackets):

$n_{y,j}$: Visual inspection of the premises to see if ICS is operational and in use. Interview with end user if required to verify that ICS is still in use (Yes/No)

SS_y : Interview with end user and visual inspection to determine if a baseline (replaced) stove is still being used in addition to ICS (Yes/No)

$\eta_{new,y,i}$: ICS will be tested using WBTs (ICS thermal efficiency)

(vi) Sample size

For the estimation of the proportion or mean value of the parameters investigated, the minimum sample size for each sample frame has to achieve the 95/10 confidence/precision for biennial sampling. Of the three parameters to be monitored, two are proportions/percentages (SS_y and $n_{y,j}$) and one is a mean value $\eta_{new,y,i}$.

In order to calculate the required sample size estimates, values for the proportions, mean values, and standard deviations are required. A pilot study was conducted to obtain the estimates for these values. Accordingly the sample size was calculated using the formula provided by Guidelines for Sampling and

Surveys for CDM Project Activities and Programme of Activities (Version 03.0).The sample size calculation is available in Excel spreadsheet for sharing with DoE. The sample size was adjusted upwards to account for non-responses where the rate was determined by CME based on previous experience.

(c) Collected data (electronic spreadsheets may be attached and referenced);

The method of collecting data is field surveys and the summary is provided in table below.

Parameter	Methods to be applied
$n_{y,j}$	Visits to the premises, visual inspection and interview with ICS end-user
SSy	Visits to the premises, visual inspection and interview with ICS end-user.
$\eta_{new,y,i}$	Water Boiling Test (WBT) Protocol Version 4.2.4

The data collected from the surveys was compiled into the Excel spreadsheet and will be shared with DoE. Hard copies of the surveys form will be kept and the database has a back up.

(d) Analysis of the collected data;

Data obtained from the samples was used to estimate proportions and mean values for the parameters described above. The values were then be factored into the emissions reduction calculations.

(e) Demonstration of whether the required confidence/precision has been met;

As part of the quality control on the data collected, the realibility calculation was performed and summary provided in table below.

Parameter	Responded samples	Value of parameter obtained	Precision achieved
$n_{y,j}$	242	97.93%	1.81%
Discontinued-use rate of baseline stove ⁵	242	86.36%	4.94%
$\eta_{new,t}$ (Vintage 1)	18	25.39%	2.14%

Sample estimates of all three parameters are within the required reliability precision.

(f) Demonstration of whether the samples were randomly selected and are representative of the population.

The samples were randomly selected using Simple Random Sampling across the CPA. Under Simple Random Sampling, the entire target population has an equal chance of being selected, thus the samples selected were deemed to be representative of population.

SECTION F. Calculation of emission reductions or net anthropogenic removals

F.1. Calculation of baseline emissions or baseline net removals

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a) Formulae for emission reductions

Emissions reductions can be calculated as per methodology AMS-II.G version 3 using the following equations:

$$ER_y = B_{y,savings} * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} * L$$

Where:

ER_y Emissions reductions during the year in tCO₂e

⁵The value of SS_y(Continued-use rate of baseline stove) is obtained by 1- 0.7790 = 0.2210

$B_{y,savings}$	Quantity of woody biomass that is saved in tonnes
$f_{NRB,y}$	Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass (0.87)
$NCV_{biomass}$	Net calorific value of non-renewable woody biomass that is substituted (IPCC default value for fuel wood 0.015 TJ/tonne)
$EF_{projected_fossilfuel}$	Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 tCO ₂ /TJ
L	A net to gross adjustment factor (0.95 default) is applied above (equation (1) of AMS II.G, version 3) in order to adjust B_{old} to account for leakages as per paragraph 13 (a) of the methodology.

To calculate $B_{y,savings}$, we use Option 2⁶

$$B_{y,savings} = B_{old} * \left(1 - \frac{h_{old}}{h_{new}}\right)$$

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

And

$$B_{y,savings} = B_{old,adjusted} * N_{y,i} * \left(1 - \frac{h_{old}}{h_{new,i}}\right)$$

Where:

$N_{y,i}$	Total number of stoves in operation for a full monitoring period equivalent in the project
η_{old}	Efficiency of the baseline system/s being replaced. The 0.10 default value is used as the replaced systems are three-stone fires or conventional systems lacking improved combustion air supply mechanism and flue gas ventilation system i.e., traditional stoves.
$\eta_{new,i}$	Efficiency of the system being deployed as part of the project activity (fraction), as determined using the Water Boiling Test (WBT) protocol.

b) Calculation of emission reductions

Calculation of $B_{old,adjusted}$

$$B_{old,adjusted} = B_{old} - 0.31 * SS_y / 0.172$$

$$B_{old,adjusted} = 6.63 - 0.31 * 0.1364 / 0.172$$

$$= 6.3942 \text{ tonnes/stove/year}$$

Calculation of $B_{y,savings}$

$$B_{y,savings} = B_{old,adjusted} * \left(1 - \frac{\eta_{old}}{\eta_{new,y,i}}\right)$$

$$B_{1,savings} = 6.3942 * [1 - (0.1/0.2539)]$$

⁶ Paragraph 6 of AMS II.G

= 3.8757 tonnes/stove/year

Emission reductions for each ICS

$$ER_y = B_{y,savings} \times f_{NRBy} \times NCV_{biomass} \times EF_{projected_fossilfuel} \times N_{y,i} \times L$$

The emission reductions shall be considered from the dates of registration of each ICS. CME has opted to present the individual set of emission reductions calculation for each ICS in which the emission reductions obtained under each vintage will be presented separately. The full calculation of each ICS is available in Excel spreadsheet for sharing with DoE.

In this section, only the example of calculation for one of the ICS will be provided. The example given is for ICS with barcode number 1911201226011 which was registered under CPA 003.

The details of registration record for ICS 1911201226011 is as below.

CPA	ICS vintage	Registration date	Installation date	Barcode number	Stove model	User name
1	1	07/08/2018	13/07/2018	1911201226011	ONIL Plancha Stove	BALTAZAR ASICONA CABA

Start date of monitoring period = 24/07/2018

End date of monitoring period = 31/08/2018

The period of Vintages 1 for ICS is as below (based on Installation Date):

Vintage 1: 07/08/2018 – 31/08/2018

Since, ICS is only eligible to claim CER from the registration date (07/08/2018) i.e. which is after the monitoring period start date, thus emission reductions will be claimed for the period stated below.

Vintage 1: 07/08/2018 – 31/08/2017 (25 days or 0.063 year)

Emission reductions achieved under Vintage 1

As ICS has operated less than a year of each vintage period, thus fraction of year to be applied in the calculation.

$$ERs = 3.8757 \times 0.913 \times 0.015 \times 81.6 \times 0.95 \times 0.063$$

$$= 0.259 \text{ tCO}_2$$

Total emission reductions achieved by the CPA 8480 – 0003

To account for the losses of emission reductions (ERs) due to non-operational of ICS, the total of emission reductions achieved by each CPA will take into account the proportion of ICS in operation which 97.93%.

The summary of total net ERs calculation is as below.

CPA	Initial total ERs	Calculation of net ERs	Net ERs (rounded down)
9558-0001	772.28	772.28 x 97.93%	756*
		Total	756

* Rounded sown value

F.2. Calculation of project emissions or actual net removals

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Not applicable

F.3. Calculation of leakage emissions

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Not applicable

F.4. Calculation of emission reductions or net anthropogenic removals

CPA UNFCCC reference number	Baseline GHG emissions or baseline net GHG removals (t CO ₂ e)	Project GHG emissions or actual net GHG removals (t CO ₂ e)	Leakage GHG emissions (t CO ₂ e)	GHG emission reductions or net anthropogenic GHG removals (t CO ₂ e)		
				Before 01/01/2013	From 01/01/2013	Total amount
8480-0003	756	0	0	0	756	756
Total	756	0	0	0	756	756

F.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the included CPA-DDs

CPA UNFCCC reference number	Amount achieved during this monitoring period (t CO ₂ e)	Amount estimated ex ante (t CO ₂ e)
8480-0003	756	4,570
Total	756	4,570

F.6. Remarks on increase in achieved emission reductions

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The emission reductions achieved in CPA 8480-0003 are less than the value estimated in ex-ante calculation. The reduction on value achieved is because of the reduced number of ICS in operation. In the ex-ante calculation, it was assumed that 9,504 ICS will be in operational for the whole monitoring period.

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Document information

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02.0	7 June 2017	Revision to: <ul style="list-style-type: none">• Ensure consistency with version 01.0 of the “CDM project standard for programmes of activities (CDM-EB93-A07-STAN);• Make editorial improvements.
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