



**Monitoring report form for CDM programme of activities
(Version 04.0)**

MONITORING REPORT			
Title of the PoA	Installation of Energy Efficient Cookstoves in Myanmar		
UNFCCC reference number of the PoA	10008		
Version numbers of the PoA-DD applicable to this monitoring report	10		
Version number of this monitoring report	02		
Completion date of this monitoring report	06/05/2021		
Monitoring period number	02		
Duration of this monitoring period	01/12/2019 to 31/12/2020 (Included both the dates)		
Monitoring report number for this monitoring period	01		
Coordinating/managing entity	Core CarbonX Solutions Pvt. Ltd.		
Host Parties	Host Party of the PoA	Is this the host Party of a CPA covered in this monitoring report? (yes/no)	
	Republic of the Union of Myanmar	Yes	
Applied methodologies and standardized baselines	AMS-II.G. ver. 7 - Energy efficiency measures in thermal applications of non-renewable biomass		
Sectoral scopes	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 until 31 December 2020	Amount achieved from 1 January 2021
	0	25,506	0
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the CPA-DDs for the CPAs covered in this monitoring report	49,494		

PART I Monitoring of programme of activities (PoA)

SECTION A. Description of PoA

A.1. General description of PoA

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The intention of the small scale Program of Activity ("hereafter SSC-PoA") involves the installation of energy-efficient Improved Cooking Stoves (ICS) in the households/ communities/Small and Medium Enterprises (SMEs) (hereafter "users") of the Republic of the Union of Myanmar for cooking and water heating purposes. It is also intended to expand the geographical scope of the PoA to the other countries in Asia. Implementation of the activity reduces the usage of non-renewable biomass i.e. fuelwood for users for cooking and water heating purposes. Thus, the PoA reduces the GHG emission occurring from the combustion of non-renewable biomass, i.e. fuelwood, thereby also contributing to sustainable development. ICSs that is disseminated under this PoA are more efficient in transferring heat from the fuel to the pot than the so called traditional stoves.

Myanmar is an agricultural country with plenty of livestock and agricultural residues. The total population is 54,584,650. Around 70% of the population residing in the rural area has to depend heavily on forests for their basic needs¹. Fuel wood is found to be the primary source of cooking fuel for 73% of households in Myanmar (42% of urban households and 93% of rural households)².

The *Coordinating and Managing Entity (CME)* targets all potential rural and urban populations in all the states of the Republic of the Union of Myanmar. The majority of populations currently use either open fire or "three-stone" method for cooking purpose. Three stone stoves is the cheapest stove to produce, which is made off three suitable stones or bricks of the same height and mud on which as cooking pot can be balanced over a fire. These open fires are fairly inefficient at converting energy into heat for cooking. Fuel is wasted, as heat is allowed to escape into the open air. Furthermore, these open fires and primitive cook are associated with a number of diseases, the most serious of which are chronic and acute respiratory illnesses, such as bronchitis and pneumonia.

The PoA promotes the dissemination of energy-efficient ICS. This in turn reduces deforestation and degradation of forests in the Republic of the Union of Myanmar through the participation of the people in adopting energy-efficient stoves. This also contributes to improvement in the quality of lives of the people from the Republic of the Union of Myanmar through reduction of drudgery, time and money spent on fuelwood collection and through the improvement of indoor air pollution. Globally, the project contributes by reducing the emission of GHG into the atmosphere.

Core CarbonX Solutions Private Limited (hereafter "CoreCarbonX") is the coordinating/managing entity ("CME") for this SSC-PoA Myanmar Ceramic Society (MCS) is to the manufacturer of the ICS. Under the scheme, International Carbon Portfolio Ltd is the implementer of the CPA 002.

Currently, two CPAs have been included in the registered PoA to meet the objective of the PoA for distribution of energy-efficient Improved Cookstove in Myanmar.

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
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¹ <http://www.fao.org/docrep/014/am252e/am252e00.pdf>

² registered PoA-DD UNFCCC reference number of the PoA 10008.

Title and reference number of the corresponding generic CPA	Version of the PoA-DD	Sectoral scopes	Applied methodologies and standardized baselines
Installation of energy efficient biomass based Improved Cooking Stoves (ICS) CPA xxx	10.0	03	AMS-II.G. ver. 7 - Energy efficiency measures in thermal applications of non-renewable biomass

A.1.2. CPAs included in the PoA

Title and UNFCCC reference number of the CPA	Version of the PoA-DD	Title and reference number of the corresponding generic CPA	Crediting period type and duration	Covered in this monitoring report? (yes/no)
Installation of Energy Efficient Cookstoves in Twante , Yangon region in Myanmar: CPA 001 UNFCCC reference number: 10008-P1-0001-CP1	04.0	Installation of energy efficient biomass based Improved Cooking Stoves (ICS) CPA xxx	Renewable and 01/04/2017 - 31/03/2024	No
Installation of Energy Efficient Cookstoves in Twante , Yangon region in Myanmar: CPA 002 UNFCCC reference number: 10008-P1-0002-CP1	10.0	Installation of energy efficient biomass based Improved Cooking Stoves (ICS) CPA xxx	Renewable and 25/07/2019 - 24/07/2026	Yes

A.2. Coordinating/managing entity

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Core CarbonX Solutions Pvt. Ltd.

SECTION B. Implementation of PoA**B.1. Description of implemented PoA**

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The management system of the PoA is designed to safeguard that actual, assessable and long term GHG emission reductions for the project activity are monitored and reported. As described in the registered PoA-DD, through a technical review, the CME assesses the competence of potential CPA/CPA implementers to ensure that they fulfil technical and eligibility requirements of potential CPAs and to plan technical and administrative processes to meet PoA requirements and to ensure that each CPA meets all requirements and eligibility criteria before inclusion in the PoA.

The management system is designed as per CDM Project Standard for Programme of Activities (Version 02.0 EB 101 Annex 03) and includes all relevant information as per paragraph 36 & 37 therein.

1) A clear definition of roles and responsibilities of personnel involved in the process of Inclusion of CPAs, including a review of their competencies;

The CPA 10008-P1-0002-CP1 is implemented by International Carbon Portfolio Limited as per the requirements of registered PoA-DD. The responsibilities as per the requirements of the validation system were assigned to Coordinating Managing Entity (CME), Core CarbonX Solutions Pvt. Ltd.

The Director, CME had reviewed the additionality and eligibility criteria as determined by the analyst, CME.

2) A record keeping system for each CPA under the PoA

CME centrally manages the overall record-keeping system for all the CPAs. The distribution record of the CPA including the beneficiary information have been collected and transferred into the electronic database in the form of MS-Excel file.

The distribution records have all the information as per the registered PDD. The CME has carried out capacity building activities at the field level and data collection procedures to ensure that appropriate records maintained for the CPA.

The CPA implementation is under the responsibility of International Carbon Portfolio Ltd. (ICP). Myanmar Ceramic Society is the cookstove manufacturer. The CME and CPA Implementer have conducted field visits of the manufacturing process including a quality check of the cookstoves.

3) Procedures for technical review of inclusion of CPAs under the PoA

CME has ensured before inclusion of the CPAs that they met all the eligibility requirements for the inclusion under the registered PoA-DD. The documents related to the CPA is collected and kept in a systematic manner. All the monitoring documents were collected and transferred into an electronic database.

4) Procedure to avoid double counting of ICS/CPA under the PoA

Double counting of the improved biomass cookstove has been avoided by assigning each unit a special serial number. The record maintaining system with customer's name and address, stove model and serial number, installation date, type of unit the new cooker is replaced ensured that the cooking stove can be traced in a specific CPA to avoid double counting.

As part of the inclusion of an SSC-CPA under the PoA, an agreement has been signed by the CI and the CME. The CME established formal agreements with all project participants CI as per the PoA-DD and the CPA-DDs to ensure clear evidence of ownership of emission reductions resulting from the project activity. All rights to CERs accrue are for the benefit of the CPA Implementer. End users were notified of ownership rights through carbon waivers provided at the point of sale/distribution, which stipulate that they cannot claim for emission reductions from the project and that all emission reduction rights are for the benefit of the CPA Implementer.

5) Records and documentation control process for each CPA under the PoA;

The CI has transferred the information to an electronic database (the installations record) which is maintained and being updated regularly by the CME. The Installations Record carries all the sales/distribution information as per the registered PoA-DD including the actual installation date. The installations record is a key component of the monitoring report since the actual installation date is used to calculate the emission reductions achieved by the ICS installed.

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

This has been developed as CPA inclusion eligibility criteria. Thus, any CPA included in the PoA, was checked for, not being registered either as a CDM project activity or as a CPA of another PoA.

7) The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA

The CI (ICP) has the operational responsibility for implementing the project and monitoring the CPAs under the PoA. MCS is the stove manufacturer. All involved parties have clearly confirmed their agreement to the implementations of CPA activities to be subscribed to this PoA.

8) Measures for continuous improvements of the PoA management system

It will be ensured that the PoA management system will be reviewed annually for the continuous improvements for the management system. There will be a systematic collection and analysis of data to ensure that:

- There will be relevant and sufficient documentation of management systems for the scope and scale of ICS implementation.
- The system will be focused on providing quality training, assessment and support services.
 - Arrangements will be in place to meet regularly with CI and its agents to seek feedback and make changes in response
 - Appropriate selection processes and ongoing professional development for trainers and assessors will be established.
 - Maintenance of and improvements to training and assessment of the CI's staff and agents will be done.
- Staff know and meet their responsibilities for applying the system, e.g.
 - communication through the organisation about management systems and decisions is effective staff are actively engaged in improving the system
 - checks are made to ensure that key policies and procedures are being implemented appropriately internal audit and organisational self-assessment

All the monitoring data is stored / will be recorded and kept under safe custody of the CME for a period of crediting period + 2 years or the last issuance of CERs + 2 years whichever occurs later. The CME will also monitor their improvements to determine their effectiveness and make further changes if needed.

B.2. Post-registration changes to PoA

B.2.1. Corrections

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>> The corrections have been approved prior to the monitoring report on 06/06/2019 and reference number of the post-registration changes is PRC-10008-001. The PRC are mentioned below;

Sr No	Post Registration Change	Type of Change	Reason
1	The latest format of the CDM-POA-DD-FORM (Version 08.1) is used	General requirement: New PoA template has been used.	The latest format of the CDM-POA-DD-FORM (Version 08.1) is used
2	Correction of typographical errors and minor editorial changes.	Permanent Changes: Corrections	Correction of typographical errors and minor editorial changes has been carried out.
3	The sources of GHG in section I.4 have been corrected.	Permanent Changes: Corrections	The source of GHG has been corrected.
4	Section H.4 Technology/measures	Permanent Changes: Corrections	The table has been added as per the requirement of new version of CDM-POA-DD-FORM (Version 08.1).

5	Section K. Eligibility criteria for inclusion of CPAs Table and inputs on component “Eligibility criterion category” and Supporting evidence for inclusion” is added.	Permanent Changes: Corrections	The table has been added as per the requirement of new version of CDM-POA-DD-FORM (Version 08.1).
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B.2.2. Inclusion of monitoring plan

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NA

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

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NA

B.2.4. Changes to programme design

The corrections have been approved prior to the monitoring report on 06/06/2019 and reference number of the post-registration changes is PRC-10008-001. The PRC are mentioned below;

Sr No	Post Registration Change	Type of Change	Reason
1	CER ownership has been assigned to CPA Implementer.	Permanent Changes: Changes to programme or project design	Different CP implementer will generate CER. Thus, the ownership has been directly assigned to CPA Implementer at the CPA level.
2	In addition to “Sales” , “Distribution” has been added in the project description because many time ICSs will be given free of cost.	Permanent Changes: Changes to programme or project design	Many times ICS will be given free of cost. Thus, instead of limiting to the “Sales” word “Distribution” has also been added in the project description and monitoring plan.
3	Section K, Update of Eligibility Criterion 6: Conditions about the methodology’s Small Scale threshold	Permanent Changes: Changes to programme or project design	As per SSC_732 Para B “ For registered PoAs and to PoAs under registration that have not indicated that they comprise solely of microscale CDM units, in accordance to paragraph 120 (m) of the “CDM project standard for programmes of activities” (version 1.0), CMEs may request a Post Registration Change to either update the version of the methodology AMS-II.G. or apply the above paragraph of the CDM project standard for PoAs. “
4	Update of Project Justification in Section I.2. Sr Number 3	Permanent Changes: Changes to programme or project design	Thus, CME has requested a Post Registration changes applying “AMS.II-G ver 09 paragraph 41: If the generic CPA consists solely of units that qualify as “microscale CDM units” as defined in the “Methodological tool 19: Demonstration of additionality of microscale project

			activities”, the conditions to ensure that CPAs that will be included meet the small-scale or microscale thresholds and remain within those thresholds throughout the crediting period of the CPAs are not required.”
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B.2.5. Changes specific to afforestation or reforestation activities

>>NA

PART II Monitoring of CPAs

SECTION C. Implementation of CPAs

C.1. Description of implemented CPAs

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The small scale CPA 002 involves the installation of energy-efficient improved biomass-based Improved Cooking Stoves (ICS) in the households of rural areas of Twante, Yangon region of Republic of the Union of Myanmar. The total number of households that has already received the E-FREE stove is 14,912 as of 30/11/2019 and the target number under CPA 002 is 30,000. Implementation of the activity reduces and will further reduce the usage of non-renewable biomass i.e. fuelwood for household activities.

The ICSs installed as part of the CPA 002 replace traditional three-stone cook stoves without a grate or a chimney. The three-stone cookstove is the more common stove used in the region, which is made of three suitable stones or bricks of the same height and mud on which a cooking pot can be balanced over a fire. These open fires are fairly inefficient at converting energy into heat for cooking. Fuel wood, which is non-renewable biomass, is wasted, as heat is allowed to escape into the open air. Furthermore, these open fires and primitive cookstoves emit a significant amount of smoke, which fills the home; this indoor cooking smoke has been associated with a number of diseases, the most serious of which are chronic and acute respiratory illnesses, such as bronchitis and pneumonia. ICS have been designed to provide an enclosure for the fire to reduce the loss of radiant heat, protect it against wind and increase heat transfer. The improvement in efficiency is achieved by properly adjusting the dimensions of the combustion chamber and ensuring effective airflow.

The activity under CPA 002 reduces deforestation and degradation of forests in Myanmar through the participation of the people in adopting fuel-efficient stoves. This also contributes to improvement in the quality of lives of the people from Myanmar through reduction of drudgery, time and money spent on fuelwood collection and through improvement of indoor air pollution. Implementation of the CPA 002 reduces the usage of non-renewable biomass i.e. fuelwood for household activities. Thus the CPA 002 will reduce the GHG emission occurring from the combustion of non-renewable biomass, i.e. fuelwood, thereby also contributing to sustainable development.

International Carbon Portfolio Ltd., a Korean company with registration number 133-86-01318, is the CPA Implementer and fully finances the implementation and ongoing operation of CPA 002. ICSs are distributed to users at no cost to users. Based on an Agreement (hereafter simply called “Sales Agreement”), users waive their rights to any CERs generated by the ICSs in favour of the CPA Implementer - International Carbon Portfolio Ltd.

Description of technology employed:

>> Emission reductions from the ICS units is calculated using the approved methodology of AMS. II.G. Energy efficiency measures in the thermal applications of non-renewable biomass, version 07.0; hence falling under the Type II project activity – Energy efficiency improvement projects.

The E-FREE cookstove is the innovative product from Tradi-Style Ceramics (TSC) Lab of Myanmar Ceramic Society (MCS) utilising ancient ash glaze technology modified to be appropriate for the present cook-stove using quick-setting clay (QSC) with a modifier. The modifier used could set and strengthen the body within 24 hours by itself without firing in the kiln. Thus avoiding the use of fuel wood for firing the stove, enabling to produce stoves where there are no kilns. The technique for making the E-FREE cookstove is simple and appropriate to be able to produce at any place in the remote villages by the villagers themselves with few days of practical training. Hence, the availability of the stove could be enhanced at remote areas where transport difficulty prevailed. As this modifier also contains low-temperature glass networking flux (GNF) heat produced during normal food cooking (about 700 degrees Centigrade) activates this flux to form glass-networks within the clay body gradually improving its strength and extend the life of the stove. As E-FREE cookstoves are more efficient in transferring heat from fuel to pot than traditional stoves, they reduce the emission of soot for good health and also saving fuel for alleviating energy poverty in rural communities. In brief, the following benefits contribute to cleaner and effective energy assess from E-FREE Cook-stoves such as:

- The efficiency of the ICS is 27.8%
- This is of single pot. E-FREE cook stove is the innovative product from Tradi-Style Ceramics (TSC) Lab of MCS utilizing ancient ash glaze technology modified to be appropriate for the present cook-stove using quick setting clay (QSC) with modifier.
- Transportation cost is saved: can produce near customer's place
- Reachable to remote rural areas: Since no kiln is required it can produce at remote areas

The Technical specification of the E-FREE cookstove is:

Specifications	Unit	Value
Cookstove Model		E-FREE
Lifespan	Years	3
Thermal Efficiency	%	27.8%
Outside Diameter	Cm	28
Inside Diameter	Cm	20
Height	Cm	25
Weight	Kg	12

The ICS unit is assembled locally by trained technicians working with MCS. The MCS has been overseeing the manufacturing process for the quality control. The model which is distributed to the households comprises of one pot stove and one grate (for collection of ash).

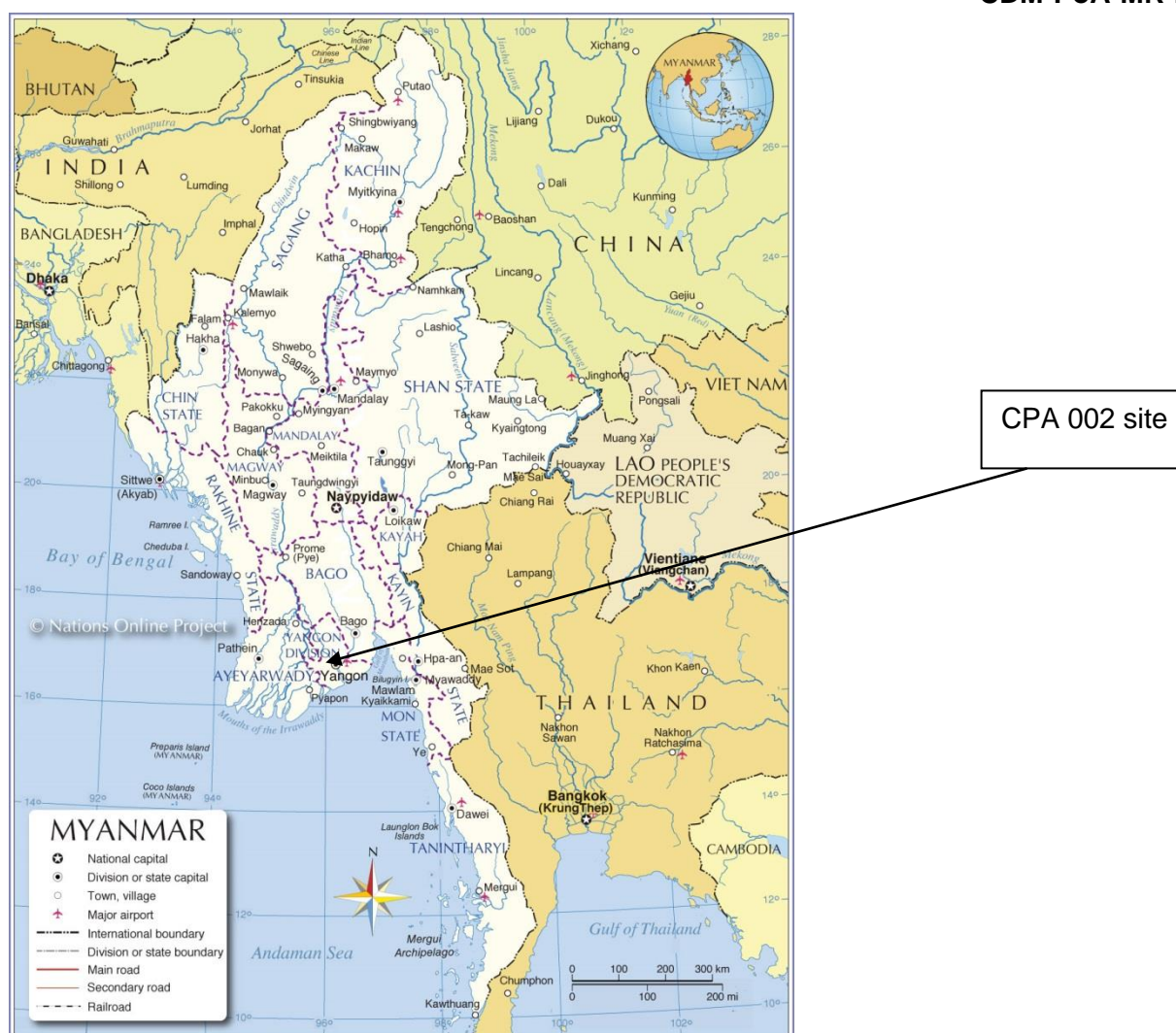
Relevant dates for the specific-case CPAs:

S.No	Activity	Timeline
1	CPA inclusion under the PoA	16/07/2019
2	Start date of crediting period	25/07/2019
3	Start Date of CPA	01/02/2019
4	Start date of Distribution E-FREE stove	19/08/2019

C.2. Location of CPAs

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All ICS included in the CPA 002 is disseminated to the households of Twante Yangon region of Myanmar. The addresses where the ICS are recorded to document this. The geographical boundary of SSC-PoA in Myanmar is also given in the below figure.



C.3. Post-registration changes to CPAs

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

>>NA

C.3.2. Corrections

>>NA

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

>>NA

C.3.4. Inclusion of monitoring plan

>>NA

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

>>NA

C.3.6. Changes to project design

>>NA

C.3.7. Changes specific to afforestation or reforestation CPA

>>NA

SECTION D. Description of monitoring system of CPAs

The CME ensured implementing the key procedures for collecting reliable information of end-users regarding the performance of the project in terms of implementation and results. For the purpose of calculating the Certified Emission Reductions (CERs) achieved by implementing the CPA has been followed based on AMS-II.G. ver. 7 - Energy efficiency measures in thermal applications of non-renewable biomass on the basis of the amount of non-renewable biomass saved by the E-FREE Cookstove in the project activity.

The key elements are the following:

Project database management
 Spot Checks of E-FREE Cookstove
 Sampling Plan for the Monitoring Survey
 Data Quality, Accuracy and Duplication Checks
 Monitoring Reporting

The monitoring plan is designed to monitor the parameters listed in Section B.5.1. of the CPA-DD, which are required for calculation of the actual GHG emission reduction achieved by the CPA using ex-post sampling survey. The share of operating stoves and the continued use of pre-project devices is determined based on sampling procedures. The CME is responsible for conducting the sampling surveys and maintaining a database with all operating stoves.

Data Collection Procedures:

The data collection procedure involved the signing the beneficiary agreement with the end user which carries the listed information below including the traditional stove type (firewood stove) used prior to ICS installation.

- Name of customer
- Address and ID number
- Stove model and serial number
- Installation date
- Type of stove (present unit) the cooker is replacing
- Type of fuel which was earlier used in the cook stove

To avoid the double counting, each cook stove has been assigned with a unique serial Number from ICP 00001 to ICP 30000.

All this information has been transferred into an electronic database Ms-Excel file to trace the specific end user.

SECTION E. Data and parameters**E.1. Data and parameters fixed ex ante**

Data / Parameter:	<i>B_{old,i,j}</i>
Unit:	Tonnes/year
Description:	Annual quantity of woody biomass used in pre project scenario
Source of data:	Default value as per methodology AMS II G, version 07
Value(s) applied:	2.15

Choice of data or Measurement methods and procedures:	This parameter shall be determined ex-ante using the following options: A default value of 0.5 tonnes/capita per year is being used to derive this parameter. Number of persons served per device has been considered as 4.3 ³ (Source: For Twantay (Twante) region page number 95, The 2014 Myanmar Population and Housing Census Department of Population Ministry of Immigration and Population May 2015 Census Report Volume 2)
Purpose of data	Calculation of baseline emission
Additional comment:	At the CPA-level it is assumed ex-ante that there is only one project stove being used per household for calculating $B_{old,i,j}$ then is determined ex-post sampling based monitoring and assess the presence of multiple operational project stoves in a sampled household.

Data / Parameter:	$\eta_{old,i,j}$
Unit:	Percentage
Description:	Efficiency of the old devices being replaced by project devices of type i and batch j.)
Source of data:	Parameter Table 14 of AMS II.G, Version 07
Value(s) applied:	10%
Choice of data or Measurement methods and procedures:	The default value of 0.10 is used as 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.
Purpose of data	Calculation of baseline emissions
Additional comment:	This parameter shall remain fixed for the monitoring periods

Data / Parameter:	f_{NRB}
Unit:	Percentage
Description:	Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass
Source of data:	"Default values of fraction of Non-Renewable biomass for least developed countries and small island developing states", version 01.0, EB 67, Annex 22
Value(s) applied:	95%
Choice of data or Measurement methods and procedures:	"Default values of fraction of Non-Renewable biomass for least developed countries and small island developing states", version 01.0, EB 67, Annex 22
Purpose of data	Calculation of baseline emission
Additional comment:	This parameter shall remain fixed for the monitoring periods

Data / Parameter:	$NCV_{biomass}$
Unit:	TJ/tonne
Description:	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne, based on the gross weight of the wood that is 'air-dried')
Source of data:	Paragraph 11 of AMS II.G/ version 07.0
Value(s) applied:	0.015
Choice of data or Measurement methods and procedures:	As per the methodology AMS II.G version 07.0

³ Page number 14, The 2014 Myanmar Population and Housing Census Department of Population Ministry of Immigration and Population May 2015 Census Report Volume 2

Purpose of data	Calculation of baseline emission
Additional comment:	This parameter shall remain fixed for the monitoring periods

Data / Parameter:	Leakage
Unit:	Fraction
Description:	Use of non-renewable woody biomass saved under the project activity to justify the baseline of other CDM project activities can also be a potential source of leakage and Increase in the use of non-renewable woody biomass outside the project boundary to create non-renewable woody biomass baselines can also be a potential source of leakage has been considered through an alternative to $B_{old,i,j}$ which is multiplied by a net to gross adjustment factor of 0.95 to account for both leakages,
Source of data:	Paragraph 38 of AMS II.G, version 07.0
Value(s) applied:	0.95
Choice of data or Measurement methods and procedures:	Default value applied as per the methodology
Purpose of data	Calculation of baseline emission
Additional comment:	This parameter shall remain fixed for the monitoring periods

E.2. Data and parameters monitored

Data / Parameter	$N_{y,i,j}$
Data Unit	Number
Description	Number of project devices of type i and batch j operating during year y.
Source of data	Stove distribution database
Value(s) applied	20,021
Measurement methods and procedures	<p>The Sales Agreement will be stored in paper format as well as the same will be transferred to electronic database which will be maintained by the CME will detail the number of project devices installed. The sales/distribution date for each ICS listed in the project database of each CPA signifies the start of operation. Surveys will be conducted on a representative sample of end-users taken from the CPA distribution database to determine the proportion of cook stoves still operating. The product of these two parameters will determine the Number of project devices of type i operating in year y.</p> <p>The total number of ICS by type i operating in year y is tracked in the project database of CPA 002, which is updated regularly.</p> <p>The number of ICS operating under the CPA will be determined by the sampling survey. The exact number of ICS operating under the CPA will be based on fraction of ICS of type i distributed in year y found operational in the sampling survey multiplied by total number of ICS of type i distributed in year y in the project database.</p> <p>The sampling survey will be carried out according to the sampling plan mentioned in section B.5.2.</p>
Monitoring frequency	At least once every two years (biennial)
QA/QC procedures	The database is periodically checked by the CME for consistency and accuracy. Each stove will have unique serial.
Purpose of data	Calculation of baseline emissions
Additional comment	In case of failure of device, devices that have been replaced by an equivalent in –service device can be counted as operating as per AMS II.G, version 7.0

Data / Parameter	$\mu_{y,i,j}$
Data Unit	Days
Description	Number of days of utilization of the project device i and batch j during the year y .
Source of data	Household survey
Value(s) applied	397 days for 4,973 E-FREE Stove. 397 days for 4,966 E-FREE Stove. 397 days for 4,973 E-FREE Stove. 372 days for 5,109 E-FREE Stove.
Measurement methods and procedures	This parameter should be monitored using the following method: Surveys will be conducted as the use of data loggers to record the continued operation of baseline devices is not practical. The surveys will be designed to capture the cooking habits and stove usage of households in the region, including quantification of use of baseline devices, by formulating questions and/or collecting evidences to determine the frequency of usage of both the project devices and baseline devices.
Monitoring frequency	Yearly
QA/QC procedures	A 95 per cent confidence interval and a 10 per cent margin of error shall be achieved for the sampled parameters. In case the desired precision is not met, lower bound values shall be used against repeating the survey to determine the operational fraction of stoves.
Purpose of data	Baseline determination
Additional comment	-

Data / Parameter	$\eta_{new,i,j}$
Data Unit	Fraction
Description	Efficiency of the project device i and batch j . implemented as part of the project activity
Source of data	Test report ⁴
Value(s) applied	0.278
Measurement methods and procedures	The test has been done at the laboratory.
Monitoring frequency	(i) Recorded at the time of commissioning/distribution (ii) Adjusted for the loss of efficiency as per para 21 (a) -22 of the methodology.
QA/QC procedures	-
Purpose of data	Calculation of baseline emission
Additional comment	21 (a) is followed for loss of efficiency measurement: A default schedule of linear decrease in efficiency up to the terminal efficiency assumed as 20 per cent shall be applied through the life span of the project device. As the life span of the project device is 3 years and the initial efficiency is 27.8%, an annual linear efficiency loss of $(27.8\%-20\%)/3 = 2.56\%$ will be applied.

⁴ Test carried out at Institute of Minerals & Materials Technology (IMMT).

Data / Parameter	Life Span
Data Unit	Number of years
Description	The operating life time of the project device
Source of data	Technical specification document provided by MCS
Value(s) applied	3
Measurement methods and procedures	-
Monitoring frequency	Fixed and recorded at the time of commissioning/distribution
QA/QC procedures	-
Purpose of data	Calculation of baseline emission
Additional comment	-

Data / Parameter	Date of commissioning of batch j																	
Unit	Date																	
Description	To establish the date of commissioning, the Project Participant opt to group the devices in “batches” and the latest date of commissioning of the last device within the batch is used as the date of commissioning for the entire batch.																	
Source of data	Internal records																	
Value(s) applied	<table><tr><th>Batch number</th><th>Date of Commissioning</th><th>Quantity</th></tr><tr><td>1st Batch</td><td>31/08/ 2019</td><td>4,973</td></tr><tr><td>2nd Batch</td><td>02/10/ 2019</td><td>4,966</td></tr><tr><td>3rd Batch</td><td>16/11 2019</td><td>4,973</td></tr><tr><td>4th Batch</td><td>25/12/2019</td><td>5,109</td></tr></table>	Batch number	Date of Commissioning	Quantity	1 st Batch	31/08/ 2019	4,973	2 nd Batch	02/10/ 2019	4,966	3 rd Batch	16/11 2019	4,973	4 th Batch	25/12/2019	5,109		
Batch number	Date of Commissioning	Quantity																
1 st Batch	31/08/ 2019	4,973																
2 nd Batch	02/10/ 2019	4,966																
3 rd Batch	16/11 2019	4,973																
4 th Batch	25/12/2019	5,109																
Measurement methods and procedures	-																	
Monitoring frequency	Fixed and recorded at the time of commissioning/distribution of the last project device in the batch																	
QA/QC procedures	All the cookstoves that are distributed in a batch have been opted under one group and the latest date of commissioning of the last device within the batch is used as the date of commissioning for the entire batch. The day after of the last date of distribution for set of cookstove is considered as the date of commissioning of the cookstoves for the batch. All data is cross-checked and approved by the Analyst CME.																	
Purpose of data	Calculation of baseline emissions																	
Additional comment	-																	

Data / Parameter	Date of commissioning of project device i
Data Unit	Date
Description	Actual date of commissioning of the project device.
Source of data	Internal records
Value(s) applied	Refer to the installation database
Measurement methods and procedures	-
Monitoring frequency	Fixed and recorded at the time of commissioning/distribution
QA/QC procedures	-
Purpose of data	Calculation of baseline emissions
Additional comment	-

E.3. Implementation of sampling plan

>>

(i) Sample Size

The sample size is calculated using the EB 86, "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities", version 04.0.

According to the "Standard for sampling and surveys for CDM project activities and programme of activities", if there is more than one parameter to be estimated, then a sample size calculation should be done for each of them. Then either the largest number for the sample size is chosen as sampling effort with one common survey, or separate sampling efforts and surveys are undertaken for each parameter.

The sample size will be calculated for

(a) A percentage –retention rate of improved cookstoves and continued-use rate of displaced traditional cookstoves; or

For all of the parameters 95% confidence is required that the margin of error in the estimate is not more than $\pm 10\%$ in relative terms.

For a percentage –retention rate of improved cookstoves and continued-use rate of displaced traditional cookstoves the equation that will be used

$$n \geq \frac{1.96^2 N \times p(1-p)}{(N-1) \times 0.1^2 \times p^2 + 1.96^2 p(1-p)}$$

Where:

N= sample size

N = N_y = Number of ICS in SSC CPA installed in year y = Total number of households

p = CME expects the proportion of stoves will be in use in the first monitoring period to be in the range of 0.85

1.96 = represents the 95% confidence required

0.1 = represents the 10% relative precision

The sample to be surveyed is drawn randomly with a geographical spread within the project boundary of the specific CPA 002. A survey is conducted through: telephonic interview due to COVID-19 restrictions from 10/12/2020 to 14/12/2020. For the telephonic conversation the data was collected through excel sheet. The telephonic collecting the data and production of final data set is done as per the below protocol.

Sampling Constants	Values
Monitoring period start	01/12/2019
Monitoring period end	31/12/2020
Level of Sampling	CPA
Confidence (%) (90 or 95)	95%
Margin of Error (%)	10%
Z value	1.960

Monitoring parameter(s)		Stove Operating Fraction for determination of $N_{y,i,j}$		
		Type of cookstove distributed for the batch		
		Simple random sampling across stove model and Batch		
Type (i)	Batch (j)	Stove population	Expected operational proportion (SoF)	Calculated Sample Size (n)
E-FREE	1 st Lot , 2 nd Lot ,3 rd Lot and 4 th Lot	20,021	0.85	67.57
Sample Size Rounded Up				68

The achieved precision level in cookstove usage is 7.09% which is detailed in the below table;

Parameter	Expected Results	Precision Level		Sample Size Calculated	Actual Results	Actual Precision Level Achieved	
		Confidence Interval	Margin of Error			Confidence Interval	Margin of Error
$N_{y,i,j}$	0.85	95%	10%	68	1.00	95%	0.00%
μ_y	0.85	95%	10%	68	0.9002	95%	7.12%

SECTION F. Calculation of emission reductions or net anthropogenic removals

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

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The equations in the methodology do not calculate baseline and project emissions separately; the calculation of baseline emission is described in the following paragraph F.2. Together with the calculation of the project emission reductions.

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

>>

Parameter	Notation	Value	Units
Number of project devices of type i and batch j operating during year y	$N_{y,i,j}$	20,021	Number
Fraction of woody biomass saved by the project activity during year y that can be established as non-renewable biomass.	$f_{NRB,y}$	95%	%
Number of days of utilization of the project device i and batch j during the year y.	$\mu_{y,i,j}$	First Batch:397 days for 4,973 E-FREE Stove, Second Batch:397 days for 4,966 E-FREE Stove	Days

		<p>Third Batch: 397 days for 4,973 E-FREE Stove</p> <p>Fourth Batch: 372 days for 5,109 E-FREE Stove</p> <p>Percentage of Utilization of 0.9002 is applied from the sampling survey analysis</p>	
Net calorific value of the non-renewable woody biomass used in project devices.	NCV _{biomass}	0.015	TJ/tonnes
ICS technology degradation	$\Delta\eta_{y,i,j}$	0.9070	Annual Degradation of 2.56% is applied ,as the stove lifetime has crossed more than 1 year degradation of 2.56% is applied
Emission factor for the substitutions of non renewable biomass (Default value as per the methodology)	EF _{projected_fossilfuel}	81.6	tCO2/TJ
Annual quantity of woody biomass used in project scenario	$B_{old,i,j}$	2.15	Tonnes
Efficiency of the pre project device being replaced by project devices of type i and batch j.	$\eta_{old,i,j}$	10.00%	Percentage
Efficiency of the project device i and batch	$\eta_{new,i,j}$	27.8 ⁵ %	Percentage
Gross Adjustment Factor (Default value as per methodology)	AF	0.95	

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

$B_{old,i,j}$ = 2.15 tonne/annum

$\eta_{old,i,j}$ =10%

$\eta_{new,i,j}$ =27.8%

$\Delta\eta_{y,i,j}$ =0.9070

⁵ As per the test results and annual degradation of 2.56% is applied

Leakage as per para 38 of AMS II G methodology has been considered. Thus, $B_{old,i,j}$ is being multiplied by a net to gross adjustment factor of 0.95⁶ to account for both leakages mentioned in para 38 (a) and (b), in which case surveys are not required.

$B_{old,i,j} = 2.15 \text{ tonne/annum} \times 0.95 = 2.04 \text{ tonne per annum}$

$B_{y,savings,i,j} = 2.04 \times (1 - (10\%/27.8\% \times 0.9070)) = 1.233 \text{ tonne/annum}$

$$ER_{y,i,j} = B_{y,savings,i,j} \times N_{y,i,j} \times \frac{\mu_{y,i,j}}{365} \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil\ fuel}$$

Batch Number	Date commissioning of batch	Quantity of	Number of days of utilization
First	31/08/2019	4,973	397
Second	02/10/2019	4,966	397
Third	16/11/2019	4,973	397
Fourth	25/12/2019	5,109	372

$$ER_{y,i,j} = (1.233 \times 4,973 \times 397 / 365 \times 0.9002 \times 0.95 \times 0.015 \times 81.6) + (1.233 \times 4,966 \times 397 / 365 \times 0.9002 \times 0.95 \times 0.015 \times 81.6) + (1.233 \times 4,973 \times 397 / 365 \times 0.9002 \times 0.95 \times 0.015 \times 81.6) + (1.233 \times 5,109 \times 372 / 365 \times 0.9002 \times 0.95 \times 0.015 \times 81.6)^{10} = (6,439 + 6,430 + 6,439 + 6,198)^{11} \text{ tCO}_2\text{e} = 25,506 \text{ tCO}_2\text{e}$$

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

$LE_y = 0$

$ER_y = 25,506 \text{ tCO}_2\text{e per annum}$

F.3. Calculation of leakage emissions

>>

To account for leakage a net to gross adjustment factor of 0.95 has been applied in line with the registered CPA-DD and therefore the $B_{old,j}$ has been multiplied by a net to gross adjustment factor to account for leakages

⁶ The adjustment factor does not need to be applied twice for option (a) and (b).

⁷ Calculation for the cookstove that was distributed under First Lot

⁸ Calculation for the cookstove that was distributed under Second Lot

⁹ Calculation for the cookstove that was distributed under Third Lot

¹⁰ Calculation for the cookstove that was distributed under Fourth Lot

¹¹ Rounded down value

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 until 31/12/2020	From 01/01/2021	Total amount
10008-P1-0002-CP1	25,506	0	0	0	25,506	0	25,506
Total	25,506	0	0	0	25,506	0	25,506

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 for this monitoring period in the CPA-DD (t CO ₂ e)
10008-P1-0002-CP1	25,506	49,494
Total	25,506	49,494

F.5.1. Explanation of calculation of “amount estimated ex ante for this monitoring period in the CPA-DD”

>>

CPA 002 is claiming emission reduction for 397 days (01/12/2019 to 31/12/2020). As per the registered CPA-DD 45,504 tCO₂e are the estimated emission reduction for a period of 365 days. Thus for 397 days the estimated ex ante emission reduction (as per registered PDD) would be 49,494 tCO₂e

1	Estimated Emission Reductions per year as per PDD, tCO ₂ e	49,494
2	Start date of the monitoring	01-12-2019
3	End date of the monitoring	31-12-2020
4	Number of monitoring days	397
5	Estimated Emission Reductions per monitoring days	25,506

F.6. Remarks on increase in achieved emission reductions

>> Not Applicable

CPA 002 is claiming emission reduction for 397 days (01/12/2019 to 31/12/2020). As per the registered CPA-DD 45,504 tCO₂e are the estimated emission reduction for a period of 365 days. Thus for 397 days the estimated emission reduction (as per registered PDD) would be 49,494 tCO₂e. There is a decrease of 48.47% in the actual emission reduction as against stated in the registered CPA-DD due to the CPA not having been fully implemented yet. There is no increase in achieved emission reductions.

F.7. Remarks on scale of small-scale CPAs

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The project activity registered under Type II: Energy Efficiency Improved Projects and remained under the limit of Type II: Energy Efficiency Improved Projects during the crediting period.

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
04.0	6 April 2021	Revision to: <ul style="list-style-type: none"> • Reflect the “Clarification: Regulatory requirements under temporary measures for post-2020 cases” (CDM-EB109-A01-CLAR).
03.0	31 May 2019	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 02.0 of the “CDM project standard for programmes of activities” (CDM-EB93-A07-STAN); • Add a section on remarks on the observance of the scale limit of small-scale CPAs during the crediting periods; • Add "changes specific to afforestation or reforestation activities/CPA" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R PoAs between two commitment periods; • Make structural and editorial improvements.
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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