



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

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

MONITORING REPORT

Title of the PoA	Clean Energy Program Supported by Republic of Korea		
UNFCCC reference number of the PoA	10415		
Version numbers of the PoA-DD applicable to this monitoring report	2.0		
Version number of this monitoring report	11.1		
Completion date of this monitoring report	23/07/2021		
Monitoring period number	Third monitoring period		
Duration of this monitoring period	13/09/2019 to 22/06/2020 (including both days)		
Monitoring report number for this monitoring period	1		
Coordinating/managing entity	ECOYE Co., LTD		
Host Parties	Host Party of the PoA	Is this the host Party of a CPA covered in this monitoring report? (yes/no)	
	Myanmar	Yes	
Applied methodologies and standardized baselines	AMS-II.G, version 08.0		
Sectoral scopes	Sectoral scope 3 (Energy Demand)		
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 tCO ₂ e	446,995 tCO ₂ e	0 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 covered in this monitoring report	484,380 tCO ₂ e		

PART I Monitoring of programme of activities (PoA)

SECTION A. Description of PoA

A.1. General description of PoA

>> In Myanmar, commonly used fuel for cooking is fuelwood. As per *The 2014 Myanmar Population and Housing Census* report, as much as 86.2% of the rural households and 25.6% of the urban households use fuelwood for cooking¹.

This high dependence on solid biomass degrades local environments; demands considerable time in fuel collection and creates indoor air pollution that causes respiratory diseases. Further, the burning of fuelwood adds significantly to GHG emissions. Both in rural and urban areas, millions of households depend upon fuelwood as their primary fuel for cooking.

(a) Policy/ measure or stated goal of the PoA

The objective of the *Clean Energy Program Supported by Republic of Korea* (hereafter referred to as “the program”) is to promote dissemination of fuelwood burning improved cookstoves (ICS). The implementation of projects under this program will improve access to clean energy, diminish demand for fuelwood, mitigate impact of climate change and contribute in socio-economic development of the beneficiary communities.

(b) Framework for the implementation of the proposed PoA

ECOYE Co., LTD as a coordinating and managing entity (CME) is implementing the CDM PoA-*Clean Energy Program Supported by Republic of Korea*. ECOYE Co., LTD is a leading carbon offset project developer and trader that assist for-profit and not-for-profit organizations to implement climate mitigation projects. ECOYE Co., Ltd. provides all implementation costs for the project under this CPA, including total operation & maintenance costs of ICS production and free distribution for CME and CPA implementers to operate the CPA in a financially sustainable condition.

The program targets consumers that use fuelwood as their primary fuel for cooking to replace the existing technologies with ICS. The consumption of fuelwood degrade local environments creates indoor air pollution that causes respiratory diseases and adds significantly to GHGs emissions. The program by replacing inefficient technology/measure such as three stone stove, tripod and traditional cookstoves shall result in clean environment, reduction of GHG emissions and enhanced living standards in user households.

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
Title-Clean Energy Program Supported by Republic of Korea Reference number-CPA MM [XX] Generic CPA MM 01	2.0	Sectoral scope 3 (Energy Demand)	AMS-II.G, version 08.0

¹The 2014 Myanmar Population and Housing Census Highlights of the Main Results Census Report Volume 2 – Table 13

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)
Clean Energy Program Supported by Republic of Korea CPA MM 02;10415-P1-0002-CP1	2.0	Title-Clean Energy Program Supported by Republic of Korea Reference number-CPA MM [XX] Generic CPA MM 01	Fixed (10/01/2019 - 09/01/2029)	Yes
CPA MM 01; 10415-P1-0001-CP1	2.0	Title-Clean Energy Program Supported by Republic of Korea Reference number-CPA MM [XX] Generic CPA MM 01	Fixed (01/07/2018 - 30/06/2028)	No (Excluded on 03/01/2019)

A.2. Coordinating/managing entity

>> ECOEYE Co., LTD
70 Dusan-ro, Geumcheon-gu, Seoul. South Korea
#1503, Hyundai Knowledge Industrial Center B

Republic of Korea
Office: +82- 2-6480-7346

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

>> The management system is designed as per the Standard for Demonstration of Additionality, Development of Eligibility Criteria and Application of Multiple Methodologies for Programme of Activities, ver 04.0 paragraph 21.

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

Table 1: Role and Responsibility

Entity	Role and Responsibility	Competencies
ECOEYE Co., LTD	As a CME, ECOEYE Co., LTD is responsible: <ul style="list-style-type: none"> •To sign agreements with CPA implementers; •To sign agreements with DOE for inclusion and verification services; To communicate with the CDMEB, including on matters related to the distribution of Certified Emission Reductions (CERs); •To review and assist in the selection and preparation of CPAs, ensuring that all CPAs 	ECOEYE Co., LTD is a leading CDM project developer and trader that assist for-profit and not-for-profit organizations to implement climate mitigation projects. With over fifteen years of experience, the CME has a team of experienced professionals who are highly skilled in CDM project identification and development, renewable energy technologies, rural markets, and sampling techniques. Over the past fifteen years, CME has developed many carbon offset projects particularly ICS PoA and managing them successfully

	<p>fulfils the eligibility criteria and neither registered as an individual CDM project activity nor included in another registered PoA ;</p> <ul style="list-style-type: none"> •To ensure that ICS under the PoA meets minimum thermal efficiency requirement of twenty percent and satisfy the condition to qualify as a 'microscale CDM unit²; •To ensure that the same approved baseline and monitoring methodology is applied to all the CPAs; •To establish CER ownership agreements with the CPA implementers; •To train and supervise CPA implementer in data collection and archiving; •To ensure that the CPA implementers maintain and provide monitoring data for calculating CERs; •To plan and manage validation and verification process; •To establish and manage the database for calculating CERs based on data received from the CPA implementers 	
CPA implementers	<p>The role of CPA implementers is detailed below:</p> <ul style="list-style-type: none"> •To disseminate ICS; •To institute adequate data collection and archiving systems; •To establish quality control procedures for all monitoring parameters; •To monitor and record the data 	<p>CPA implementer and the CME are same entity. CME has developed many carbon offset projects particularly ICS PoA and managing them successfully. It has a team of experienced professionals who are highly skilled in CDM project management</p>

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

The CME provides capacity building and training to CPA implementer's team to enhance:

- ICS marketing and distribution;
- Data collection and archiving capability; and
- The CME keeps records of capacity building and training activities.

c) A procedure for technical review of inclusion of CPAs:

²Methodological tool Demonstration of additionality of microscale project activities Version 09.0. Paragraph 12

- The CME collects all documents/information necessary to check compliance of CPA with the eligibility criteria of the PoA;
- Checking whether the CPA and included technology fulfills eligibility criteria of the PoA or not;
- The CME reviews monitoring plan of the CPA to ensure that it is in line with the monitoring plan mentioned in section B.7.2 of the PoA DD.

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 included as a CPA in another registered CDM PoA):

- Every new CPA is compared to the already existing database and the list of similar project activities that are under validation or registered at the UNFCCC or any other mechanism to avail climate change mitigation benefits;
- CPA implementers in the PoA are made aware of the double counting principle i.e., CPA should neither a CDM project and/or as a part of any other CDM PoA and/or any other mechanism to avail climate change mitigation benefits;
- To avoid-double counting of ICS, all ICS under the PoA bears the CME logo and 12-digit unique serial number. The unique serial number is a combination of numbers representing ICS's country of manufacturing, country of destination and manufacturing date. There are two types of ICS models: S26-13 and S32-13 and each has different combination of numbers representing different parameters. In any case, both have 12-digit numbers.

Unique serial number and user location details identify the project devices individually and separate them from other programs, if any in the present or in the future. The unique serial number can be verified with the project database (PD).

Each ICS distributed is entered into the PD with a unique serial number and user details that clearly and unmistakably keep track of the ICS in each CPA. Therefore, it is not possible for a particular ICS to be counted in two different CPAs.

Stratified sampling approach has been applied for monitoring of CPA (10415-P1-0002-CP1) covered in this monitoring report.

B.2. Post-registration changes to PoA

B.2.1. Corrections

>> 1. *Indicate whether there are any corrections to programme information or parameters fixed at the registration or renewal of the PoA period in the following categories: (a) Corrections that have been approved by the Board as applicable from the periods prior to this monitoring period; (b) Corrections that have been approved by the Board as applicable from this monitoring period; (c) Corrections that are beings submitted with this monitoring report as part of the request for issuance (post-registration change – issuance track) as applicable from this monitoring period.*

1 (a) - Corrections to the programme information and parameters have been approved by the Board as applicable from the periods prior to this monitoring period;

1 (b) – No corrections that have been approved by the Board as applicable from this monitoring period;

1 (c) – No corrections that are being submitted with this monitoring report as part of the request for issuance (post-registration change – issuance track) as applicable from this monitoring period.

2. *For the corrections referred to in 1(a) and 1(b) above, provide the approval dates and reference numbers of the post-registration changes.*

1 (a) - Corrections to the registered PoA-DD were approved on 17/12/2018 (effective approval date) under reference number PRC-10415-001.

3. *For the corrections referred to in 1(c) above, provide the version number and the completion date of the revised PoA-DD and of the DOE validation report.*

Not applicable.

B.2.2. Inclusion of monitoring plan

>> Not applicable.

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

>> 1. *Indicate whether there are any permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baseline, or methodological regulatory documents.*

Corrections to the registered PoA-DD were approved on 17/12/2018 (effective approval date) under reference number PRC-10415-001.

2. *If there are such changes, list all the changes since the registration of the PoA, separating them into the following categories: (a) Changes that have been approved by the Board prior to the submission of this monitoring report; (b) Changes that are being submitted with this monitoring report as part of the request for issuance (post-registration change - issuance track).*

2 (a) Corrections to programme information or parameters have been approved by the Board under the prior-approval track.

List of changes made in the PoA DD:

- Updated section I.2: Tool 30 to calculate fNRB has been removed;
- Updated section I.6.1: Equation 6 of the AMS-II.G version 08.0 and related parameters are added;
- Updated section I.6.2: fNRB section is updated, $B_{old,i,j}$ and $B_{old,HH}$ is added;
- Updated section I.6.3: Equation 6 of the AMS-II.G version 08.0 and related parameters are added, fNRB value and ex ante emission reduction calculations are updated;
- Updated section I.7.1: $N_{d,HH}$, μ_y , $\eta_{new,ij}$;
- Updated section I.7.2, sampling plan to include monitoring parameter μ_y ;
- Updated section I.7.3: monitoring parameter μ_y ;

- Section K: updated format of eligibility criteria table.

2 (b) – No permanent changes, therefore not applicable.

3. *For the changes referred to in 2(a) above, provide the approval dates and reference numbers of the post-registration changes.*

Corrections to the registered PoA-DD were approved on 17/12/2018 (effective approval date) under reference number PRC-10415-001.

4. *For the changes referred to in 2(b) above, provide the version number and the completion date of the revised PoA-DD and of the DOE validation report.*

No permanent changes, therefore, not applicable.

B.2.4. Changes to programme design

>> No change in the programme design.

B.2.5. Changes specific to afforestation or reforestation activities

>> Not applicable.

PART II Monitoring of CPAs

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SECTION C. Implementation of CPAs

C.1. Description of implemented CPAs

>> The Clean Energy Program Supported by Republic of Korea CPA MM 02 is a small-scale type II project activity under “Clean Energy Program Supported by Republic of Korea” PoA.

The purpose of the CPA is to disseminate fuelwood burning improved cookstoves [ICS] to households that are using fuelwood as cooking fuel. ECOEYE Co., Ltd. provides all implementation costs for the project under this CPA including, total operation & maintenance costs of ICS production and free distribution for CME and CPA implementers to operate the CPA(s) in a financially sustainable condition.

Technology

This CPA includes distribution of ICS models: S-26-13 and S32-13. These are fuel efficient fuelwood burning stoves. An ICS has an enclosure for the fire to reduce the loss of radiant heat and protect it against the wind. It increases heat transfer to the cooking pot by guiding upward flow of the flue gases. ICS burns fuel more cleanly and efficiently reducing fuel consumption and GHG emissions, easing pressure on forest resources and reducing indoor air pollution.

Table 2: Annual Energy Savings per ICS in MWh^{th3}

Age	ICS Model		
	ICS S26-13 (N _{mp02})	ICS S32-13 (N _{mp02})	ICS S32-13 (N _{mp02+}) ⁴
1-365	Not Applicable	12.93	12.93
366-730	11.01	12.45	Not Applicable
731-1095	10.55	Not Applicable	Not Applicable

As per the above table, the annual energy savings is less than 1% of the small-scale CDM thresholds i.e., 1800 MWh^{th5} and satisfies the condition i.e., annual energy savings of no more than 20 GWh/year to qualify as a microscale CDM unit⁶.



Figure 1 ICS S26-13



Figure 2 ICS S32-13

Technical description of the ICS S26-13 and S32-13 under the CPA MM 02 is given below:

³Please refer ER calculation sheets for the details

⁴Nmp02 and Nmp02+ has been defined in the section C.3.1 of this report

⁵CDM project standard for programmes of activities version 02.0. Paragraph 126

⁶CDM project standard for programmes of activities version 02.0. Paragraph 128

Table 3: Technical Description of the ICS S26-13 and S32-13⁷

S.No	Parameter	S26-13	S32-13
1	Specific Fuel Consumption	0.035 MJ/min/L ⁸	0.039 MJ/min/L ⁹
2	Design Thermal Efficiency	28.9%	38.7%
3	Dimensions	325*270*268 mm	320*320*267 mm
4	Material	Stove body: 0.5mm stainless steel, Grade 201 Chamber: 1mm stainless steel, Grade 201 Stovetop: cast iron	Stove body: 0.5mm cold roll sheet Chamber: 1mm stainless steel, Grade 201 Stovetop: cast iron
5	Lifespan	5 years	5 years
6	Design Thermal Power	3.8 kW	4 kW

Table 4: CPA Details

CPA title	Clean Energy Program Supported by Republic of Korea CPA MM 02
CPA reference number	10415-P1-0002-CP1
CPA crediting period start date	10/01/2019
Distribution date of first ICS included in this monitoring period	28/09/2017
Distribution date of last ICS included in this monitoring period	19/06/2020

C.2. Location of CPAs

>> Physical/ Geographical boundary of the CPA is The Republic of The Union of Myanmar,

Latitude: 19° 04' 24.47" N

Longitude: 96° 40' 15.74" E

Source: <http://latitude.to/map/mm/myanmar>

⁷Manufacturer specification

⁸S26-13 WBT certificate

⁹S32-13 WBT certificate

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

1. There are temporary deviations from the monitoring plan in the included CPA-DD for the CPA (10415-P1-0002-CP1) covered in this monitoring report. The temporary deviations are listed below:

CPA -10415-P1-0002-CP1 got second issuance 10415-MP2-IRP1 (hereinafter MP02). The monitoring period for MP02 was from 12 January 2019 to 12 September 2019 and the monitoring survey was conducted in September-October 2019 (monitoring survey was started on 19/10/2019 and completed by 26/10/2019).

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survey and WBTs. As per the guidance provided in SSC_781 and Section 4.8.2 of the General guidelines for SSC CDM methodologies version 23.1, following temporary deviations from the registered monitoring plan have been made.

For the sake of simplification, quantity of project devices distributed and operating under the MP03 is denoted by $N_{y,i,j}$ and classified into two groups N_{mp02} and N_{mp02+} .

Where:

$N_{y,i,j}$	Number of project devices operating during MP03
N_{mp02}	Number of project devices operating during MP02
N_{mp02+}	Number of project devices distributed during MP03

Table 5: Temporary Deviations from the Monitoring Plan

Particular		Monitoring Method	Justification	Deviation	Duration of the non-conforming monitoring period
$N_{y,i,j}$ = Number of project devices operating during MP03. $N_{y,i,j} = N_{mp02} + N_{mp02+}$	N_{mp02} : Number of project devices operating during MP02	MP02 monitoring survey data	Survey data is valid for the period of 12 months ¹⁰	No	Not applicable
	N_{mp02+} : Number of project devices distributed during MP03	Lower bound of MP02 monitoring survey data ¹¹	SSC_781 ¹²	Yes	MP03
μ_{mp03} : Adjustment to account for any continued use of pre-project devices during the monitoring period. For project devices operating during MP03.	μ_{mp02} : For project devices operating during MP02	MP02 monitoring survey data	Survey data is valid for the period of 12 months ¹³	No	Not applicable
	μ_{mp02+} : For of project devices distributed during MP03	Lower bound of MP02 monitoring survey data	SSC_781	Yes	MP03

¹⁰General guidelines for SSC CDM methodologies Version 23.1 footnote 4

¹¹ SSC_781, suggests Telephonic survey and Lower Bound approach. Therefore, both are acceptable. The telephonic survey is not an option because of the following:

- a) In Myanmar, it is easy to get active mobile sim card. Therefore, people change their mobile numbers frequently;
- b) The telephone approach may not be suitable for long interviews, long and/or complex ICS monitoring survey questions; and
- c) Unreliable telephone network.

¹²<https://cdm.unfccc.int/methodologies/SSCmethodologies/clarifications/60293>

¹³General guidelines for SSC CDM methodologies Version 23.1 footnote 4

$\eta_{new,i,j}$ Efficiency of the project device (N _{mp02})	$\eta_{new,S\ 32\ 13\ (mp02,1-365)}$ Efficiency of the project devices which are 1-365 days old	As per AMS-II.G version 08.0 Para 25 (a)	SSC_781	Yes	MP03
	$\eta_{new,S\ 26\ 13\ (mp02,366-730)}$ Efficiency of the project devices which are 366-730 days old				
	$\eta_{new,S\ 26\ 13\ (mp02,731-1095)}$ Efficiency of the project devices which are 731-1095 days old				
	$\eta_{new,S\ 32\ 13\ (mp02,366-730)}$ Efficiency of the project devices which are 366-730 days old				
$\eta_{new,i,j}$ Efficiency of the project device (N _{mp02+})	$\eta_{new,S\ 26\ 13\ (mp02+,1-365)}$ and $\eta_{new,S\ 32\ 13\ (mp02+,1-365)}$ Efficiency of the project devices which are 1-365 days old				

3. Provide the version number and the completion date of the DOE verification report.

DOE final validation report version 1.5, 21/06/2021 for post registration change (PRC) PRC-10415-002.

C.3.2. Corrections

>> No corrections to the programme information or parameters fixed at the inclusion of the CPA covered in this monitoring report.

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

>> No change to the start of the crediting period of the CPA covered in this monitoring report.

C.3.4. Inclusion of monitoring plan

>> There are no post-registration changes to include a monitoring plan into the CPA-DD.

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

>> There are no permanent changes to the monitoring plan in the included CPA-DD, or permanent deviation of monitoring from the applied methodology, applied standardized baseline, or other methodological regulatory documents, for the CPA covered in this monitoring report.

C.3.6. Changes to project design

>> There are no changes to the project design of the CPA covered in this monitoring report.

C.3.7. Changes specific to afforestation or reforestation CPA

>> Not applicable

SECTION D. Description of monitoring system of CPAs

>> The CME has trained field staff in project implementation, particularly in data collection and archiving. All ICS under the PoA bear the CME logo and 12-digit unique serial number. The unique serial number is a combination of numbers representing the country of ICS manufacturing, country of destination and manufacturing date. Unique serial number and user location details identify the project devices individually and separate them from other programs, if any in the present or in the future. The unique serial number can be verified with the project database. To establish the date of commissioning of ICS, the CME has used the actual date of distribution of ICS as commissioning date of each ICS and not opted to group the devices in "batches". However, next day after the date of distribution of ICS has been considered as the start date of ICS operation.

Step 1: Data collection

ICS were distributed in a social gathering organized in some village school or community hall. Relevant customer data such as name, address, signature, ICS type, unique serial number, and distribution date were recorded by the field personnel using paper-based means.

Step 2: Data Archiving

The CME maintains a record-keeping system- Project Database (PD). The total number of ICS by type and age group deployed during the crediting period can be tracked in the PD, which is updated regularly. All distributed ICS has been recorded for the distribution date and user details. The date on which household receives ICS is recorded in the project database and next day has been considered as the start date of ICS operation. This information allows the CME/CPA implementers to track particular ICS and/or user.

The CME has a monitoring manager responsible for field staff training, QA/QC of the data, analysis and reporting into the monitoring report. The CME has a database manager who manages the process of collecting the information of installed ICS from the stove distributors and entering the data into the project

database. For the monitoring survey, a monitoring team was organized by the CME consisting of survey coordinator, survey supervisor and trained monitoring staff, who conducted the surveys and the WBTs.

Table 6: Data Collection Team Organization Structure

Information flow ▲ ▲ ▲	Monitoring Team				Flow of project device ▼ ▼ ▼
	The CME (monitoring manager: overall planning and execution)				
	The CME (database manager: end user data checking and archiving)				
	Distributor's Field Staff (end user data collection)		Distributor's Field Staff (end user data collection)		
	End User	End User	End User	End User	

Survey Team

The sample survey was conducted by the CME. Survey team was supervised and trained by the CME. Survey team was consisting of one survey coordinator and three supervisors and eight surveyors.

Survey coordinator's Responsibilities

Overall planning and execution of the survey.

Supervisor's Responsibilities

- To explain survey objectives and procedure to the survey team;
- Ensure availability of all materials for the team to complete its assigned survey;
- Assignment of work to each surveyor;
- Check all completed survey forms to make sure that all the data fields have been accurately filled in, any discrepancy shall be corrected;
- Takes responsibility for the safe collection, storage, and transport of the completed survey forms.

Surveyor's Responsibilities

- To study instructions and follow them precisely;
- To know the substance of the survey form and the method for filling it out;
- To conduct interviews of respondents efficiently and with high quality and give the completed survey forms to the supervisor.

Assistant's Responsibilities

Assistants provided by the distributor helped surveyors in locating households selected for the survey

Table 7: Survey Team Organization Structure

Personnel								Entity
Survey Coordinator								CME
Supervisor				Supervisor				CME
Surveyor	Surveyor	Surveyor	Surveyor	Surveyor	Surveyor	Surveyor	Surveyor	CME

Assistant	Assistant	Assistant	Assistant	Assistant	Assistant	Assistant	Assistant	Distributor
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SECTION E. Data and parameters

E.1. Data and parameters fixed ex ante

Data / Parameter	f_{NRB}
Unit	Fraction
Description	Fraction of woody biomass saved by the project activity during year y that can be established as non-renewable biomass
Source of data	<p>fNRB calculation sheet</p> <ul style="list-style-type: none"> •SSC WG 35th meeting Report, Annex 20, Eq 3 •FAO Forest Resource Assessment (FRA) 2015 •2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 4, Table 4.9 •http://www.fao.org/docrep/004/Y1997E/y1997e21.htm
Value(s) applied	0.8832
Choice of data or measurement methods and procedures	<p><u>Choice of Data</u></p> <p>Option A, paragraph 43 of the applied methodology AMS-II.G. version 08.0</p> <p><i>“To determine the value of the fraction of non-renewable biomass (fNRB) to be applied in a Component Project Activity (CPA) of a POA, use one of the two options as follows: (a) Conduct local studies to determine the local fNRB value (sub national values); or (b) Use default national values approved by the Board (see footnote 3). The choice of which option to use shall be made ex ante. However, a switch from a national value of fNRB (i.e. option (b)) to sub-national values (i.e. option (a)) is permitted, under the condition that the selected approach is consistently applied to all CPAs”</i></p> <p><u>Measurement methods and procedure</u></p> <p>The measurement procedure is based on Equation 11 of the AMS-II.G. version 08.0 and approach mentioned in Annex 20 of the SSC WG 35th meeting report</p>
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	Parameter is fixed ex ante at CPA level

Data / Parameter	$NCV_{biomass}$
Unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass, briquettes or charcoal used in project devices.
Source of data	AMS-II.G version 08.0- Pg 17. Data/parameter table 12
Value(s) applied	0.015

Choice of data or measurement methods and procedures	IPCC default for wood fuel, 0.015 TJ/tonne, based on the gross weight of the wood that is 'air-dried' may be used if fuel used in project device is also woody biomass
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	Fixed ex ante at PoA level

Data / Parameter	η_{old}
Unit	Fraction
Description	Efficiency of pre - project device, which is a three stone fire using firewood (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney; for other types of devices, a default value of 0.2 may be optionally used. Weighted average values will be used (taking the amount of woody biomass consumed by each device as the weighting factor) if more than one type of device is being replaced
Source of data	AMS-II.G version 08.0. Data/parameter table 17
Value(s) applied	0.1
Choice of data or measurement methods and procedures	Default value suggested in AMS-II.G version 08.0
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	The parameter value is fixed ex ante at CPA level.

Data / Parameter	$EF_{projected\ fossil\ fuel}$
Unit	tCO ₂ e/TJ
Description	Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers
Source of data	AMS-II.G version 08.0- page 5
Value(s) applied	81.6
Choice of data or measurement methods and procedures	Default value suggested in AMS-II.G version 08.0
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	The parameter value is fixed ex ante at PoA level

Data / Parameter	LF_y
Unit	Fraction
Description	Leakage adjustment factor
Source of data	AMS-II.G version 08.0 Para 42 c

Value(s) applied	0.95
Choice of data or measurement methods and procedures	As per the methodology AMS-II.G version 08.0: Gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required
Purpose of data/parameter	Calculation of leakage emissions
Additional comments	The parameter value is fixed ex ante at PoA level

Data / Parameter	Life Span
Unit	Number of years
Description	Operating lifetime of S26-13 and S32-13
Source of data	Manufacturer specification
Value(s) applied	5
Choice of data or measurement methods and procedures	Fixed and recorded at the time of commissioning/distribution
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	Project devices will be removed after completing life span and no emission reductions will be claimed

Data / Parameter	$B_{old,HH}$
Unit	tonnes/household/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	UN Database http://data.un.org/Data.aspx?d=EDATA&f=cmID%3AFW%3BtrID%3A1231) year 2016 The 2014 Myanmar Population and Housing Census The Union Report Census Report Volume 2, 2015 Table 13 https://myanmar.unfpa.org/en/publications/union-report-volume-2-main-census-report
Value(s) applied	4.18
Choice of data or measurement methods and procedures	Historical data
Purpose of data/parameter	Calculation of baseline emissions
Any comments	Decided at CPA level

Data / Parameter	$B_{old,i,j}$
Unit	tonnes/year
Description	Annual quantity of woody biomass that would have been used in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project device type i and batch j

Source of data	Calculated parameter to be fixed ex-ante
Value(s) applied	4.18
Choice of data or measurement methods and procedures	AMS-II.G version 08.0 Equation 9 $B_{old,HH}$ divided by $N_{d,HH}$ (number of project device/household)
Purpose of data/parameter	Calculation of baseline emissions
Any comments	CME has distributed only one improved stove per household. Therefore $N_{d,HH}$ is equal to one and $B_{old,i,j}$ equals $B_{old,HH}$

E.2. Data and parameters monitored

Data/Parameter	$N_{y,i,j}$																																				
Unit	Number of units																																				
Description	Number of project devices of type i and batch j operating during year y																																				
Measured/calculated/default	Calculated																																				
Source of data	Project database and MP02 monitoring survey																																				
Value(s) of monitored parameter	$N_{y,i,j} = N_{mp02} + (N_{mp02+})$ 271,076= 165,804 + 105,272 <table><tr><td>N_{mp02}</td><td>Model</td><td>Model</td></tr><tr><td>Batch</td><td>S26-13</td><td>S32-13</td></tr><tr><td>1-365</td><td>0</td><td>30,504</td></tr><tr><td>366-730</td><td>2,547</td><td>128,735</td></tr><tr><td>731-1095</td><td>4,018</td><td>0</td></tr><tr><td>Sub Total</td><td>6,565</td><td>159,239</td></tr></table> <table><tr><td>N_{mp02+}</td><td>Model</td><td>Model</td></tr><tr><td>Batch</td><td>S26-13</td><td>S32-13</td></tr><tr><td>1-365</td><td>0</td><td>105,272</td></tr><tr><td>366-730</td><td>0</td><td>0</td></tr><tr><td>731-1095</td><td>0</td><td>0</td></tr><tr><td>Sub Total</td><td>0</td><td>105,272</td></tr></table>	N_{mp02}	Model	Model	Batch	S26-13	S32-13	1-365	0	30,504	366-730	2,547	128,735	731-1095	4,018	0	Sub Total	6,565	159,239	N_{mp02+}	Model	Model	Batch	S26-13	S32-13	1-365	0	105,272	366-730	0	0	731-1095	0	0	Sub Total	0	105,272
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366-730	0	0																																			
731-1095	0	0																																			
Sub Total	0	105,272																																			
Monitoring equipment	Not Applicable																																				
Measuring/reading/recording frequency	At least once in every two years (biennial)																																				

Calculation method (if applicable)	<p>All distributed ICS were recorded in the project database for the distribution date and the recipient's location. The total number of ICS by type and age group deployed during the selected monitoring period can be tracked in the project database of the CPA.</p> <p>The number of ICS operating under the CPA was determined by conducting a sampling survey. The exact number of ICS operating under the CPA is based on fraction of ICS of type (S32-13 and S26-13) and age group (1-365 days, 366-730 days and 731-1095 days) found operating in the sampling survey multiplied by total number of ICS of type (S32-13 and S26-13) and age group (1-365 days, 366-730 and 731-1095) in the project database. Sampling survey was carried out according to the sampling plan mentioned in section B.7.2 of the PoA-DD.</p> <p>Lower Bound¹⁴ value of fraction of stoves operational in MP02 has been used to determine N_{mp02+} stoves i.e., 105,272. Please refer section C.3.1 of this report for the justification of calculation method.</p>
QA/QC procedures	A 95 per cent confidence interval and a 10 per cent margin has been applied for the sampling parameter
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	<p>During the ex-post monitoring survey presence of additional ICS was cross-checked on sampling basis and total ICS population has been discounted by the fraction of sampled household found using more than one project ICS. Electronic copy of data sources will be archived for at least two years after the end of the final crediting period or the last issuance of CERs, whichever occurs later.</p>

Data / Parameter	$\eta_{new,i,j}$																					
Unit	Fraction																					
Description	Efficiency of the project device of each type i and batch j																					
Measured/calculated/default	Calculated																					
Source of data	WBT Certificate																					
Value(s) applied	<table><tr><td>N_{mp02}</td><td>Efficiency</td><td>Efficiency</td></tr><tr><td>Batch</td><td>S26-13</td><td>S32-13</td></tr><tr><td>1-365</td><td>Not applicable</td><td>0.3870</td></tr><tr><td>366-730</td><td>0.2712</td><td>0.3496</td></tr><tr><td>731-1095</td><td>0.2534</td><td>Not applicable</td></tr></table> <table><tr><td>N_{mp02+}</td><td>Efficiency</td></tr><tr><td>Batch</td><td>S32-13</td></tr><tr><td>1-365</td><td>0.3870</td></tr></table>	N_{mp02}	Efficiency	Efficiency	Batch	S26-13	S32-13	1-365	Not applicable	0.3870	366-730	0.2712	0.3496	731-1095	0.2534	Not applicable	N_{mp02+}	Efficiency	Batch	S32-13	1-365	0.3870
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1-365	0.3870																					

¹⁴Lower Bound values have been calculated as per the Guideline: Sampling and surveys for CDM project activities and programmes of activities Version 04.0, Equation (30) of Appendix 3

Monitoring equipment	Not applicable																																	
Measuring/reading/recording frequency	<p>Adjusted for the loss of efficiency as per paragraph 25 (a) of the AMS-II.G version 08.0</p> <table border="1"> <tr> <th>N_{mp02}</th><th>Efficiency</th><th>Measuring/reading/recording frequency</th></tr> <tr> <td>Batch</td><td>S26-13</td><td></td></tr> <tr> <td>366-730</td><td>0.2712</td><td>Adjusted for the loss of efficiency as per paragraph 25 (a) of the AMS-II.G version 08.0</td></tr> <tr> <td>731-1095</td><td>0.2534</td><td>Adjusted for the loss of efficiency as per paragraph 25 (a) of the AMS-II.G version 08.0</td></tr> </table> <table border="1"> <tr> <th>N_{mp02}</th><th>Efficiency</th><th>Measuring/reading/recording frequency</th></tr> <tr> <td>Batch</td><td>S32-13</td><td></td></tr> <tr> <td>1-365</td><td>0.3870</td><td>Adjusted for the loss of efficiency as per paragraph 25 (a) of the AMS-II.G version 08.0</td></tr> <tr> <td>366-730</td><td>0.3496</td><td>Adjusted for the loss of efficiency as per paragraph 25 (a) of the AMS-II.G version 08.0</td></tr> </table> <table border="1"> <tr> <th>N_{mp02+}</th><th>Efficiency</th><th>Measuring/reading/recording frequency</th></tr> <tr> <td>Batch</td><td>S32-13</td><td></td></tr> <tr> <td>1-365</td><td>0.3870</td><td>Adjusted for the loss of efficiency as per paragraph 25 (a) of the AMS-II.G version 08.0</td></tr> </table>	N _{mp02}	Efficiency	Measuring/reading/recording frequency	Batch	S26-13		366-730	0.2712	Adjusted for the loss of efficiency as per paragraph 25 (a) of the AMS-II.G version 08.0	731-1095	0.2534	Adjusted for the loss of efficiency as per paragraph 25 (a) of the AMS-II.G version 08.0	N _{mp02}	Efficiency	Measuring/reading/recording frequency	Batch	S32-13		1-365	0.3870	Adjusted for the loss of efficiency as per paragraph 25 (a) of the AMS-II.G version 08.0	366-730	0.3496	Adjusted for the loss of efficiency as per paragraph 25 (a) of the AMS-II.G version 08.0	N _{mp02+}	Efficiency	Measuring/reading/recording frequency	Batch	S32-13		1-365	0.3870	Adjusted for the loss of efficiency as per paragraph 25 (a) of the AMS-II.G version 08.0
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Batch	S32-13																																	
1-365	0.3870	Adjusted for the loss of efficiency as per paragraph 25 (a) of the AMS-II.G version 08.0																																
Calculation method (if applicable)	<p>Please refer Section C.3.1 of this report for the justification of calculation method.</p> <p>Values for the following age group have been calculated as per the AMS-II.G version 08.0 Para 25 (a). Please refer ER sheet for the calculation details.</p> <table border="1"> <tr> <th>N_{mp02}</th><th>Efficiency</th><th>Efficiency</th></tr> <tr> <td>Batch</td><td>S26-13</td><td>S32-13</td></tr> <tr> <td>1 -365</td><td>Not applicable</td><td>0.3870</td></tr> <tr> <td>366-730</td><td>0.2712</td><td>0.3496</td></tr> <tr> <td>731-1095</td><td>0.2534</td><td>Not applicable</td></tr> </table> <table border="1"> <tr> <th>N_{mp02+}</th><th>Efficiency</th></tr> <tr> <td>Batch</td><td>S32-13</td></tr> <tr> <td>1-365</td><td>0.3870</td></tr> </table>	N _{mp02}	Efficiency	Efficiency	Batch	S26-13	S32-13	1 -365	Not applicable	0.3870	366-730	0.2712	0.3496	731-1095	0.2534	Not applicable	N _{mp02+}	Efficiency	Batch	S32-13	1-365	0.3870												
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N _{mp02+}	Efficiency																																	
Batch	S32-13																																	
1-365	0.3870																																	
QA/QC procedures	As per paragraph 25 (a) of the AMS-II.G version 08.0																																	
Purpose of data/parameter	Calculation of baseline emissions																																	

Additional comments	Values calculated as per the AMS-II.G version 08.0 Para 25 (a) are applicable only to this monitoring period
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Data / Parameter	Date of commissioning of project device <i>i</i>
Unit	Date
Description	Actual date of commissioning of the project device
Measured/calculated/default	Measured
Source of data	Project database
Value(s) applied	Refer project database
Monitoring equipment	Not applicable
Measuring/reading/recording frequency	Recorded at the time of distribution of project devices to the end user
Calculation method (if applicable)	The distribution is referred to the date on which end user has received project device
QA/QC procedures	If it was found that ICS is no longer in use during monitoring survey and spot checks, it was accounted as not in use over the entire monitoring period.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	The CME has considered next day after the date of distribution of ICS as the start date of crediting period of ICS. Electronic copy of data sources will be archived for at least two years after the end of the final crediting period or the last issuance of CERs, whichever occurs later.

Data / Parameter	Date of commissioning of batch <i>j</i>
Unit	Date
Description	To establish the date of commissioning, the Project Participant may opt to group the devices in "batches" and the latest date of commissioning of a device within the batch shall be used as the date of commissioning for the entire batch
Measured/calculated/default	Each sale was recorded in Project database along with the name of recipient, contact details, location of household (village, district etc)
Source of data	Project database
Value(s) applied	Not applicable
Monitoring equipment	Not applicable

Measuring/reading/recording frequency	Fixed and recorded at the time of commissioning/distribution of the last project device in the batch
Calculation method (if applicable)	Not applicable
QA/QC procedures	Not applicable
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	To establish the date of commissioning project device, the Project Participant has not opted to group the devices in "batches" and the actual date of distribution of each project device has been used. Therefore, reporting of this parameter is not applicable.

Data / Parameter	μ_y
Unit	Fraction
Description	Adjustment to account for any continued use of pre-project devices during the year y
Measured/calculated/default	Calculated
Source of data	MP02 monitoring survey
Values applied	μ_{MP02} : 0.84 μ_{MP02+} : 0.78
Monitoring equipment	Not applicable
Measuring/reading/recording frequency	At least once in every two years (biennial)
Calculation method (if applicable)	Household survey was conducted. The survey captured the cooking habits and ICS usage of households in the project area, including quantification of use of baseline devices, by formulating questions to determine the frequency of usage of both, the project devices and baseline devices. Sampling survey was carried out according to the sampling plan mentioned in section B.7.2 of the PoA-DD. Please refer Section C.3.1 of this report for the justification of calculation method. Lower Bound ¹⁵ value of the MP02 survey has been used for μ_{MP02+}
QA/QC procedures	A 95 per cent confidence interval and a 10 per cent margin of error has been selected
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	Electronic copy of data sources will be archived for at least two years after the end of the final crediting period or the last issuance of CERs, whichever occurs later.

¹⁵Lower Bound values have been calculated as per the Guideline: Sampling and surveys for CDM project activities and programmes of activities Version 04.0, Equation (30) of Appendix 3

Data / Parameter	$N_{d,HH}$						
Unit	Number						
Description	Number of project devices distributed per household						
Measured/calculated/default	Measured						
Source of data	Project database						
Value(s) applied	<table border="1"> <tr> <td>ICS Type</td><td>$N_{d,HH}$</td></tr> <tr> <td>S26-13</td><td>1</td></tr> <tr> <td>S32-13</td><td>1</td></tr> </table>	ICS Type	$N_{d,HH}$	S26-13	1	S32-13	1
ICS Type	$N_{d,HH}$						
S26-13	1						
S32-13	1						
Monitoring equipment	Not applicable						
Measuring/reading/recording frequency	Recorded at the time of distribution of project devices						
Calculation method (if applicable)	Recorded at the time of distribution of project devices and it was crosschecked with user details having number of ICS						
QA/QC procedures	CME has distributed only one improved stove per household. Therefore $N_{d,HH}$ is equal to one. Project database was checked and households that have received more than one ICS were identified and additional ICS(s) were removed from the project database and emission reduction calculation						
Purpose of data/parameter	Calculation of baseline emissions						
Additional comments	Electronic copy of data sources will be archived for at least two years after the end of the final crediting period or the last issuance of CERs, whichever occurs later.						

E.3. Implementation of sampling plan

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Sampling Plan for MP03

As explained in the Section C.3.1 of this report, no monitoring survey has been conducted for MP03. As per Section 4.8.1 of the General guidelines for SSC CDM methodologies version 23.1, the simplified requirement on monitoring of distributed units has been adopted for μ_y and $N_{y,li}$ parameters only.

Applicability of simplified requirement on monitoring of distributed units has been justified in the following table:

Table 8: Requirements of Simplified Monitoring of Distributed Units

Applicability		Justification
Paragraph	Description	
24	The simplified requirements described under section 4.8.2 below apply to:	a) (CPAs) solely comprises of distributed units. The annual

	<p>(a) Small-scale project activities (PAs) and component project activities (CPAs) solely comprising distributed units, to estimate parameter values required by the methodologies. Distributed units, in the context of monitoring surveys, are units of size equal to or below one per cent of Small-Scale CDM threshold (e.g. 150 kW of installed capacity for type I PAs/CPAs, 600 MWh of energy savings for type II PAs/CPAs and 600 tCO₂ of emission reductions for type III PAs/CPAs);</p> <p>(b) The parameters may include the fraction of operating/non-operating equipment and other parameters as required by the methodology;</p> <p>(c) The guidelines are also applicable to cases where single sampling plan is adopted for the PoA as per the CDM sampling standard (i.e. a common survey is conducted for a group of CPAs)</p>	<p>energy savings of each unit is less than 1800 MWh¹⁶.</p> <p>The actual annual energy savings has been mentioned in Table 2 of this report;</p> <p>b) The parameters include the fraction of operating/non-operating equipment and other parameters as required by the methodology¹⁷;</p> <p>c) Only one CPA has been included under the monitoring survey</p>
25	<p>The requirements in this document do not overrule any provisions in the approved methodologies (for example, methodology AMS-III.AR. version 4.0 allows, under certain conditions, project activities for distribution of LED lamps to claim emission reductions for a maximum of two years without a survey). The simplified requirements described under section 4.8.2 are applicable only if the applied methodology and the monitoring plan allow for biennial monitoring. If coordinating/managing entities or project participants choose to switch from annual monitoring to biennial monitoring to apply the provisions in the guidelines, the confidence/precision requirements of biennial monitoring stipulated in the applied methodology should be met, i.e. survey results show the confidence/precision of 95/10 (or 95/5 if it is specified in the applied methodology)</p>	<p>The applied methodology i.e. AMS-II.G version 08.0¹⁸ and the monitoring plan¹⁹ allow for biennial monitoring</p>
26	<p>To apply these simplified requirements, PAs/CPAs shall not have more than 24 months gap between consecutive surveys, and shall implement their first survey within 24 months of the implementation of the first unit of the PA/CPA</p>	<p>CPA will not have more than 24 months gap between consecutive surveys.</p> <p>The first survey was conducted on November 2018 and the first unit of the CPA was installed on 30 September 2017²⁰. Therefore, first survey was conducted within 24 months of the implementation of the first unit of the CPA</p>

¹⁶CPA 10415-P1-0002-CP1: Clean Energy Program Supported by Republic of Korea CPA MM 02. Registered CPA DD Section F, sub point F;

¹⁷Parameter $N_{y,i,j}$. Page 16 of this report

¹⁸AMS-II.G version 08.0 Data / Parameter table 8 and 9

¹⁹CPA 10415-P1-0002-CP1: Clean Energy Program Supported by Republic of Korea CPA MM 02. Registered CPA DD, page 22 and 24

²⁰Please refer Table 4 of this report

27	<p>PA/CPAs may apply the result of the surveys for monitoring period up to 12 months after the date of the survey</p> <p>if:</p> <p>(a) The average lifetime of the units is known and is four years or more. It shall also be confirmed by e.g. previous experience with similar technologies or manufacturer or the elements of the project design, in order to assure that the local conditions are unlikely to result in premature failure of the technology;</p> <p>(b) At least 50 per cent of the distributed units were functional in the previous survey undertaken by PAs/CPAs (this condition is applicable only after the first monitoring survey is concluded)</p>	<p>a) The average lifetime of the units is known and is more than four years²¹;</p> <p>b) More than 94 per cent distributed units were functional in the previous survey undertaken by the CPA²²;</p>
28	<p>PAs/CPAs may, instead of conducting a survey, assume zero per cent as the fraction of failure during the first 12 months after the implementation of the first unit in the PAs/CPA if:</p> <p>(a) They satisfy the conditions in paragraph 27; and</p> <p>(b) They have maintenance/service infrastructure evidenced through, for example:</p> <p>(i) Presence of a dedicated service team or a contract with a service provider with track record; or</p> <p>(ii) Maintenance logbook of the service team's activities; or</p> <p>(iii) Comprehensiveness of the scope for the warranty/service guarantee, applicable for the period</p>	<p>The concept of "fraction of failure" is suitable for lighting equipment such as LED lamps and solar lights.</p> <p>The CPA involves distribution of improved cookstoves. Therefore, this paragraph is not applicable</p>
29	<p>PAs/CPA if they satisfy the conditions in paragraph 27 but not paragraph 28. The failure fraction shall be based on the lifetime of the PAs/CPA's units and calculated as below:</p> $DFF = \frac{1}{2 \times LT} \text{Equation (1)}$ <p>Where:</p> <p>DFF = Conservative default failure fraction for the 12 months from PA/CPA's implementation starting date</p> <p>LT = Average lifetime of the distributed unit (year)</p>	<p>The concept of "fraction of failure" is suitable for lighting equipment such as LED lamps and solar lights.</p> <p>The CPA involves distribution of improved cookstoves. Therefore, this paragraph is not applicable</p>
30	<p>PAs/CPAs which do not satisfy the conditions in paragraph 27:</p> <p>(a) Shall not use a default failure fraction and shall survey the operation/failure fraction prior to their first verification; and</p> <p>(b) Shall not apply the result of their surveys for the</p>	<p>The CPA satisfies the conditions in paragraph 27, as proved above. Therefore, paragraph 30 is not applicable</p>

²¹CPA 10415-P1-0002-CP1: Clean Energy Program Supported by Republic of Korea CPA MM 02. Registered CPA DD, page 4 table 1

²²Monitoring report: 12 Jan 2019 - 12 Sep 2019 (10415-MP2-MRP1), page 20

	quantification of emission reductions of monitoring periods extending beyond the survey date	
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Actual and lower bound values of survey conducted for MP02, as applicable have been used to determine the values of monitoring parameters for MP03.

Sampling Plan of MP02 for CPA MM02 (Reference number - 10415-P1-0002-CP1)

The CPA involves distribution of ICS throughout the project area thereby replacing traditional cookstoves. The population is heterogeneous in nature i.e., common technology with similar operating characteristics but dispersed i.e., distribution of ICS is spread across many provinces. The population consists of sub-populations which are homogeneous called Strata. The characteristics of the population (for example quantity of biomass consumed) are more similar within the stratum (ICS of same type, age group and provinces in which they are operating) than across the strata. Therefore, Stratified Sampling technique was adopted to conduct sampling survey.

To ensure representativeness of the population, dissimilarity (such as ICS type, age group and provinces in which they are operating) within the included CPA has been considered in the sample size calculation. The ICS of same type, age group and province in which they are operating were grouped in the same strata.

(a) Procedure of Stratified Sampling

In stratified sampling, the population elements i.e., ICS shall be grouped into mutually exclusive, non-overlapping groups of sample units called strata. Every ICS can be assigned to only one stratum in such a way that no ICS will be excluded.

- 1) Segregating total number of ICS operating under the CPA into sub-groups or strata based on ICS type, age group and province where they are located;
- 2) Calculating total sample size and then sample size for each strata;
- 3) Drawing sample from each stratum according to the sample size through simple random sampling method using random number generator.

(b) Target population

The target population includes all ICS using Households (HHs) in the project database (PD), which are end-users of the project technology. This represented total 176,545 HHs.

(c) Sample Frame

Total number of ICS operating under the PoA were separated into sub-groups or strata based on ICS type (S26-13 and S32-13), age group (1 to 365 days and 366 to 730 days) and Region where they are located:

Table 9: Sample Frame

Region	Yangon		Ayeyarwady			Bago		Sagaing	Shan
ICS Model	S26-13				S32-13	S26-13			
Age (Days)	1-365	366-730	1-365	366-730	1-365	1-365	366-730	366-730	366-730
Sample Frame	14	728	2,566	1,438	169,548	56	297	1,379	519

(d) Sample Selection

A stratified sampling method has been used to select the sample for the project survey. Excel's built-in random number generator was used to generate random numbers. Sample size was calculated as per the formula described in the registered PoA DD. The expected values of parameters (standard deviation and proportion) have been determined by using the CME's knowledge and experience²³.

Table 10: Sample Size

Region		Yangon		Ayeyarwady			Bago		Sagaing	Shan
ICS Model		S26-13				S32-13	S26-13			
Age (Days)		1-365	366-730	1-365	366-730	1-365	1-365	366-730	366-730	366-730
Stratum Number		1	2	3	4	5	6	7	8	9
Sample Frame		14	728	2,566	1,438	169,548	56	297	1,379	519
Sample Size		1	1	2	1	93	1	1	1	1
$N_{y,i,j}$	Calculated									
	Actual	3	3	3	3	116	3	3	3	3
μ_y	Calculated	1	1	2	2	123	1	1	1	1
	Actual	2	3	3	2	109	2	3	3	3

(e) Survey

Data for $N_{y,i,j}$ and μ_y was collected through questionnaire form method. On-site survey was conducted to determine $N_{y,i,j}$ and μ_y by checking usage of ICS by the households. End user were interviewed to verify that ICS is still in use or not.

(f) Survey Results

Parameter	Expected Result	Precision Level		Actual Relative Precision	Actual Results	Lower Bound Values
		Confidence Level	Relative Precision			
$N_{y,i,j}$	0.80	95%	10%	4.45%	0.94	0.90
U_y	0.75			7.70%	0.84	0.78

²³Sampling and surveys for CDM project activities and programmes of activities, version 09.0, para 13

SECTION F. Calculation of emission reductions or net anthropogenic removals

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

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As per applicable methodology, AMS-II.G. version 08.0; formula to calculate emission reductions (ERs) is:

$$ER_y = \sum_i \sum_j ER_{y,i,j} - LE_y \quad \text{Equation (1)}$$

Where:

i	=	Indices for the situation where more than one type of project device is introduced to replace the pre-project devices ²⁴
j	=	Indices for the situation where there is more than one batch of project device
ER_y	=	Emission reductions during year y in t CO ₂ e
$ER_{y,i,j}$	=	Emission reductions by project device of type i and batch j during year y in t CO ₂ e
LE_y	=	Leakage emissions in the year y

Where:

Equation (2)

$$ER_{y,i,j} = B_{y,savings,i,j} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\ fossil\ fuel}$$

Where:

$B_{y,savings,i,j}$	=	Quantity of woody biomass that is saved in tonnes per cook stove device of type i and batch j during year y
$f_{NRB,y}$	=	Fraction of woody biomass that can be established as non-renewable biomass using survey methods or government data or default country specific fraction of non-renewable woody biomass (fNRB) values available on the CDM website
$NCV_{biomass}$	=	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')
$EF_{projected\ fossil\ fuel}$	=	Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 t CO ₂ /TJ ²⁵
$N_{y,i,j}$	=	Number of project devices of type i and batch j operating during year y
μ_y	=	Adjustment to account for any continued use of pre-project devices during the year y when applying equations 6 and 8 (fraction). Use 1.0 in other cases

To calculate $B_{y,savings,i,j}$ CPAs will use equation 6 of option 3 of the AMS-II.G version 08.0

²⁴For example, in some instances, full replacement of the pre-project device would require the implementation of more than one project device (e.g. one stove suitable for cooking and the other stove suitable for cooking/boiling water)

²⁵ This value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis. It is assumed that the mix of present and future fuels used would consist of a solid fossil fuel (lowest in the ladder of fuel choices), a liquid fossil fuel (represents a progression over solid fuel in the ladder of fuel use choices) and a gaseous fuel (represents a progression over liquid fuel in the ladder of fuel use choices). Thus a 50 per cent weight is assigned to coal as the alternative solid fossil fuel (96 t CO₂/TJ) and a 25 per cent weight is assigned to both liquid and gaseous fuels (71.5 t CO₂/TJ for kerosene and 63.0 t CO₂/TJ for liquefied petroleum gas (LPG))

$$B_{y,savings,i,j} = B_{old,i,j} \times \left(1 - \frac{\eta_{old,i,j}}{\eta_{new,i,j}}\right) \quad \text{Equation (6)}$$

Where:

- $B_{old,i,j}$ = Annual quantity of woody biomass that would have been used in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project device type i and batch j
- $B_{y=1,new,i,j,survey}$ = Quantity of woody biomass used by project devices in tonnes per device of type i and batch j
- $\eta_{new,i,j}$ = Efficiency of the device of each type i and batch j implemented as part of the project activity
- $\eta_{old,i,j}$ = Efficiency of pre - project device, which is a three stone fire using firewood (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney;

$$B_{old,i,j} = (B_{old,HH} / N_{d,HH}) \quad \text{Equation (9)}$$

Where:

- $B_{old,HH}$ = 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
- $N_{d,HH}$ = Number of project device per household

Formula to calculate baseline emissions (BE_y) is:

$$BE_y = \sum_i \sum_j ER_{y,i,j} + LE_y$$

Where:

- i = Indices for the situation where more than one type of project device is introduced to replace the pre-project devices²⁶
- j = Indices for the situation where there is more than one batch of project device
- BE_y = Baseline emissions avoided during year y in t CO₂e
- $ER_{y,i,j}$ = Emission reductions by project device of type i and batch j during year y in t CO₂e
- LE_y = Leakage emissions in the year y

Table 11: ER Calculation Parameters

S No	Description	Parameter	Unit	Value	Comment
1	Efficiency of pre - project device, which is a three stone fire using firewood	$\eta_{old,i,j}$	<i>Fraction</i>	0.10	Default value fixed ex ante at CPA level

²⁶For example, in some instances, full replacement of the pre-project device would require the implementation of more than one project device (e.g. one stove suitable for cooking and the other stove suitable for cooking/boiling water)

	(not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney				
2	Efficiency of the device of each type i and batch j implemented as part of the project activity	$\eta_{new, S 26 13 (mp02, 366 - 730)}$	Fraction	0.2712	Monitored at CPA level
		$\eta_{new, S 26 13 (mp02, 731 - 1095)}$		0.2534	
		$\eta_{new, S 32 13 (mp02, 1 - 365)}$		0.3870	
		$\eta_{new, S 32 13 (mp02, 366 - 730)}$		0.3496	
		$\eta_{new, S 32 13 (mp02 + , 1 - 365)}$		0.3870	
3	Adjustment to account for any continued use of pre-project devices during the year y when applying equations 6 and 8 (fraction). Use 1.0 in other cases	μ_{MP02}	Fraction	0.84	Monitored at CPA level
		μ_{MP02+}		0.78	
4	Fraction of non-renewable biomass	f_{NRB}	Fraction	0.8832	Fixed ex ante at CPA level
5	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')	$NCV_{biomass}$	TJ/tonne	0.015	Default value fixed ex ante at PoA level
6	Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 t CO ₂ /TJ	$EF_{projected fossil fuel}$	tCO ₂ e/TJ	81.6	Default value fixed ex ante at PoA level
7	Leakage Factor	LF	Factor	Net to gross adjustment factor of 0.95. Fixed Ex ante at PoA level	Net to gross adjustment factor of 0.95. Fixed Ex ante at PoA level
8	Number of project devices of type i and batch j operating during year y	$N_{y,i,j}$	Number	271,076 ²⁷	Calculated

²⁷Please refer Section E.2 , Data/Parameter table $N_{y,i,j}$ of this report for breakdown by device type and batch

9	Annual quantity of woody biomass that would have been used in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project device type i and batch j	$B_{old,i,j}$		tonnes/hh/yr	4.18	Calculated at CPA level
10	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	$B_{old,HH}$		tonnes/hh/yr	4.18	Historical data. Fixed Ex ante at PoA level
11	Number of project device per household	$N_{d,HH}$		Number	1	Monitored at CPA level
12	Leakage emissions per ICS in the year y	N_{mp02}	$LE_{y,S2613}(mp02,366-730)$	tCO_2e	0.1132	Calculated
			$LE_{y,S2613}(mp02,731-1095)$		0.1085	
			$LE_{y,S3213}(mp02,1-365)$		0.1330	
			$LE_{y,S3213}(mp02,366-730)$		0.1280	
		N_{mp02+}	$LE_{y,S3213}(mp02+,1-365)$		0.1173	
13	Emission reductions by each project device of type i during year y in tCO_2e	N_{mp02}	$ER_{y,2613}(mp02,366-730)$	tCO_2e	2.1503	Calculated
			$ER_{y,S2613}(mp02,731-1095)$		2.0621	
			$ER_{y,S3213}(mp02,1-365)$		2.5262	
			$ER_{y,S3213}(mp02,366-730)$		2.4320	
		N_{mp02+}	$ER_{y,S3213}(mp02+,1-365)$		2.2278	
14	Baseline emissions avoided by each project device of type i during year y in tCO_2e	N_{mp02}	$BE_{y,S2613}(mp02,366-730)$	tCO_2e	2.3767	Calculated
			$BE_{y,S2613}(mp02,731-1095)$		2.2792	
			$BE_{y,S3213}(mp02,1-365)$		2.7921	
			$BE_{y,S3213}(mp02,366-730)$		2.6880	
		N_{mp02+}	$BE_{y,S3213}(mp02+,1-365)$		2.4623	

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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AMS-II.G., version 08.0 suggests two sources of leakage:

- a) Leakage related to the non-renewable woody biomass saved by the project activity. This was assessed by the following method:

$B_{y,savings,i,j}$ is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.

Table 12: Leakage Calculation per unit

ICS Group	Model	Formula	Value
Nmp02	$LE_{y,S2613(mp02,366-730)/unit/yr}$	$B_{y,savings,S2613(mp02,366-730)} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil\ fuel}^* (1-0.95)$	0.1132
	$LE_{y,S2613(mp02,731-1095)/unit/yr}$	$B_{y,savings,S2613(mp02,731-1095)} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil\ fuel}^* (1-0.95)$	0.1085
	$LE_{y,S3213(mp02,366-730)/unit/yr}$	$B_{y,savings,S3213(mp02,366-730)} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil\ fuel}^* (1-0.95)$	0.1280
	$LE_{y,S3213(mp02,1-365)/unit/yr}$	$B_{y,savings,S3213(mp02,1-365)} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil\ fuel}^* (1-0.95)$	0.1330
Nmp02+	$LE_{y,S3213(mp02+,1-365)/unit/yr}$	$B_{y,savings,S3213(mp02+,1-365)} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil\ fuel}^* (1-0.95)$	0.1173

Table 13: Leakage Calculation²⁸

ICS Group	Model	Formula
Nmp02	$LE_{y,S2613(mp02,366-730)/yr}$	$B_{y,savings,S2613(mp02,366-730)} \times N_{y,S2613(mp02,366-730)} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil\ fuel}^* (1-0.95)$
	$LE_{y,S2613(mp02,731-1095)/yr}$	$B_{y,savings,S2613(mp02,731-1095)} \times N_{y,S2613(mp02,731-1095)} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil\ fuel}^* (1-0.95)$
	$LE_{y,S3213(mp02,366-730)/yr}$	$B_{y,savings,S3213(mp02,366-730)} \times N_{y,S3213(mp02,366-730)} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil\ fuel}^* (1-0.95)$
	$LE_{y,S3213(mp02,1-365)/yr}$	$B_{y,savings,S3213(mp02,1-365)} \times N_{y,S3213(mp02,1-365)} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil\ fuel}^* (1-0.95)$
Nmp02 +	$LE_{y,S3213(mp02+,1-365)/yr}$	$B_{y,savings,S3213(mp02+,1-365)} \times N_{y,S3213(mp02+,1-365)} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil\ fuel}^* (1-0.95)$

- b) If devices currently being utilised outside the project boundary are transferred to the project activity, then leakage is to be considered.

No transfer of project devices from outside to the project activity area, hence this type of leakage was not considered.

²⁸Actual calculations are provided in the ER calculation sheets

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
10415-P1-0002-CP1	470,521	0	23,526	0	446,995	0	446,995
Total	470,521	0	23,526	0	446,995	0	446,995

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 (tCO ₂ e)	Amount estimated ex ante for this monitoring period in the CPA-DD (t CO ₂ e)
10415-P1-0002-CP1	446,995	484,380
Total	446,995	484,380

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

>>

As per the registered CPA DD, for ICS S26-13 annual emission reductions of 2.276 tCO₂e/unit/yr and for ICS S32-13 annual emission reductions of 2.581 tCO₂e/unit/yr were estimated. Therefore, following unitary method, the amount of estimated ex-ante for this monitoring period has been identified.

Table 14: Estimated Ex-ante Calculation²⁹

CPA	ERs in MP03	Ex-Ante ERs
Total	446,995	484,380

F.6. Remarks on increase in achieved emission reductions

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There is no increase in the achieved emission reductions.

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

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According to the registered CPA DD section *F* subsection *k*- *Where applicable, the conditions that ensure that every CPA meets the small-scale or microscale threshold and remains within those thresholds throughout the crediting period of the CPA. However, for a CPA that consists of only units that qualify as microscale CDM units” as defined in the methodological tool “Demonstration of additionality of microscale project activities”, this condition is not required.*

²⁹Please refer ER calculation sheets for the details

As per the table below, the annual energy savings is less than 1% of the small-scale CDM thresholds i.e., 1800 MWh^{th30} and satisfies the condition i.e., annual energy savings of no more than 20 GWh/year to qualify as a microscale CDM unit³¹. Therefore, compliance of the CPA with the small-scale thresholds at the aggregate level of the CPA is not required.

Table 15: Annual Energy Savings per ICS in MWh^{th32}

Age	ICS Model		
	ICS S26-13 (N _{mp02})	ICS S32-13 (N _{mp02})	ICS S32-13 (N _{mp02+}) ³³
1-365	Not Applicable	12.93	12.93
366-730	11.01	12.45	Not Applicable
731-1095	10.55	Not Applicable	Not Applicable

³⁰CDM project standard for programmes of activities version 02.0. Paragraph 126

³¹CDM project standard for programmes of activities version 02.0. Paragraph 128

³²Please refer ER calculation sheets for the details

³³Nmp02 and Nmp02+ has been defined in the section C.3.1 of this report

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.
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