



**Monitoring report form for CDM programme of activities  
(Version 03.0)**

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

**MONITORING REPORT**

<b>Title of the PoA</b>	Clean Energy Program Supported by Republic of Korea	
<b>UNFCCC reference number of the PoA</b>	10415	
<b>Version numbers of the PoA-DD applicable to this monitoring report</b>	2.0	
<b>Version number of this monitoring report</b>	1.0	
<b>Completion date of this monitoring report</b>	05/11/2020	
<b>Monitoring period number</b>	Third monitoring period	
<b>Duration of this monitoring period</b>	13/09/2019 to 22/06/2020 (including both days)	
<b>Monitoring report number for this monitoring period</b>	1	
<b>Coordinating/managing entity</b>	ECOYE Co., LTD	
<b>Host Parties</b>	<b>Host Party of the PoA</b>	<b>Is this the host Party of a CPA covered in this monitoring report? (yes/no)</b>
	Myanmar	Yes
<b>Applied methodologies and standardized baselines</b>	AMS-II.G, version 08	
<b>Sectoral scopes</b>	Sectoral scope 3 (Energy Demand)	
<b>Amount of GHG emission reductions or net anthropogenic GHG removals achieved by all CPAs covered in this monitoring report in this monitoring period</b>	<b>Amount achieved before 1 January 2013</b>	<b>Amount achieved from 1 January 2013</b>
	0 tCO <sub>2</sub> e	467761 tCO <sub>2</sub> e
<b>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</b>	489564 tCO <sub>2</sub> e	

## PART I Monitoring of programme of activities (PoA)

### SECTION A. Description of PoA

#### A.1. General description of PoA

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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 cooking<sup>1</sup>.

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(s) 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 degrades 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.

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<sup>1</sup> The 2014 Myanmar Population and Housing Census Highlights of the Main Results Census Report Volume 2 – A, Pg 32 ([http://myanmar.unfpa.org/sites/asiapacific/files/pub-pdf/Census%20Highlights%20Report%20-%20ENGLISH%20\(1\).pdf](http://myanmar.unfpa.org/sites/asiapacific/files/pub-pdf/Census%20Highlights%20Report%20-%20ENGLISH%20(1).pdf))

**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

**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**

&gt;&gt;

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

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

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

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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
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ECOYE Co., LTD	<p>As a CME, ECOYE Co., LTD is responsible:</p> <ul style="list-style-type: none"> <li>• To sign agreements with CPA implementers;</li> <li>• 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);</li> <li>• To review and assist in the selection and preparation of CPAs, ensuring that all CPAs fulfils the eligibility criteria and neither registered as an individual CDM project activity nor included in another registered PoA ;</li> <li>• 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 unit<sup>2</sup>;</li> <li>• To ensure that the same approved baseline and monitoring methodology is applied to all the CPAs;</li> <li>• To establish CER ownership agreements with the CPA implementers;</li> <li>• To train and supervise CPA implementer in data collection and archiving;</li> <li>• To ensure that the CPA implementers maintain and provide monitoring data for calculating CERs;</li> <li>• To plan and manage validation and verification process;</li> <li>• To establish and manage the database for calculating CERs based on data received from the CPA implementers</li> </ul>	<p>ECOYE 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>
CPA implementers	<p>The role of CPA implementers is detailed below:</p> <ul style="list-style-type: none"> <li>• To disseminate ICS;</li> <li>• To institute adequate data collection and archiving systems;</li> <li>• To establish quality control procedures for all monitoring parameters;</li> <li>• To monitor and record the data</li> </ul>	<p>CPA implementer and 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>

<sup>2</sup>Methodological tool Demonstration of additionality of microscale project activities Version 08.0. Paragraph 8 (c,i), 9 (b,i) and 10 (b,i)

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

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

- 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: S 26-13 and S 32-13 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 product database.

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.

**B.2. Post-registration changes to PoA****B.2.1. Corrections**

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

**B.2.2. Inclusion of monitoring plan**

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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**

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

**B.2.4. Changes to programme design**

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No change in the programme design.

**B.2.5. Changes specific to afforestation or reforestation activities**

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Not applicable.

**PART II Monitoring of CPAs**

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**SECTION C. Implementation of CPAs****C.1. Description of implemented CPAs**

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The proposed 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 S 32-13. 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<sup>th3</sup>

Age	ICS Model		
	ICS 26-13 (Nmp02)	ICS 32-13 (Nmp02)	ICS 32-13 (Nmp02+) <sup>4</sup>
1-365	Not Applicable	12.94	12.94

<sup>3</sup> Please refer ER calculation sheets for the details

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

366-730	11.60	12.88	Not Applicable
731-1095	11.50	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 MWhth<sup>5</sup> and also satisfies the condition i.e. annual energy savings of no more than 20 GWh/year to qualify as a microscale CDM unit<sup>6</sup>.

Technical description of the ICS under the CPA- S 26-13 and S 32-13 is given below:



Figure 1 ICS S 26-13



Figure 2 ICS S 32-13

Table 3: Technical Description of the ICS S 26-13 and S 32-13<sup>7</sup>

S.No	Parameter	S 26-13	S 32-13
1	Specific Fuel Consumption	0.035 MJ/min/L <sup>8</sup>	0.039 MJ/min/L <sup>9</sup>
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	Stove body: 0.5mm cold roll sheet

<sup>5</sup> CDM project standard for programmes of activities version 02.0. Paragraph 122

<sup>6</sup> Methodological tool Demonstration of additionality of microscale project activities Version 09.0. Paragraph 12

<sup>7</sup> Manufacturer specification

<sup>8</sup> S 26-13 WBT certificate

<sup>9</sup> S 32-13 WBT certificate

		Chamber: 1mm stainless steel, Grade 201 Stovetop: cast iron	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	30/09/2017
Distribution date of last ICS included in this monitoring period	19/06/2020

## C.2. Location of CPAs

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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>



Figure 3 Geographic Boundary of the CPA: The Republic of the Union of Myanmar



### 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

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CPA -10415-P1-0002-CP1 got second issuance 10415-MP2-IRP1 (hereinafter MP02). The crediting period for MP02 was from 12 January 2019 to 12 September 2019 and the monitoring survey and WBTs were conducted in September-October 2019.

Now, the CPA has proposed third issuance request i.e. MP03 with crediting period, 13 September 2019 to 22 June 2020. Ideally, monitoring survey should have been conducted in month of June 2020. However, because of pandemic COVID-19 it wasn't possible to conduct a new monitoring survey or WBTs. Therefore, clarification request SSC\_781 was submitted to seek temporary relief from conducting fresh monitoring 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 23.0, 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 <sup>10</sup>	No	Not applicable
	$N_{MP02+}$ : Number of project devices distributed during MP03	Lower bound of MP02 monitoring survey data	SSC_781	Yes	MP03

<sup>10</sup> General guidelines for SSC CDM methodologies Version 23.0 footnote 4

$\mu_{MP03}$ : Adjustment to account for any continued use of pre-project devices during the monitoring period. For project devices operating during MP03.	$\mu_{MP02}$ : For project devices operating during MP02	MP02 monitoring survey data	Survey data is valid for the period of 12 months <sup>11</sup>	No	Not applicable
	$\mu_{MP02+}$ : For of project devices distributed during MP03	Lower bound of MP02 monitoring survey data	SSC_781	Yes	MP03
$\eta_{new}$ Efficiency of the project device	$\eta_{1-365}$ Efficiency of the project devices which are 1-365 days old	MP02 WBT data	Survey data is valid for the period of 12 months <sup>12</sup>	No	Not applicable
	$\eta_{366-730}$ Efficiency of the project devices which are 366-730 days old	MP02 WBT results	Survey data are valid for the period of 12 months <sup>13</sup>	No	Not applicable
	$\eta_{731-1095}$ Efficiency of the project devices which are 731-1095 days old	Lower bound of MP02 WBT results	SSC_781	Yes	MP03

**C.3.2. Corrections**

&gt;&gt;

Not applicable

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

&gt;&gt;

Not applicable

**C.3.4. Inclusion of monitoring plan**

&gt;&gt;

Not applicable

**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**

&gt;&gt;

Not applicable

<sup>11</sup> General guidelines for SSC CDM methodologies Version 23.0 footnote 4<sup>12</sup> General guidelines for SSC CDM methodologies Version 23.0 footnote 4<sup>13</sup> General guidelines for SSC CDM methodologies Version 23.0 footnote 4

**C.3.6. Changes to project design**

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Not applicable

**C.3.7. Changes specific to afforestation or reforestation CPA**

&gt;&gt;

Not applicable

**SECTION D. Description of monitoring system of CPAs**

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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 digits 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 product 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	
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### Survey Team

The sample survey was conducted by the CME. Survey team was supervised and trained by the CME. Survey team consists 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

## 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"> <li>SSC WG 35th meeting Report, Annex 20, Eq 3</li> <li>FAO Forest Resource Assessment (FRA) 2015</li> <li>2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 4, Table 4.9</li> <li><a href="http://www.fao.org/docrep/004/Y1997E/y1997e21.htm">http://www.fao.org/docrep/004/Y1997E/y1997e21.htm</a></li> </ul>
Value(s) applied	0.8832
Choice of data or measurement methods and procedures	<p><u>Choice of Data</u> Option A, paragraph 43 of the applied methodology AMS-II.G. version 08</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> The measurement procedure is based on Equation 11 of the AMS-II.G. version 08 and approach mentioned in Annex 20 of the SSC WG 35<sup>th</sup> meeting report</p>
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	Parameter is fixed ex ante at CPA level

<b>Data / Parameter</b>	NCV <sub>biomass</sub>
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 ver 08- 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

<b>Data / Parameter</b>	$\eta_{old}$
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 ver 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 ver 08.0
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	The parameter value is fixed ex ante at CPA level.

<b>Data / Parameter</b>	$EF_{projected\_fossilfuel}$
Unit	tCO <sub>2</sub> e/t
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 ver 08- page 5
Value(s) applied	81.6
Choice of data or measurement methods and procedures	Default value suggested in AMS.II-G ver 08.0
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	The parameter value is fixed ex ante at PoA level

<b>Data / Parameter</b>	$LF_y$
Unit	Fraction
Description	Leakage adjustment factor
Source of data	AMS II.G version 08. Para 42 c
Value(s) applied	0.95
Choice of data or measurement methods and procedures	As per the methodology AMS II.G ver 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

<b>Data / Parameter</b>	Life Span
Unit	Number of years
Description	Operating life time of S 26-13 and S 32-13
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

<b>Data / Parameter</b>	$B_{old,HH}$
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 ( <a href="http://data.un.org/Data.aspx?d=EDATA&amp;f=cmID%3AFW%3BtrID%3A1231">http://data.un.org/Data.aspx?d=EDATA&amp;f=cmID%3AFW%3BtrID%3A1231</a> ) year 2016 The 2014 Myanmar Population and Housing Census The Union Report Census Report Volume 2, 2015 Table 13 ( <a href="https://myanmar.unfpa.org/en/publications/union-report-volume-2-main-census-report">https://myanmar.unfpa.org/en/publications/union-report-volume-2-main-census-report</a> )
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

<b>Data / Parameter</b>	$B_{old,i,j}$
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 ver 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 monitoring survey
Value(s) of monitored parameter	270953
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 (S 32-13 and S 26-13) 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 (S 32-13 and S 26-13) 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>
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.</p> <p>Electronic copy of data sources will be archived for two years</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	Water Boiling Test Results



Value(s) applied	ICS Model	Age (Days)	$\eta_{new,i,j}$							
	S 26-13	731-1095	0.2936 <sup>14</sup>							
		366-730	0.2989							
		1-365	0.2962							
	S 32-13	366-730	0.3831 <sup>15</sup>							
		1-365	0.3879							
Monitoring equipment	Equipment	Accuracy	Calibration Date	Recommended Next Calibration Date	Frequency					
	Electronic weighing machine	1 gram	18/01/2019	17/01/2020	Annual					
	Digital Thermometer	0.1 C	17/09/2019	17/09/2020	Annual					
	Digital Moisture meter	0.1%	25/09/2019	25/09/2020	Annual					
Measuring/reading/recording frequency	Adjusted for the loss of efficiency as per paragraph 25 (d) of the AMS-II.G ver 08									
Calculation method (if applicable)	As per the registered CPA-DD page 22 and 23, nine stoves: 3 units of S26-13 (more than 1 year old) 3 units of S26-13 (less than 1 year old) and 3 units of S32-13 (less than 1 year old), with three tests conducted for each stove therefore, total twenty-seven tests were conducted									
	The standard deviation of the twenty-seven test results is narrow and 90/10 precision requirement is met									
	ICS Model	Age (Days)	SD	Margin of Error						
	S 26-13	366-730	0.0098	1.79%						
		1-365	0.0231	4.28%						
	S 32-13	1-365	0.0088	1.25%						
QA/QC procedures	Lower bound values have been used for the following:									
	ICS Model		Age (Days)							
	S 26-13		731-1095							
	S 32-13		366-730							
Purpose of data	Calculation of baseline emissions									
Additional comments	For the subsequent monitoring of the same CPA, the previously monitored value of thermal efficiency shall be used for ex-ante purposes. If thermal efficiency of the project devices falls below 20 percent no emission reductions will be claimed									

<sup>14</sup> Lower Bound value. Please refer the ER calculation sheets for the details

<sup>15</sup> Lower Bound value. Please refer the ER calculation sheets for the details

<b>Data / Parameter</b>	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	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 record will be archived for 2 years

<b>Data / Parameter</b>	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 will be 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	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.

<b>Data / Parameter</b>	$\mu_y$
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	$\mu_{MP02}$ : 0.8440 $\mu_{MP02+}$ : 0.8141
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. Lower Bound value has been used for $\mu_{MP02+}$
QA/QC procedures	A 95 per cent confidence interval and a 10 per cent margin of error has been selected
Purpose of data	Calculation of baseline emissions
Additional comments	All data sources will be archived for two years

<b>Data / Parameter</b>	$N_{d,HH}$
Unit	Number
Description	Number of project devices distributed per household
Measured/calculated/default	Measured

Source of data	Project database	
Value(s) applied	ICS Type	$N_{d,HH}$
	S 26-13	1
	S 32-13	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 householdsthathave received more than one ICS were identified and additional ICS(s) were removed from the project database and emission reduction calculation.	
Purpose of data	Calculation of baseline emissions	
Additional comments	All data sources will be archived for two years	

### 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 23.0, the simplified requirement on monitoring of distributed units has been adopted.

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	<p>The simplified requirements described under section 4.8.2 below apply to:</p> <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 tCO<sub>2</sub> 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>a) (CPAs) solely comprises of distributed units. The annual energy savings of each unit is less than 600 MWh<sup>16</sup>.</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 methodology<sup>17</sup>;</p>

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

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

	(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)	c) Only one CPA has been included under the monitoring survey
25	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)	The applied methodology i.e. AMS-II.G version 08 <sup>18</sup> and the monitoring plan <sup>19</sup> allow for biennial monitoring
26	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	CPA will not have more than 24 months gap between consecutive surveys.  The first survey was conducted on November 2018 and the first unit of the CPA was installed in 30 September 2017 <sup>20</sup> . Therefore, first survey was conducted within 24 months of the implementation of the first unit of the CPA
27	PA/CPAs may apply the result of the surveys for monitoring period up to 12 months after the date of the survey  if:  (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;	a) The average lifetime of the units is known and is more than four years <sup>21</sup> ;  b) More than 94 per cent distributed units were functional in the previous survey undertaken by the CPA <sup>22</sup> ;

<sup>18</sup> AMS-II.G ver 08. Data / Parameter table 8 and 9

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

<sup>20</sup> Table 4 of this report

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

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

	(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)	
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> <p>Equation (1)</p> <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 quantification of emission reductions of monitoring periods extending beyond the survey date</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>

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 for MP02

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 taken into account 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 175,015 HHs.

*(c) Sample Frame*

Total number of ICS operating under the PoA were separated into sub-groups or strata based on ICS type (S 26-13 and S 32-13), age group (1 to 365 days and 366 to 730) and Region where they are located:

Table 9: Sample Frame

Region	Yangon		Ayeyarwady			Bago		Sagaing	Shan
ICS Model	S 26-13				S 32-13	S 26-13			
Age (Days)	1-365	366-730	1-365	366-730	1-365	1-365	366-730	366-730	366-730
Sample Frame	14	728	2566	1438	168018	56	297	1379	519

*(d) Sample Selection*

A stratified sampling method has been used to select the sample for PS. 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 (mean, standard deviation and proportion) have been determined by using the CME's knowledge and experience<sup>23</sup>.

Table 10: Sample Size

Region	Yangon		Ayeyarwady			Bago		Sagaing	Shan
ICS Model	S 26-13				S 32-13	S 26-13			
Age (Days)	1-365	366-730	1-365	366-730	1-365	1-365	366-730	366-730	366-730

<sup>23</sup> Sampling and surveys for CDM project activities and programmes of activities, version 07.0, para 12 (b) and 12 (c)

Sample Frame	14	728	2566	1438	168018	56	297	1379	519
Sample Size	1	1	2	1	93	1	1	1	1
$N_{y,i}$ Calculated									
$\mu_y$ Calculated	1	1	2	2	123	1	1	2	1
$\eta_{new,i,j}$	As per the registered CPA DD page 22 and 23, nine stoves: 3 units of S26-13 (more than 1 year old) 3 units of S26-13 (less than 1 year old) and 3 units of S32-13 (less than 1 year old), with three tests conducted on each stove therefore total twenty seven tests were conducted								

## Result-Thermal Efficiency

ICS Model	Age (Days)	Confidence Interval	Margin of Error	$\eta_{new,i,j}$	SD	Margin of Error
S 26-13	366-730	90	10	0.2989	0.0098	1.79%
	1-365	90	10	0.2962	0.0231	4.28%
S 32-13	1-365	90	10	0.3879	0.0088	1.25%

ICS Model	Age (Days)	Confidence Interval	Margin of Error	$\eta_{new,i,j}$	SD	Margin of Error
S 26-13	366-730	90	10	0.2989	0.0098	1.79%
	1-365	90	10	0.2962	0.0231	4.28%
S 32-13	1-365	90	10	0.3879	0.0088	1.25%

## (e) Survey

Data for  $N_{y,i,j}$  and  $\mu_y$  was collected through questionnaire form method and for  $\eta_{new,i,j}$  by conducting the WBT.

On-site survey was conducted to determine  $N_{y,i,j}$ ,  $\mu_y$  by checking usage of ICS by the households. End user were interviewed to verify that ICS is still in use or not.

**SECTION F. Calculation of emission reductions or net anthropogenic removals****F.1. Calculation of baseline emissions or baseline net removals**

&gt;&gt;

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<sup>26</sup>
- $j$  = Indices for the situation where there is more than one batch of project device
- $ER_y$  = Emission reductions during year  $y$  in t CO<sub>2</sub>e
- $ER_{y,i,j}$  = Emission reductions by project device of type  $i$  and batch  $j$  during year  $y$  in t CO<sub>2</sub>e

<sup>24</sup> Expected Result-0.80, Confidence Interval 95%, Margin of Error 10%

<sup>25</sup> Expected Result-0.75, Standard Deviation 0.4, Confidence Interval 95%, Margin of Error 10%

<sup>26</sup> For 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)



$LE_y$  = Leakage emissions in the year  $y$

Where

$$ER_{y,i,j} = B_{y,savings,i,j} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossil\ fuel} \quad \text{Equation (2)}$$

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 ( $f_{NRB}$ ) 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')
- $EF_{projected\_fossilfuel}$  = 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<sub>2</sub>/TJ<sup>27</sup>
- $N_{y,i,j}$  = Number of project devices of type  $i$  and batch  $j$  operating during year  $y$
- $\mu_y$  = 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.Gver 08

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

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
- (f)
- $\eta_{old,i,j}$  = 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

<sup>27</sup> 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 CO<sub>2</sub>/TJ) and a 25 per cent weight is assigned to both liquid and gaseous fuels (71.5 t CO<sub>2</sub>/TJ for kerosene and 63.0 t CO<sub>2</sub>/TJ for liquefied petroleum gas (LPG))

$B_{old,HH}$  = 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

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 (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney	$\eta_{old,i,j}$	Fraction	0.10	Default value fixed ex ante at CPA level
2	Efficiency of the device of each type i and batch j implemented as part of the project activity	$\eta_{new,i,j,S26-13}$ (366–730)	Fraction	0.2989	Monitored at CPA level
		$\eta_{new,i,j,S26-13}$ (731–1095)		0.2936	
		$\eta_{new,i,j,S32-13}$ (1–365)		0.3879	
		$\eta_{new,i,j,S32-13}$ (366–730)		0.3831	
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	$\mu_{MP02}$	Fraction	0.84	Monitored at CPA level
		$\mu_{MP02+}$		0.81	
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 <sub>2</sub> /TJ	$EF_{projected\_fossilfuel}$	tCO <sub>2</sub> e/t	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	270953	Calculated
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 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 $y$	Nmp02	$LE_{i,j,S26-13}$ (366-730)	tCO <sub>2</sub> e	0.1193	Calculated
			$LE_{i,j,S26-13}$ (731-1095)		0.1182	
			$LE_{j,S32-13}$ (1-365)		0.1331	
			$LE_{j,S32-13}$ (366-730)		0.1325	
		Nmp02+	$LE_{j,S32-13}$ (1-365)		0.1225	
13	Emission reductions by each project device of type $i$ during year $y$ in t CO <sub>2</sub> e	Nmp02	$ER_{i,j,S26-13}$ (366-730)	tCO <sub>2</sub> e	2.2669	Calculated
			$ER_{i,j,S26-13}$ (731-1095)		2.2462	
			$ER_{j,S32-13}$ (1-365)		2.5283	
			$ER_{j,S32-13}$ (366-730)		2.5172	
		Nmp02+	$ER_{j,S32-13}$ (1-365)		2.3268	

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

&gt;&gt;

Not applicable.

## F.3. Calculation of leakage emissions

&gt;&gt;

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

ICS Group	Model	Formula	Value
Nmp02	$LE_{i,j,S26-13}^{(366-730)/unit/yr}$	$B_{y,savings,i,j,26-13(366-730)} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossil\ fuel} * (1-0.95)$	0.1193
	$LE_{i,j,S26-13}^{(730-1095)/unit/yr}$	$B_{y,savings,i,j,26-13(1-365)} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossil\ fuel} * (1-0.95)$	0.1182
	$LE_{j,S32-13}^{(366-730)/unit/yr}$	$B_{y,savings,i,j,32-13(1-365)} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossil\ fuel} * (1-0.95)$	0.1325
	$LE_{j,S32-13}^{(1-365)/unit/yr}$	$B_{y,savings,i,j,32-13(1-365)} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossil\ fuel} * (1-0.95)$	0.1331
Nmp02+	$LE_{j,S32-13}^{(1-365)/unit/yr}$	$B_{y,savings,i,j,32-13(1-365)} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossil\ fuel} * (1-0.95)$	0.1225

- 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.

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

CPA UNFCCC reference number	Baseline GHG emissions or baseline net GHG removals (t CO <sub>2</sub> e)	Project GHG emissions or actual net GHG removals (t CO <sub>2</sub> e)	Leakage GHG emissions (t CO <sub>2</sub> e)	GHG emission reductions or net anthropogenic GHG removals (t CO <sub>2</sub> e)		
				Before 01/01/2013	From 01/01/2013	Total amount
10415-P1-0002-CP1	492447	0	24686	0	467761	467761
<b>Total</b>	492447	0	24686	0	467761	467761

#### 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 <sub>2</sub> e)	Amount estimated ex ante for this monitoring period in the CPA-DD (t CO <sub>2</sub> e)
10415-P1-0002-CP1	467761	489564
<b>Total</b>	467761	489564

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

&gt;&gt;

As per the registered CPA DD, for ICS S 26-13 annual emission reductions of 2.276 tCO<sub>2</sub>e/unit/yr and for ICS S32-13 annual emission reductions of 2.581 tCO<sub>2</sub>e/unit/yr were estimated. Therefore, following unitary method, the amount of estimated ex-ante for this monitoring period has been identified.

Table 13: Estimated Ex-ante Calculation<sup>28</sup>

CPA	ERs in MP03	Ex-Ante ERs
Total	467761	489564

### F.6. Remarks on increase in achieved emission reductions

&gt;&gt;

There is no increase in the achieved emission reductions.

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

&gt;&gt;

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.*

As per the table below, the annual energy savings is less than 1% of the small-scale CDM thresholds i.e. 1800 MWh<sup>29</sup> and also satisfies the condition i.e. annual energy savings of no more than 20 GWh/year to qualify as a microscale CDM unit<sup>30</sup>. Therefore compliance of the CPA with the small-scale thresholds at the aggregate level of the CPA is not required.

Table 14: Annual Energy Savings per ICS in MWh<sup>th31</sup>

Age	ICS Model		
	ICS 26-13 (Nmp02)	ICS 32-13 (Nmp02)	ICS 32-13 (Nmp02+) <sup>32</sup>
1-365	Not Applicable	12.94	12.94
366-730	11.60	12.88	Not Applicable
731-1095	11.50	Not Applicable	Not Applicable

<sup>28</sup> Please refer ER calculation sheet for details

<sup>29</sup> CDM project standard for programmes of activities version 02.0. Paragraph 122

<sup>30</sup> Methodological tool Demonstration of additionality of microscale project activities Version 09.0. Paragraph 12

<sup>31</sup> Please refer ER calculation sheets for the details

<sup>32</sup> Nmp02 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>
03.0	31May 2019	Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with version 02.0 of the “CDM project standard for programmes of activities” (CDM-EB93-A07-STAN);</li> <li>• Add a section on remarks on the observance of the scale limit of small-scale CPAs during the crediting periods;</li> <li>• Add "changes specific to afforestation or reforestation activities/CPA" as a possible post-registration changes;</li> <li>• Clarify the reporting of net anthropogenic GHG removals for A/R PoAs between two commitment periods;</li> <li>• Make structural and editorial improvements.</li> </ul>
02.0	7 June 2017	Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with version 01.0 of the “CDM project standard for programmes of activities (CDM-EB93-A07-STAN);</li> <li>• Make editorial improvements.</li> </ul>
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