



**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>	Viet Nam Improved Cookstove Project by KCM	
<b>UNFCCC reference number of the PoA</b>	10477	
<b>Version numbers of the PoA-DD applicable to this monitoring report</b>	11 (dated 27/05/2020)	
<b>Version number of this monitoring report</b>	02	
<b>Completion date of this monitoring report</b>	21/09/2020	
<b>Monitoring period number</b>	02	
<b>Duration of this monitoring period</b>	01/09/2019 – 31/05/2020 (inclusive of both dates)	
<b>Monitoring report number for this monitoring period</b>	01	
<b>Coordinating/managing entity</b>	Korea Carbon Management 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>
	Viet Nam	Yes
<b>Applied methodologies and standardized baselines</b>	AMS-II.G “Energy efficiency measures in thermal applications of non-renewable biomass”, Version 11.0	
<b>Sectoral scopes</b>	03	
<b>Amount of GHG emission reductions or net anthropogenic GHG removals achieved by all CPAs covered in this monitoring report</b>	<b>Amount achieved before 1 January 2013</b>	<b>Amount achieved from 1 January 2013</b>
	0	211,235 tCO <sub>2</sub>
<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>	269,382 tCO <sub>2</sub>	

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

### SECTION A. Description of PoA

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

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The “Viet Nam Improved Cookstove Project by KCM”, a SSC CDM Program of activity (PoA), is an initiative implemented by Korea Carbon Management Ltd. (herein after referred as KCM as well). The main objective of this PoA involves the installation of energy efficient Improved Cooking Stove (ICS) in the households/ communities/Small and Medium Enterprises (SMEs) (hereafter “users”) of Viet Nam for cooking and water heating for households. Implementation of the proposed activity will reduce the usage of non-renewable biomass i.e. fuel wood for users for cooking and water heating purposes. Thus, the PoA will reduce the GHG emission occurring from the combustion of non-renewable biomass, i.e. fuel wood, thereby also contributing to sustainable development. ICSs that will be disseminated under this PoA are more efficient in transferring heat from the fuel to the pot than traditional stoves.

Korea Carbon Management Ltd. (KCM) is the coordinating/managing entity (“CME”) for this PoA. Korea Carbon Management Ltd. is a company registered in the Republic of Korea with company registration number 142-81-56603. KCM purchased ICS for distribution to households in Viet Nam. The PoA facilitates the dissemination of ICS manufactured by appropriate ICS manufacturers or technology suppliers meeting CPA eligibility criteria free of cost to the end user. Carbon revenues will be used to fund ICS purchases, distribution, and cover operating and monitoring costs.

Currently, eight CPAs have been included in the PoA to fulfil the objective as mentioned above. Three types of cookstoves have been distributed, including 3G, 4G and TK90 stoves under these CPAs. The details are provided in the subsequent sections of this document.

#### 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
Improved cookstove project in XXX  (Ref. CPA XXX)	11	03	AMS-II.G “Energy efficiency measures in thermal applications of non-renewable biomass”, Version 11.0  Standardized baseline: N/A

#### 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)
Improved Cookstove Project in Hoa Binh Province – CPA 001 Version 13  (Ref. 10477-P1-0001-CP1)	11	Improved cookstove project in XXX  (Ref. CPA XXX)	Fixed 23/07/2019 – 22/07/2029	Yes
Improved Cookstove Project in Hoa Binh Province – CPA 002.  Version 10	11	Improved cookstove project in XXX  (Ref. CPA XXX)	Fixed 02/08/2019 – 01/08/2029	Yes

(Ref. 10477-P1-0002-CP1)				
Improved Cookstove Project in Phu Tho Province – CPA 003 Version 10 (Ref. 10477-P1-0003-CP1)	11	Improved cookstove project in XXX (Ref. CPA XXX)	Fixed 02/08/2019 01/08/2029	– Yes
Improved Cookstove Project in Phu Tho Province – CPA 004 Version 10 (Ref. 10477-P1-0004-CP1)	11	Improved cookstove project in XXX (Ref. CPA XXX)	Fixed 02/08/2019 01/08/2029	– Yes
Improved Cookstove Project in Thai Nguyen Province – CPA 005 Version 10 (Ref. 10477-P1-0005-CP1)	11	Improved cookstove project in XXX (Ref. CPA XXX)	Fixed 02/08/2019 01/08/2029	– Yes
Improved Cookstove Project in Thai Nguyen Province – CPA 006 Version 10 (Ref. 10477-P1-0006-CP1)	11	Improved cookstove project in XXX (Ref. CPA XXX)	Fixed 02/08/2019 01/08/2029	– Yes
Improved Cookstove Project in Yen Bai Province – CPA 007 Version 07 (Ref. 10477-P1-0007-CP1)	11	Improved cookstove project in XXX (Ref. CPA XXX)	Fixed 15/01/2020 14/01/2030	– Yes
Improved Cookstove Project in Yen Bai Province – CPA 008 Version 07 (Ref. 10477-P1-0008-CP1)	11	Improved cookstove project in XXX (Ref. CPA XXX)	Fixed 15/01/2020 14/01/2030	– Yes

## A.2. Coordinating/managing entity

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Korea Carbon Management Ltd. (KCM)

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## SECTION B. Implementation of PoA

### B.1. Description of implemented PoA

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#### 1. The management system

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

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

The eight CPAs (10477-P1-0001-CP1, 10477-P1-0002-CP1, 10477-P1-0003-CP1, 10477-P1-0004-CP1, 10477-P1-0005-CP1, 10477-P1-0006-CP1, 10477-P1-0007-CP1 and 10477-P1-0008-CP1 ) are implemented by KCM in line with the validated management system. CME has been prescribed as nominated entity to adhere to a series of responsibilities as per validated system. The eight CPAs were already included in the PoA by adopting required actions as per the responsibility chart.

The responsibility of CPA Manager has been taken up by the CDM professionals associated with CME. Solar Serve and Viet Charcoal are the manufacturers of the project ICSs. The CDM Managers nominated by KCM closely work with the team to ensure adherence to all responsibilities and requirements prescribed for CPA Manager/Consultant.

**b) A record keeping system for each CPA under the PoA**

KCM maintains a PoA Distribution and Monitoring database. The database includes CPA wise list of stoves distributions, including the following information below:

- Name of customer
- Address and ID number
- Stove model and serial number.
- Installation/distribution date.
- Type of stove (pre-project device) the cooker is replacing

The CME conducts checks to ensure that appropriate records are maintained for each CPA. Also, the required trainings for the operational team, field personnel etc. were conducted initially before the implementation starts and similar trainings will again be conducted by CME for effective management of the entire system.

The CPA implementation (for all eight CPAs) has been under the responsibility of CME. The CME has conducted independent quality check, field visit, testing of sample etc. at CME's level for the entire programme.

**c) Procedures for technical review of inclusion of CPAs under the PoA**

The CME has ensured before the inclusion of CPAs that they met all the eligibility criteria. The documents related to the CPA are kept, organized and referred in a clear manner: The eventual hard copies of the original monitoring documents are kept in the office and the electronic material of the documents are kept by INTRACO.

**d) A procedure to avoid double counting**

The CPAs meet the eligibility criteria number 2 of the PoA ("A unique numbering system (i.e. conformity letter) for ICS is applied for each CPA, assigning a unique number to each ICS and allowing to clearly identify for each ICS to which CPA it belongs.") which is evident from the Stove Distribution Database which includes the serial number of each distributed efficient cookstove together with the contact details of the user. In addition, it has been cross-checked if there is any other voluntary carbon activities operating in the same geographic area, and it has been confirmed that there is no other GHG program or project exist in the host country which has ensured that the CPA is not included in any other CDM project activity or voluntary carbon activity.

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

CME is maintaining the general database of the CPAs included under the PoA and the separate electronic databases for each CPAs. All data monitored and required for verification and issuance will be kept for two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever is later.

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

Each CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity. As prescribed 'if each of the independent subsystems/measures included in the CPA (for all the eight CPAs) is no larger than 1% of the small-scale thresholds defined by the methodology applied then that CPA of PoA is exempted from performing debundling check i.e., considering as not being a de-bundled component of a large scale activity'. CME has ensured that the cookstoves "3G, 4G and TK90" included under the CPAs meet this condition.

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

CME has the operational responsibility for implementing and monitoring the CPAs under the PoA. Currently Solar Serve and Viet Charcoal are the stove manufacturers.

**h) Measures for continuous improvements of the PoA management system**

CME is responsible for the coordination of the monitoring activities of the CPAs, is frequently in contact with personnel working in the field regarding the stove manufacturing and distribution as well as the monitoring issues to ensure that the work is proceeding and managed following validated CPA-DDs. For continuous improvement of the system, CME is deploying carbon experts and other professionals who have experience in managing stove program so that any issues, gaps, etc. can be mitigated effectively ensuring a proper program. Also, CME envisages that more awareness building exercises, educational sessions and regular check and balances shall be conducted in near future across the CPAs so that PoA can be driven by a robust system.

**2. Sampling approach**

According to the Sampling Standard, 95/10 reliability is to be applied whenever sampling across a group of CPAs, which will typically be the case for this PoA. In the case of conducting CPA-specific sampling, requires 90/10 confidence/precision if annual sampling is applied, or 95/10 confidence/precision if biennial (every two years) sampling is applied. CME has considered 95/10 confidence/precision sampling to consider eight CPAs under one sampling. Further details are provided in section E.3 below.

**3. Technical information**

Each respective SSC-CPA-DD describes the technical specification of the cookstove envisaged for dissemination under the CPA.

The ICS models are fuel efficient, resulting in a decrease in fuel use in comparison to conventional pre-project stoves while also reducing particulate matter and carbon emissions. Design considerations have also streamlined assembly and construction to reduce cost and production times.

The CPAs include the distribution of 3G, 4G and TK90 Cookstoves, which are high efficiency wood-fuel ICS for meeting the thermal energy needs of beneficiary households. These improved cookstoves replace traditional inefficient wood-fuel cookstoves/3-stone fires in the baseline.

The 3G, 4G and TK90 cookstoves are designed to increase heat transfer to the cooking pot, while being suitable for traditional utensils and cooking habits of the people in Viet Nam. The improvement in thermal efficiency is achieved by optimizing the dimensions of these improved cookstove combustion chamber and ensuring effective airflow to aid complete combustion of biomass.

**Table 01: Technical specification of these cookstoves**

Technical specification	3G	4G	TK90
Type of cookstove	Wood fired	Wood fired	Wood fired
Mode of operation	Portable	Portable	Portable
Thermal efficiency <sup>1</sup>	29.41%	30.0%	28.57%
Lifetime	5 years	5 years	10 years
Outside Diameter	25 cm	25 cm	24 cm
Inside Diameter	14.5 cm	15 cm	14 cm
Height	24.5 cm	26.5 cm	22 cm
Weight	2.3 kg	2.0-2.2 kg	8-10 kg
Other design feature	Single pot	Single pot	Single pot
Expected Annual energy savings from cookstove according to CPA-DD	See ER calculation spreadsheet	See ER calculation spreadsheet	See ER calculation spreadsheet

## B.2. Post-registration changes to PoA

### B.2.1. Corrections

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1<sup>st</sup> Post registration correction were presented in PRC ref. PRC-10477-1 and approved on 20/11/2019 as follows:

1. The PoA DD form has been updated to version 09
2. In section B, the updating of eligibility criteria has been done as per the CDM Project Standard for PoAs or other regulatory documents applicable at the time that eligibility criteria will be updated instead of Standard Demonstration of additionality development of eligibility criteria and application of multiple methodologies for programmes of activities.

2<sup>nd</sup> Post registration correction were presented in PRC ref. PRC-10477-3 and approved on 29/06/2020 as follows:

1. The PoA been updated from methodology AMS-II.G. Version 10.0 to AMS-II.G. Version 11.0.
2. References to applicable Tools have been updated to use the latest available versions. Additional information has been provided in Section A.3. In regards to the technology eligible for implementation under this PoA to comply with paragraph 124(d) and footnote 23 of PS –PoA ver 02. Eligibility criterion 3 has been updated to be in line with Section A.3
3. Editorial changes were made follows:

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<sup>1</sup> The thermal efficiency is ex-ante estimated value at the time of validation

- The table in Section A.5 has been updated to reflect that an additional LoA from another annex 1 country has been received for the CME.
- Additional spacing before the last paragraph in Section C was added;
- A Typo in section F.3 was corrected.
- Spacing has been introduced for eligibility criterion 6 in section K to change “Tool21” to “Tool 21”.

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

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N/A

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

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1<sup>st</sup> Post registration changes affecting the registered monitoring plan were presented in PRC ref. PRC-10477-1 and approved on 20/11/2019 as follows:

1. In section I.6.2, the parameter lifespan has been removed
2. In section A.3, I.2 and I.7.1, the efficiency testing method has been added following approaches:
  - (i) Certification by a national standards body or an appropriate certifying agent recognized by that body; or
  - (ii) Alternatively, manufacturer specifications on efficiency based on water boiling test (WBT) may be used. The sampling test of stoves by such certification bodies/agents or manufacturers shall be conducted following a 90/10 precision in accordance with the “Standard for sampling and surveys for CDM project activities and programme of activities”; or
  - (iii) A simplified approach may be used, when the efficient cookstoves are produced by a manufacture with a good quality management system in place to ensure that the individual equipment produced do not vary beyond the range of acceptance limits (e.g. characteristics such as materials, criterial dimensions):

(a) Conduct a sample test on three cook stoves with three tests conducted for each stove. The test can be carried out by project proponents by themselves or stove manufacturers.

(b) If the standard deviation of the nine test results indicated above is very small and 90/10 precision requirement is met (in this case, the value of the t-distribution for 90 per cent confidence shall be used instead of Z value), the efficiency determined is acceptable, otherwise more sample tests would be required until 90/10 precision is met.

Moreover, the yearly efficiency loss of ICS will be calculated as per paragraph 32 d) of AMS-II.G Version-10.0 in place of paragraph 32 a) in registered PoA DD.

3. In section I.7.2, changing the sample size calculation equation for parameter Adjustment to account for any continued use of pre- project devices during the year  $y$  ( $\mu_{y,i,j}$ ) and adding the sample size calculation for parameter operating efficiency ( $\eta_{new,i,j}$ ) .
4. Addition of text to indicate the options that would be chosen for values of the proportions, mean values, and standard deviations to calculate the required sample size estimates.

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

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Post registration changes affecting the registered POA were presented in PRC ref. PRC-10477-3 and approved on 29/06/2020 as follows:

- The POA has been updated from methodology AMS-IIG version 10.0 to AMS-II.G Version 11.0;
- References to applicable Tools have been updated to use the latest available tools.

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

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N/A

**PART II      Monitoring of CPAs**

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

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**a) Purpose of the CPA(s) and the measures taken for GHG emission reductions or net GHG removals by sinks.**

The main objective of the CPAs is dissemination of the efficient woody biomass-based ICS to the rural household of Viet Nam, which will result in reduced firewood consumption leading to climate change mitigation in a sustainable manner. Overall objectives are reduction of greenhouse gases, conservation of forests and woodlands as well as improved health conditions of ICS users due to improved indoor air quality. Thus, ICS reduce GHG emissions through their improved thermal efficiency as compared to traditional/ baseline stoves.

The project activity targets households in rural communities with no previous ICS access. The geographical boundary is the Country of Viet Nam. ICS are distributed free of cost to users. The CME, Korea Carbon Management (KCM) financed the implementation of the CPAs in full.

The CPAs apply Type II small-scale methodology AMS-II.G Version 11.0. The CPAs are therefore Type II CPAs. The CPAs qualify as Type II small-scale CPA. The implemented CPAs help in achieving following co-benefits, which will contribute to the sustainable development in host country as envisaged in the registered POA-DD:

**Environmental well-being:**

- The programme will contribute to the reduction in GHG emission due to reduction in use of non-renewable biomass and it can ensure natural recovery of forests and/or reforestation.
- The programme will lead to reduction in indoor air pollutants from wood smoke and avoid smoke related health disorders.
- The reduction in non-renewable biomass consumption for cooking through efficient use leads to improved ecological balance.
- The programme will support fire prevention in the household kitchen.

**Socio and Economic Benefits:**

- Implementation of project activity results in employment opportunities for people involved in installation, maintenance and distribution of these households biomass based cookers.
- Programme will improve the status of living of people in households and people /owners involved in communities/Small and Medium Enterprises (SMEs) cooking since the community level implementation of units of these kinds can be carried out at considerably lower costs. There will be less dependence on firewood and its expenses and time associated with firewood buying and collection.
- Business development component of the PoA has resulted in the enhancement of capacity development and technical knowhow for moderately educated people in the community through workshops, seminars and training programs.
- Adaptation of locally manufactured technology using available raw materials with optimised energy efficiencies leads to build technical self-reliance.
- Community health issues such as chronic lung diseases, acute respiratory infections, cataracts, blindness, and adverse effects on pregnancy will be decreased due to improvement of indoor air quality.



**Technological benefit**

- The introduction of locally manufactured technology with improved energy efficiency helps in technological self-reliance in the area.

**b) Description of the installed technology, technical processes and equipment**

The CPAs include the distribution of 3G, 4G and TK90 Cookstoves, which are high efficiency wood-fuel ICS for meeting the thermal energy needs of beneficiary households. These improved cookstoves replace traditional inefficient wood-fuel cookstoves/3-stone fires in the baseline.

The 3G, 4G and TK90 Cookstoves are designed to increase heat transfer to the cooking pot, while being suitable for traditional utensils and cooking habits of the people in Viet Nam. The improvement in thermal efficiency is achieved by optimizing the dimensions of these improved cookstove combustion chamber and ensuring effective airflow to aid complete combustion of biomass.

**Table 02: Technical specification of these cookstoves**

Technical specification	3G	4G	TK90
Type of cookstove	Wood fired	Wood fired	Wood fired
Mode of operation	Portable	Portable	Portable
Thermal efficiency <sup>2</sup>	29.41%	30.0%	28.57%
Lifetime	5 years	5 years	10 years
Outside Diameter	25 cm	25 cm	24 cm
Inside Diameter	14.5 cm	15 cm	14 cm
Height	24.5 cm	26.5 cm	22 cm
Weight	2.3 kg	2.0-2.2 kg	8-10 kg
Other design feature	Single pot	Single pot	Single pot
Expected Annual energy savings from cookstove according to CPA-DD	See ER calculation spreadsheet	See ER calculation spreadsheet	See ER calculation spreadsheet

**c) Information on implementation and actual operation of the CPAs including relevant dates for the CPA(s) (e.g. construction, commissioning, continued operation periods, etc.);****Table 03: Timeline of CPAs**

CPA	Steps	Timeline
CPA 001	Inclusion under the PoA	23/07/2019
	Start date of 'Crediting Period'	23/07/2019
	Project start date (i.e. equipment contract signed)	27/09/2018
	Implementation status as on 31/05/2020 (number of stoves distributed)	Completed. 30,000 cookstoves were distributed by 28/06/2019
	Inclusion under the PoA	02/08/2019
	Start date of 'Crediting Period'	02/08/2019
	Project start date (i.e. equipment contract signed)	10/05/2019

<sup>2</sup> The thermal efficiency is ex-ante estimated value at the time of validation

<b>CPA 002</b>	Implementation status as on 31/05/2020 (number of stoves distributed)	Completed. 30,000 cookstove were distributed by 25/09/2019, detail below: <ul style="list-style-type: none"> <li>• 11,960 cookstoves were distributed by 31/07/2019</li> <li>• 1,713 cookstove were distributed by 15/08/2019.</li> <li>• 6,640 cookstove were distributed by 31/08/2019.</li> <li>• 9,687 cookstoves were distributed by 25/09/2019.</li> </ul>
<b>CPA 003</b>	Inclusion under the PoA	02/08/2019
	Start date of 'Crediting Period'	02/08/2019
	Project start date (i.e. equipment contract signed)	10/05/2019
	Implementation status as on 31/05/2020 (number of stoves distributed)	Completed. 28,000 cookstove were distributed by 06/09/2019, detail below: <ul style="list-style-type: none"> <li>• 16,220 cookstoves were distributed by 31/07/2019.</li> <li>• 1,030 cookstoves were distributed by 15/08/2019.</li> <li>• 6,710 cookstoves were distributed by 31/08/2019</li> <li>• 4,040 cookstoves were distributed by 06/09/2019</li> </ul>
<b>CPA 004</b>	Inclusion under the PoA	02/08/2019
	Start date of 'Crediting Period'	02/08/2019
	Project start date (i.e. equipment contract signed)	10/05/2019
	Implementation status as on 31/05/2020 (number of stoves distributed)	Completed. 28,000 cookstove were distributed by 10/09/2019, detail below: <ul style="list-style-type: none"> <li>• 13,760 cookstoves were distributed by 31/07/2019</li> <li>• 1,130 cookstoves were distributed by 15/08/2019.</li> <li>• 6,040 cookstoves were distributed by 31/08/2019.</li> <li>• 7,070 cookstoves were distributed by 10/09/2019.</li> </ul>
<b>CPA 005</b>	Inclusion under the PoA	02/08/2019
	Start date of 'Crediting Period'	02/08/2019
	Project start date (i.e. equipment contract signed)	10/05/2019
	Implementation status as on 31/05/2020 (number of stoves distributed)	Completed. 28,000 cookstove were distributed by 30/09/2019, detail below: <ul style="list-style-type: none"> <li>• 10,025 cookstoves were distributed by 31/07/2019</li> <li>• 1,300 cookstoves were distributed by 15/08/2019.</li> <li>• 4,315 cookstoves were distributed by 31/08/2019.</li> <li>• 12,360 cookstoves were distributed by 30/09/2019</li> </ul>
	Inclusion under the PoA	02/08/2019
	Start date of 'Crediting Period'	02/08/2019

<b>CPA 006</b>	Project start date (i.e. equipment contract signed)	10/05/2019
	Implementation status as on 31/05/2020 (number of stoves distributed)	Completed. 28,000 cookstove were distributed by 27/09/2019, detail below: <ul style="list-style-type: none"> <li>• 10,275 cookstoves were distributed by 31/07/2019.</li> <li>• 1,700 cookstoves were distributed by 15/08/2019.</li> <li>• 3,020 cookstoves were distributed by 31/08/2019.</li> <li>• 13,005 cookstoves were distributed by 27/09/2019</li> </ul>
<b>CPA 007</b>	Inclusion under the PoA	30/12/2019
	Start date of 'Crediting Period'	15/01/2020
	Project start date (i.e. equipment contract signed)	24/12/2019
		Completed. 26,000 cookstove were distributed by 11/03/2020, detail below <ul style="list-style-type: none"> <li>• 2,005 cookstoves were distributed by 18/01/2020</li> <li>• 15,875 cookstoves were distributed by 29/02/2020</li> <li>• 8,120 cookstoves were distributed by 11/03/2020</li> </ul>
<b>CPA 008</b>	Inclusion under the PoA	30/12/2019
	Start date of 'Crediting Period'	15/01/2020
	Project start date (i.e. equipment contract signed)	24/12/2019
	Implementation status as on 31/05/2020 (number of stoves distributed)	Completed. 26,000 cookstove were distributed by 10/03/2020, detail below: <ul style="list-style-type: none"> <li>• 1,519 cookstoves were distributed by 18/01/2020</li> <li>• 16,266 cookstoves were distributed by 26/02/2020</li> <li>• 8,215 cookstoves were distributed by 10/03/2020</li> </ul>

**d) Total GHG emission reductions or net GHG removals by sinks achieved in this monitoring period for the specific-case CPAs, including information on how double counting is avoided.**

During the second period, 01/09/2019 to 31/05/2020, a total emission reduction of 211,235 tCO<sub>2e</sub> has been achieved. Double counting is avoided as each energy efficient stove included under this project has an unique identification number which has be recorded on the project database to demonstrate that the stove is a part of the project activity

**C.2. Location of CPAs**

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All the CPAs are implemented within the national boundary of the host country, Viet Nam.

**1. CPA 001: Improved cookstove project in Hoa Binh Province – CPA 001**

The ICSs (*3G Cookstoves*) under this CPA have been implemented in several villages and households in the districts of Tan Lac, Luong Son, Lac Son and Kim Boi within Hoa Binh Province, Viet Nam.

The coordinates of these districts are:

District	Longitude	Latitude
Luong Son	105.4307° – 105.6469°E	20.7536° – 20.9480°N
Lac Son	105.2838° – 105.5771°E	20.3598° – 20.6370°N
Tan Lac	105.1128°- 105.3915°E	20.42588° – 20.7373°N
Kim Boi	105.3706°- 105.7063°E	20.5253° – 20.8275°N

## 2. CPA 002: Improved cookstove project in Hoa Binh Province – CPA 002

The ICSs (*4G Cookstoves*) under this CPA have been implemented in several villages and households in the districts of Da Bac, Mai Chau, Cao Phong, Lac Thuy and Yen Thuy within Hoa Binh Province, Viet Nam.

The co- ordinate of these districts is below:

District	Longitude	Latitude
Da Bac	104.8532° – 105.3107°E	20.7561° – 21.1129° N
Mai Chau	104.8358° – 105.1571°E	20.5595° – 20.8049° N
Cao Phong	105.1786°-105.4190° E	20.5928° – 20.7843° N
Lac Thuy	105.6159° – 105.8549° E	20.3681° – 20.6034° N
Yen Thuy	105.5421° – 105.7288° E	20.3063° – 20.5497° N

## 3. CPA 003: Improved cookstove project in Phu Tho Province – CPA 003

The ICSs (*4G Cookstoves*) under this CPA have been implemented in several villages and households in the districts of Yen Lap, Tam Nong, Thanh Son, Thanh Thuy and Tan Son within Phu Tho Province, Viet Nam.

The co- ordinate of these districts is below:

District	Longitude	Latitude
Yen Lap	104.8824° – 105.1686°E	21.2034° – 21.5432° N
Tam Nong	105.1473° – 105.3551°E	21.2174° – 21.3969° N
Thanh Thuy	105.2325° – 105.3551°E	21.0034° – 21.2446° N
Thanh Son	105.0371° – 105.3405°E	21.0175° – 21.3596° N
Tan Son	104.8143° – 105.1145°E	21.2550° – 20.9179° N

## 4. CPA 004: Improved cookstove project in Phu Tho Province – CPA 004

The ICSs (*TK90 Cookstoves*) under this CPA have been implemented in several villages and households in the districts of Doan Hung, Thanh Ba, Ha Hoa, Cam Khe and Phu Ninh within Phu Tho Province, Viet Nam. The addresses where the ICS proposed will be recorded and maintained.

The geographical coordinates of Districts are:

District	Longitude	Latitude
Doan Hung	105.0174° – 105.2503° E	21.5126° – 21.7197° N
Cam Khe	104.9778° -105.1966° E	21.2699° – 21.4997° N
Ha Hoa	104.8685° – 105.1446° E	21.4837° – 21.6907° N
Thanh Ba	105.0786° – 105.2293°E	21.3268° – 21.5762° N
Phu Ninh	105.2113° – 105.3974° E	21.3715° – 21.5428° N

#### 5. CPA 005: Improved cookstove project in Thai Nguyen Province – CPA 005

The ICSs (4G Cookstoves) under this CPA have been implemented in several villages and households in these districts of Dinh Hoa, Phu Luong, Dai Tu within Thai Nguyen Province, Viet Nam. The addresses where the ICS proposed will be recorded and maintained.

The geographical coordinates of Districts are:

District	Longitude	Latitude
Dinh Hoa	105.4944° -105.7761° E	21.7484° – 22.0465°N
Phu Luong	105.6273° -105.8210° E	21.6159° – 21.9134°N
Dai Tu	105.4781° -105.7724° E	21.4304° – 21.7758°N

#### 6. CPA 006: Improved cookstove project in Thai Nguyen Province – CPA 006

The ICSs (4G Cookstoves) under this CPA have been implemented in several villages and households in these districts of Vo Nhai, Dong Hai, Phu Binh and Pho Yen town within Thai Nguyen Province, Viet Nam. The addresses where the ICS proposed will be recorded and maintained.

The geographical coordinates of Districts are:

District	Longitude	Latitude
Vo Nhai	105.8486° – 106.2364° E	21.6060° – 21.9665° N
Phu Binh	105.8768° – 106.0505° E	21.3943° – 21.5912° N
Dong Hy	105.7865° – 106.0741° E	21.5221° – 21.8486° N
Pho Yen	105.6677° – 105.9437° E	21.3301° – 21.5751° N

#### 7. CPA 007: Improved cookstove project in Yen Bai Province – CPA 007

The ICSs (4G Cookstoves) under this CPA have been implemented in several village and households in these districts of Mu Cang Chai, Luc Yen, Tran Yen and Yen Binh within Yen Bai Province, Viet Nam. These addresses where the ICS proposed will be recorded and maintained.

The geographical coordinates of Districts are:

District	Longitude	Latitude
Luc Yen	104.5625° – 104.8806°E	21.9329° – 22.2913°N
Mu Cang Chai	103.8858°- 104.4155°E	21.6438° – 21.9662°N
Tran Yen	104.6491°- 104.9366°E	21.5326° – 21.8778°N
Yen Binh	104.7465°- 105.0976°E	21.6500° – 21.0714°N

**8. CPA 008: Improved cookstove project in Yen Bai Province – CPA 008**

The ICSs (4G Cookstoves) under this CPA have been implemented in several village and households in these districts of Van Chan, Tram Tau and Van Yen within Yen Bai Province, Viet Nam. These addresses where the ICS proposed will be recorded and maintained.

The geographical coordinates of Districts are:

District	Longitude	Latitude
Van Yen	104.3409° – 104.7900°E	21.6643° – 22.1987°N
Van Chan	104.2677° – 104.9099°E	21.3281° – 21.8126°N
Tram Tau	104.2767° – 104.6601°E	21.3520° – 22.6688°N

**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**

>>  
N/A

**C.3.2. Corrections**

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1<sup>st</sup> Post registration correction were presented in PRC ref. PRC-10477-2 and approved on 25/11/2019 as follows:

1. In section A.3, adding footnote for lab where conduct testing thermal efficiency.
2. In section B.4.2, parameter lifespan has been removed.

2<sup>nd</sup> Post registration changes affecting the registered monitoring plan were presented in PRC ref. PRC-10477-4 to PRC-10477-11 and approved on 17/08/2020 as follows:

1. The CPA been updated from methodology AMS-II.G. Version 10.0 to AMS-II.G. Version 11.0. Due to this update, among others, there are changes in the values of parameter “ $EF_{\text{project fossil fuel}}$ ”, which also leads to change in the estimated emission reduction from the CPA.
2. References to applicable Tools have been updated to use the latest available versions.
3. Editorial changes were made as follows:

CPAs	Corrections
10477-P1-0001-CP1	<ul style="list-style-type: none"> <li>• Section A.3., the word “lifespan” has been changed to “lifetime”;</li> <li>• Section B.4.3., the word “equations” has once been changed to “equation”.</li> <li>• Section B.5.1 in parameter <math>\eta_{\text{new},i,j}</math>, the word “criterial” was changed to “critical” and the word “number.” has been added under parameter <math>N_{y,i,j}</math>;</li> </ul>
10477-P1-0002-CP1	<ul style="list-style-type: none"> <li>• Section A.3., the word “lifespan” has been changed to “lifetime” and a row in Table 1 was added to show the cookstove model name;</li> <li>• Section B.4.3., the “equations” for <math>B_{y,\text{savings},i,j}</math> has once been removed.</li> <li>• Section B.5.1 in parameter <math>\eta_{\text{new},i,j}</math>, the word “manufacture was changed to “manufacturer” and the word “criterial” was changed to “critical”.</li> </ul>
10477-P1-0003-CP1	<ul style="list-style-type: none"> <li>• Section A.3., the word “lifespan” has been changed to “lifetime”.</li> <li>• Section B.4.3., the “equations” for <math>B_{y,\text{savings},i,j}</math> has once been removed</li> <li>• Section B.5.1 in parameter <math>\eta_{\text{new},i,j}</math>, the word “manufacture was changed to “manufacturer” and the word “criterial” was changed to “critical”.</li> </ul>
10477-P1-0004-CP1	<ul style="list-style-type: none"> <li>• Section A.3., the word “lifespan” has been changed to “lifetime” and further information corrected in relation to the replacement of stoves during the crediting period;</li> <li>• Section B.4.3., the “equations” for <math>B_{y,\text{savings},i,j}</math> has once been removed</li> <li>• Section B.5.1 in parameter <math>\eta_{\text{new},i,j}</math>, the word “manufacture was changed to “manufacturer” and the word “criterial” was changed to “critical”.</li> </ul>

10477-P1-0005-CP1	<ul style="list-style-type: none"> <li>• Section A.3., the word “lifespan” has been changed to “lifetime”;</li> <li>• Section B.4.3., the reference for <math>\eta_{new,i,j}</math> was replaced with corrected reference to <math>f_{NRB,y}</math> and the “equations” for <math>B_{y,savings,i,j}</math> has once been removed</li> <li>• Section B.5.1 in parameter <math>\eta_{new,i,j}</math>, the word “manufacture was changed to “manufacturer” and the word “criterial” was changed to “critical”.</li> </ul>
10477-P1-0006-CP1	<ul style="list-style-type: none"> <li>• Section A.3., the word “lifespan” has been changed to “lifetime”;</li> <li>• Section B.4.3., the “equations” for <math>B_{y,savings,i,j}</math> has once been removed.</li> <li>• Section B.5.1 in parameter <math>\eta_{new,i,j}</math>, the word “manufacture was changed to “manufacturer” and the word “criterial” was changed to “critical”.</li> <li>• Section B.5.2 (b) The wording “-pre” has once been remove.</li> </ul>
10477-P1-0007-CP1	<ul style="list-style-type: none"> <li>• Section A.3., the word “lifespan” has been changed to “lifetime”;</li> <li>• Section B.4.3., the “equations” has once been changed to “equation”</li> <li>• Section B.5.1 in parameter <math>\eta_{new,i,j}</math>, the word “manufacture was changed to “manufacturer” and the word “criterial” was changed to “critical” and the word “number” has been added under parameter <math>N_{y,i,j}</math>;</li> </ul>
10477-P1-0008-CP1	<ul style="list-style-type: none"> <li>• Section A.3., the word “lifespan” has been changed to “lifetime”;</li> <li>• Section B.4.3., the “equations” has once been changed to “equation”</li> <li>• Section B.5.1 the word “number” has been added under parameter <math>N_{y,i,j}</math>;</li> <li>• Section B.5.1 in parameter <math>\eta_{new,i,j}</math>, the word “manufacture was changed to “manufacturer” and the word “criterial” was changed to “critical”</li> </ul>

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

>>  
N/A

### C.3.4. Inclusion of monitoring plan

>>  
N/A

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

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Post registration changes affecting the registered monitoring plan were presented in PRC ref. PRC-10477-2 and approved on 25/11/2019 as follows:

1. In section B.5.1, the efficiency testing method has been added following approaches:
    - (i) Certification by a national standards body or an appropriate certifying agent recognized by that body; or
    - (ii) Alternatively, manufacturer specifications on efficiency based on water boiling test (WBT) may be used. The sampling test of stoves by such certification bodies/agents or manufacturers shall be conducted following a 90/10 precision in accordance with the “Standard for sampling and surveys for CDM project activities and programme of activities”; or
    - (iii) A simplified approach may be used, when the efficient cookstoves are produced by a manufacture with a good quality management system in place to ensure that the individual equipment produced do not vary beyond the range of acceptance limits (e.g. characteristics such as materials, criterial dimensions):
      - (a) Conduct a sample test on three cook stoves with three tests conducted for each stove. The test can be carried out by project proponents by themselves or stove manufacturers.
      - (b) If the standard deviation of the nine test results indicated above is very small and 90/10 precision requirement is met (in this case, the value of the t-distribution for 90 per cent confidence shall be used instead of Z value), the efficiency determined is acceptable, otherwise more sample tests would be required until 90/10 precision is met.
- Moreover, the yearly efficiency loss of ICS will be calculated as per paragraph 32 d) of AMS-II.G Version-10.0 in place of paragraph 32 a) in included CPA DD and the QA/QC procedure has been deleted.

2. Changing the sample size calculation equation for parameter Adjustment to account for any continued use of pre-project devices during the year  $y$  ( $\mu_{y,i,j}$ ) and adding the sample size calculation for parameter operating efficiency ( $\eta_{new,i,j}$ ).

3. Addition of text to indicate the options that would be chosen for values of the proportions, mean values, and standard deviations to calculate the required sample size estimates

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

>>

Post registration changes affecting the registered CPAs were presented in PRC ref. PRC-10477-4 to PRC-10477-11 and approved on 17/08/2020 as follows:

- The CPAs has been updated from using approved methodology AMS-IIG version 10.0 to AMS-II.G Version 11.0;
- References to applicable Tools have been updated to use the latest available tools.

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

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N/A

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

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The Monitoring Plan applied in the PoA involves a number of key elements that ensure that the CME have high-quality, unbiased and reliable information regarding the performance of the project in terms of implementation and outcomes, and for the purposes of calculating Certified Emission Reductions (CERs) following AMS-II.G. version 11.0 on the basis of the amount of non-renewable biomass saved by the ICS in the project activity.

**The key elements are the following:**

- Project database management

- Spot Checks of ICS
- Sample Plan for the Monitoring Survey
- Data Quality, Consistency and Duplication Checks
- Monitoring Reporting

The CME has trained field staff in project implementation, particularly in data collection and archiving. All ICSs under the PoA have unique serial numbers, following the format KCM – CPA XXX – XXXXX, the unique serial number is a combination of numbers and letters representing CME, the number of the CPA and the serial number of the cookstoves for each CPA. Unique serial numbers and user location details identify the project devices individually and separate it from other programs. The unique serial number can be verified with the project database. To establish the date of commissioning of the ICS, The CME has used the actual date of distribution of each ICS.

*Step 1: Data collection*

ICS were distributed in a social gathering organized in village schools and community halls. The electronic project database of CPA includes the information from the signed household’s representative such as name, address, signature, ICS type, unique serial number and distribution date were recorded by the field personnel using paper-based means. The data obtained during the monitoring surveys (survey date and answers together with the user’s contact details and unique stove IDs).

*Step 2: Data Archiving*

The purpose of record keeping and data archiving is to provide enough information to enable full monitoring for each monitoring period.

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. 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 has been organized by the CME consisting of survey coordinator, survey supervisor and trained monitoring staff, who conducted the surveys and the WBTs.

All data monitored and required for verification and issuance will be kept for two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever is later.

Table 04: Data Collection Team Organization Structure

Monitoring Team			
The CME (End user data checking and archiving)			
Field Staff (end user data collection)		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. The survey team consisted of one survey coordinator and two 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.

Table 05: Survey Team Organization Structure

Survey coordinator							
Supervisor				Supervisor			
Surveyor	Surveyor	Surveyor	Surveyor	Surveyor	Surveyor	Surveyor	Surveyor

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

**SECTION E. Data and parameters**

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

<b>Data/Parameter</b>	<b>B<sub>old,HH</sub></b>
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	Survey of local usage was conducted for the target consumer group included in this CPA
Value(s) applied	CPA 001: 2.159 CPA 002: 2.178 CPA 003: 2.340 CPA 004: 2.380 CPA 005: 2.323 CPA 006: 2.255 CPA 007: 2.509 CPA 008: 2.522
Choice of data or measurement methods and procedures	Combination of literature and/or field survey.
Purpose of data/parameter	Calculation of baseline emission

Additional comments	The value is fixed ex-ante Assessments, information and results established in initial CPAs may be used in subsequent CPAs in lieu of conducting fresh assessments at each CPA level in absence of new data
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<b>Data/Parameter</b>	<b>B<sub>old,i,j</sub></b>
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>i</i> and batch <i>j</i>
Source of data	Calculated
Value(s) applied	CPA 001: 2.159 CPA 002: 2.178 CPA 003: 2.340 CPA 004: 2.380 CPA 005: 2.323 CPA 006: 2.255 CPA 007: 2.509 CPA 008: 2.522
Choice of data or measurement methods and procedures	The annual quantity of wood that would have been consumed in absence of the project activity will be calculated as below  $B_{old,i,j} = B_{old,HH} / N_{d,HH}$  Where, $B_{old,HH}$ is determined through survey and $N_{d,HH}$ is a monitoring parameter
Purpose of data/parameter	Calculation of baseline emission
Additional comments	Only one project stove has been distributed per household and the survey found that households did not use other ICS.

<b>Data/Parameter</b>	<b><math>\eta_{old,i,j}</math></b>
Unit	Percentage
Description	Efficiency of the old devices being replaced by project devices of type <i>i</i> and batch <i>j</i> .
Source of data	Default value as per applied methodology AMS-II.G, Version 11.0
Value(s) applied	10
Choice of data or measurement methods and procedures	The default value of 0.10 is used as the replaced system is a three stone fire, or a conventional device with no improved combustion air supply or flue gas ventilation, i.e. without a grate or a chimney.
Purpose of data/parameter	Calculation of Quantity of woody biomass that is saved in tonnes per device
Additional comments	The value is fixed ex - ante

<b>Data/Parameter</b>	$f_{NRB}$
Unit	%
Description	Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass
Source of data	Calculated
Value(s) applied	CPA 001: 82.68 CPA 002: 82.68 CPA 003: 83.53 CPA 004: 83.53 CPA 005: 82.89 CPA 006: 82.89 CPA 007: 77.616 CPA 008: 77.616
Choice of data or measurement methods and procedures	Tool30 "Calculation of fraction of non- renewable biomass" version 01.0 was used to calculate project or PoA-specific $f_{NRB}$ values. Project proponents considered the area where biomass is sourced and justify the selection of the area in CDM project design documents.  For this SSC-CPA, secondary data is used to determine the parameter as per the calculation of the fraction of non-renewable biomass, Version 01.
Purpose of data/parameter	Calculation of baseline emission
Additional comments	This parameter shall remain fixed for the monitoring periods

<b>Data/Parameter</b>	$NCV_{Biomass}$
Unit	TJ/Tonne
Description	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.0156 TJ/tonnes, based on the gross weight of the wood that is 'air-dried')
Source of data	AMS - II.G, Version 11.0
Value(s) applied	0.0156
Choice of data or measurement methods and procedures	Default value as per applied methodology AMS - II.G version 11.0
Purpose of data/parameter	Calculation of baseline emission
Additional comments	This parameter shall remain fixed for the monitoring periods

<b>Data/Parameter</b>	$EF_{projected\_fossil\ fuel}$
Unit	tCO <sub>2</sub> /TJ
Description	Emission factor for the substitution of non-renewable woody biomass by similar consumers
Source of data	AMS - II.G, Version 11.0
Value(s) applied	85.7
Choice of data or measurement methods and procedures	Default value for Developing Region "East Asia and the Pacific" as per methodology has been applied. As per Table 1 in Appendix 1 of methodology AMS-II.G. Version 11.0, Viet Nam is classified as being part of Developing Region "East Asia and the Pacific".
Purpose of data/parameter	Calculation of baseline emission

Additional comments	This parameter shall remain fixed for the monitoring periods
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Data/Parameter	$L_y$
Unit	Fraction
Description	Leakage adjustment factor
Source of data	Paragraph 48 of AMS-II.G, Version 11.0
Value(s) applied	0.95
Choice of data or measurement methods and procedures	Default value applied as per the methodology
Purpose of data/parameter	Calculation of baseline emission
Additional comments	This parameter shall remain fixed for the monitoring period

## E.2. Data and parameters monitored

Data/Parameter	$N_{y,i,j}$																																				
Unit	Number																																				
Description	Number of project devices of type i and batch j operating during year y.																																				
Measured/calculated/default	Measured																																				
Source of data	Stove distribution database and Monitoring survey records																																				
Value(s) of monitored parameter	224,000																																				
	<table border="1"> <thead> <tr> <th>Data</th> <th>CPA 001</th> <th>CPA 002</th> <th>CPA 003</th> <th>CPA 004</th> <th>CPA 005</th> <th>CPA 006</th> <th>CPA 007</th> <th>CPA 008</th> </tr> </thead> <tbody> <tr> <td><math>N_{y,3G,1}</math></td> <td>30,000</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td><math>N_{y,4G,1}</math></td> <td>-</td> <td>30,000</td> <td>28,000</td> <td>-</td> <td>28,000</td> <td>28,000</td> <td>26,000</td> <td>26,000</td> </tr> <tr> <td><math>N_{y,TK9 0,1}</math></td> <td></td> <td></td> <td></td> <td>28,000</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Data	CPA 001	CPA 002	CPA 003	CPA 004	CPA 005	CPA 006	CPA 007	CPA 008	$N_{y,3G,1}$	30,000	-	-	-	-	-	-	-	$N_{y,4G,1}$	-	30,000	28,000	-	28,000	28,000	26,000	26,000	$N_{y,TK9 0,1}$				28,000				
	Data	CPA 001	CPA 002	CPA 003	CPA 004	CPA 005	CPA 006	CPA 007	CPA 008																												
	$N_{y,3G,1}$	30,000	-	-	-	-	-	-	-																												
$N_{y,4G,1}$	-	30,000	28,000	-	28,000	28,000	26,000	26,000																													
$N_{y,TK9 0,1}$				28,000																																	
Monitoring equipment	The stove installations are monitored via CPA distribution record and operational rate is monitored on sampling basis using questionnaire survey.																																				
Measuring/reading/recording frequency	At least biennially																																				
Calculation method (if applicable)	<p>CME maintains the database of all stoves installed. The number of operating stoves for each age category has been determined on a sampling basis. The stove population in the database was categorized on the basis of age and stratified random sampling was applied to identify the samples for each age. The identified samples were monitored for operational status of stove. The results from monitoring were used to calculate <math>N_{y,i,j}</math> as follows:</p> $N_{y,i,j} = (n_{i,j,operational} / n_{i,j,total}) * N_{y,i,j,installed}$ <p>Where:  N = Number of stoves  n = Number of samples.</p>																																				
QA/QC procedures	A 95 /10 confidence / margin of error is applied for the sampling parameter as per para 22 of Standard: Sampling and surveys for CDM project activities and programmes of activities, Version 08.0																																				
Purpose of data/parameter	Calculation of baseline emissions																																				

Additional comments	<p>The installed ICS will also be monitored once every two years to determine if they are still operating; those devices that have been replaced by an equivalent in – service device can be counted as operating as per AMS - II.G, version 11.0.</p> <p>CME notes that during the past Verification, the operational rate of stoves was observed as 1.0. As this value doesn't allow for the calculation of the sample size for this verification, the CME has conservatively estimated the operational rate to be 0.95 to calculate the sample size. This has been proven to be conservative as the operational rate observed during the survey was 1.0.</p>
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<b>Data/Parameter</b>	$\mu_y$
Unit	Fraction
Description	Adjustment to account for any continued use of pre-project devices during the year <i>y</i>
Measured/calculated/default	Calculated
Source of data	Monitoring survey records
Value(s) of monitored parameter	0.9683
Monitoring equipment	Not applicable. Utilization is monitored on sampling basis using questionnaire survey.
Measuring/reading/recording frequency	At least biennially
Calculation method (if applicable)	<p>The sampled households were checked for presence of baseline stove and if it was being used along with project stove for cooking.</p> <ul style="list-style-type: none"> <li>• 1.0 for days on which only ICS is used;</li> <li>• 0.0 for days on which on traditional stove is used</li> <li>• 0.5 for days when both ICS and traditional stoves are used</li> </ul>
QA/QC procedures	A 95 /10 confidence / margin of error is achieved for the sampling parameter as per para 22 of Standard: Sampling and surveys for CDM project activities and programmes of activities, Version 08.0
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	<p>All data sources will be archived till two years after the end of the crediting period.</p> <p>CME notes that during the past Verification, the utilization rate of stoves was observed as 1.0. As this value doesn't allow for the calculation of the sample size for this verification, the CME has conservatively estimated the utilization rate to be 0.95 to calculate the sample size. This has been proven to be conservative as the utilization rate observed during the survey was 0.9683. The observed utilization rate shall inform the sample size calculation for future verifications.</p>

<b>Data/Parameter</b>	$\eta_{new,i,j}$
Unit	%
Description	Efficiency of the project device <i>i</i> and batch <i>j</i> implemented as part of the project activity
Measured/calculated/default	Measured and calculated
Source of data	Efficiency test Records and results

Value(s) of monitored parameter	<table border="1"> <thead> <tr> <th>Data Ex Post</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td><math>\eta_{new,3G}</math></td> <td>28.03%</td> </tr> <tr> <td><math>\eta_{new,4G}</math></td> <td>29.02%</td> </tr> <tr> <td><math>\eta_{new,TK90}</math></td> <td>27.37%</td> </tr> </tbody> </table>	Data Ex Post	Value	$\eta_{new,3G}$	28.03%	$\eta_{new,4G}$	29.02%	$\eta_{new,TK90}$	27.37%
	Data Ex Post	Value							
	$\eta_{new,3G}$	28.03%							
	$\eta_{new,4G}$	29.02%							
$\eta_{new,TK90}$	27.37%								
The average value is considered									
Monitoring equipment	Based on WBT method (thermometer, weighing scales, moisture content meters)								
Measuring/reading/recording frequency	Adjusted for the loss of efficiency as paragraph 37d)								
Calculation method (if applicable)	<p>For determination of efficiency of the project ICS (<math>\eta_{new,i,j}</math>) an across CPA sampling based on the ICS model and its vintage with the applied 95/10 confidence precision level was performed by Viet Charcoal Production Company Limited.</p> <p>The WBT for determination of thermal efficiency (<math>\eta_{new,i,j}</math>) has been performed by Viet Charcoal Production Company Ltd (manufacturer of ICS) in accordance with WBT Protocol (version 4.2.3) and 95/10 precision requirement was met. This is also in accordance with point 2 of data parameter table 12 of applied methodology AMS-II.G (Version 11.0).</p>								
QA/QC procedures	-								
Purpose of data/parameter	Calculation of baseline emission								
Additional comments	<p>If any sample stove is found to be operating below the 20% efficiency, the proportionate number of stoves of that type included in the CPA will be considered to be non-operational and not accounted for ER calculation.</p> <p>CME notes that the standard deviation used for the calculation of initial sample size is based on previous WBTs carried out during Verification 1. Since the standard deviation of those tests is much lower than the one assumed at the time of CPA-DD writing, also the resulting initial sample size is lower than the one stated in the CPA-DD. The initial sample size using the lower standard deviation was calculated with 1. Since the calculated sample size is lower than 30, the Sampling Standard requires to apply the Student's t-distribution. However the t-distribution cannot be applied in this case, since the degrees of freedom would result in 0 (1-1) for which the t-Table does not provide any t value. Hence, the CME decided to choose as initial sample size 3 for each model of ICS (3G, 4G and TK90) model and their vintage (1 year old) and calculated the precision level. The 95/10 confidence/precision level was met for all of the 3 stove models, hence 3 was considered as an appropriate initial sample size for each stove model.</p>								

<b>Data/Parameter</b>	<b>Date of commissioning of batch j</b>
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	Measured
Source of data	Internal distribution database
Value(s) of monitored parameter	Refer the ICS distribution database
Monitoring equipment	N/A
Measuring/reading/recording frequency	Recorded at the time of distribution records
Calculation method (if applicable)	N/A



QA/QC procedures	N/A
Purpose of data/parameter	Start date
Additional comments	<p>The record to be kept for crediting period + 2 years. In order to be conservative in emission reduction calculation, CME has considered the last date of distribution of a particular month as the date of complete commissioning of the stove batch distributed for that particular month (here a batch is referred to as total numbers of stoves distributed in a particular month). Therefore, start date of accounting of emission reductions for stoves distributed in a particular month has been considered as the last date of stove distribution for that month. This is also a conservative approach. The details related to date of accounting of stoves are of provided in the ER calculation sheet.</p> <p>In the current monitoring period, the total numbers of stoves included are the stoves distributed until 31/05/2020. Please note that the last stoves distributed during this period were on 11/03/2020.</p>

<b>Data/Parameter</b>	<b>Date of commissioning of project device i</b>
Unit	Date
Description	Actual date of commissioning of the project device
Measured/calculated/default	Measured
Source of data	Internal records
Value(s) of monitored parameter	Refer the ICS distribution database
Monitoring equipment	N/A
Measuring/reading/recording frequency	Fixed and recorded at the time of commissioning/distribution
Calculation method (if applicable)	N/A
QA/QC procedures	N/A
Purpose of data/parameter	-
Additional comments	The record to be kept for crediting period + 2 years

<b>Data/Parameter</b>	<b><math>N_{d,HH}</math></b>
Unit	Number
Description	Number of project devices distributed per household
Measured/calculated/default	Measured
Source of data	Internal records and ex-post survey
Value(s) of monitored parameter	1
Monitoring equipment	N/A
Measuring/reading/recording frequency	Recorded at the time of commissioning/distribution of project devices and it can be crosschecked with user details having number of ICS. This is also checked during the ex-post survey.
Calculation method (if applicable)	N/A
QA/QC procedures	N/A

Purpose of data/parameter	To calculate baseline emission
Additional comments	The record to be kept for crediting period + 2 years

### E.3. Implementation of sampling plan

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As of now only eight CPAs i.e. (CPA 10477-P1-0001-CP1, 10477-P1-0002-CP1, 10477-P1-0003-CP1, 10477-P1-0004-CP1, 10477-P1-0005-CP1, 10477-P1-0006-CP1, 10477-P1-0007-CP1 and 10477-P1-0008-CP1) are included and are active under the PoA. The total ICS distributed across all the CPAs is 224,000 until 31/05/2020; the number of ICS distributed under each CPA are as follows:

CPA 001 (10477-P1-0001-CP1)	Start date of stove crediting period (date of last stove given in a month)	Start date of ER accounting for 2 <sup>nd</sup> period	Total Number of stoves distributed
Total stoves distributed as on 23/07/2019	23/07/2019	01/09/2019	30,000
		<b>Total</b>	<b>30,000</b>

CPA 002 (10477-P1-0002-CP1)	Start date of stove crediting period (date of last stove given in a month)	Start date of ER accounting for 2 <sup>nd</sup> period	Total Number of stoves distributed
Total stoves distributed by 31/07/2019	31/07/2019	01/09/2019	11,960
Total stoves distributed by 15/08/2019	15/08/2019	01/09/2019	1,713
Total stoves distributed by 31/08/2019	31/08/2019	01/09/2019	6,640
Total stoves distributed to 25/09/2019	25/09/2019	25/09/2019	9,687
		<b>Total</b>	<b>30,000</b>

CPA 003 (10477-P1-0003-CP1)	Start date of stove crediting period (date of last stove given in a month)	Start date of ER accounting for 2 <sup>nd</sup> period	Total Number of stoves distributed
Total stoves distributed by 31/07/2019	31/07/2019	01/09/2019	16,220
Total stoves distributed by 15/08/2019	15/08/2019	01/09/2019	1,030
Total stoves distributed by 31/08/2019	31/08/2019	01/09/2019	6,710
Total stoves distributed to 06/09/2019	06/09/2019	06/09/2019	4,040
		<b>Total</b>	<b>28,000</b>

CPA 004 (10477-P1-0004-CP1)	Start date of stove crediting period (date of last stove given in a month)	Start date of ER accounting for 2 <sup>nd</sup> period	Total Number of stoves distributed
Total stoves distributed by 31/07/2019	31/07/2019	01/09/2019	13,760
Total stoves distributed by 15/08/2019	15/08/2019	01/09/2019	1,130
Total stoves distributed by 31/08/2019	31/08/2019	01/09/2019	6,040
Total stoves distributed to 10/09/2019	10/09/2019	10/09/2019	7,070
		<b>Total</b>	<b>28,000</b>

<b>CPA 005 (10477-P1-0005-CP1)</b>	<b>Start date of stove crediting period (date of last stove given in a month)</b>	<b>Start date of ER accounting for 2<sup>nd</sup> period</b>	<b>Total Number of stoves distributed</b>
Total stoves distributed by 31/07/2019	31/07/2019	01/09/2019	10,025
Total stoves distributed by 15/08/2019	15/08/2019	01/09/2019	1,300
Total stoves distributed by 31/08/2019	31/08/2019	01/09/2019	4,315
Total stoves distributed to 30/09/2019	30/09/2019	30/09/2019	12,360
		<b>Total</b>	<b>28,000</b>

<b>CPA 006 (10477-P1-0006-CP1)</b>	<b>Start date of stove crediting period (date of last stove given in a month)</b>	<b>Start date of ER accounting for 2<sup>nd</sup> period</b>	<b>Total Number of stoves distributed</b>
Total stoves distributed by 31/07/2019	31/07/2019	01/09/2019	10,275
Total stoves distributed by 15/08/2019	15/08/2019	01/09/2019	1,700
Total stoves distributed by 31/08/2019	31/08/2019	01/09/2019	3,020
Total stoves distributed to 27/09/2019	27/09/2019	27/09/2019	13,005
		<b>Total</b>	<b>28,000</b>

<b>CPA 007 (10477-P1-0007-CP1)</b>	<b>Start date of stove crediting period (date of last stove given in a month)</b>	<b>Start date of ER accounting for 2<sup>nd</sup> period</b>	<b>Total Number of stoves distributed</b>
Total stoves distributed to 31/01/2020	18/01/2020	18/01/2020	2,005
Total stoves distributed to 29/02/2020	29/02/2020	29/02/2020	15,875
Total stoves distributed to 11/03/2020	11/03/2020	11/03/2020	8,120
		<b>Total</b>	<b>26,000</b>

<b>CPA 008 (10477-P1-0008-CP1)</b>	<b>Start date of stove crediting period (date of last stove given in a month)</b>	<b>Start date of ER accounting for 2<sup>nd</sup> period</b>	<b>Total Number of stoves distributed</b>
Total stoves distributed to 31/01/2020	18/01/2020	18/01/2020	1,519
Total stoves distributed to 29/02/2020	26/02/2020	26/02/2020	16,266
Total stoves distributed to 10/03/2020	10/03/2020	10/03/2020	8,215
		<b>Total</b>	<b>26,000</b>

The second monitoring period is from 01/09/2019 to 31/05/2020. The start date of ER accounting has been considered as per the batch commissioning dates as described under section E.3 above.

CME has followed the sampling plan as described under the registered PoA-DD, section B.5.2. As per the same, the share of operating stoves and the continued use of pre-project devices was determined based on sampling procedures. Additionally, the efficiency of the ICS has been tested. The CME has taken the responsibility of conducting the sampling surveys and maintaining a database with all operating stoves.

As per the Guideline for Sampling and Surveys for CDM Project Activities and Programme of Activities, version 04, the sampling plan is as follows:

### 1. Sampling Design

Due to the large number of ICS distributed as part of the CPAs included in the PoA, it is not economically feasible to monitor each individual ICS unit distributed. Therefore, representative sampling was undertaken as part of a PoA-wide Sampling Plan (by grouping and sampling across CPAs) that is designed in line with the requirements of the “Sampling and surveys for CDM project activities and programme of activities”, version 04

#### (a) Objective and reliability requirements:

The objective is to obtain an unbiased and reliable estimate of the proportion or mean value of the following key variables over the course of the crediting period, and with 95/10 confidence/precision for annual and 95/10 for biennial sampling across CPAs (as per Methodology AMS-II.G version 11.0). In case a single CPA is sampled 90/10 confidence/precision for annual and 95/10 confidence/precision shall be required for biennial sampling. CME has considered 95/10 confidence/precision sampling to consider eight CPAs under one sampling frame. Following are the parameters considered for monitoring via sampling survey.

$N_{y,i,j}$	Number of project devices of type $i$ and batch $j$ operating during year $y$
$\mu_{y,i,j}$	Adjustment to account for any continued use of pre-project devices during the year $y$
$\eta_{new,i,j}$	Efficiency of the project device $i$ and batch $j$ . implemented as part of the project activity

The efficiency of the project ICS ( $\eta_{new,i,j}$ ) is a monitoring parameter, which was calculated based on Water Boiling Tests (WBT).

All the samplers and testers were hired locally and spoke the local language which enabled fully understanding of any responses given by users.

#### (b) Target Population

The target population is total ICS population served under the CPAs (and covered under the monitoring report), and the sampling frame consists of aggregated data of end users of the ICS as recorded in the CPA Databases.

#### (c) Sampling Frame

The CPAs involve the distribution of the same ICS technology (i.e. 3G,4G and TK90) throughout the project area replacing traditional cookstoves. The population is homogeneous in nature i.e. common technology with similar operating characteristics. Stoves are distributed to people in rural areas.

As prescribed under the registered monitoring plan, CPAs shall be grouped together to create a Primary Sampling Unit, which is homogenous. As per EB 86 Annex 04, Appendix-2, paragraph 1, for the use of a single sampling plan covering a group of CPAs, provided the homogeneity of population can be demonstrated, or differences are taken into account in the sample size calculation, a 95/10 confidence/precision is applied for annual sampling. As per Methodology AMS II.G version 11.0, a 95/10 confidence/precision shall be achieved for biennial sampling. In case a single CPA is sampled, 90/10 confidence/precision for annual and 95/10 confidence/precision shall be required for biennial sampling.

All the eight CPAs are implemented by the CME. Since all the eight CPAs have homogenous

population and distributed ICS are of same technology, therefore CPAs are grouped and a primary sample unit has been considered. Thus, the total stove database for all the eight CPAs is considered to be a primary sample unit and sample size has been calculated based on the same.

#### d) Sampling Method

As per registered monitoring plan, the sampling method for monitored parameters  $N_{y,i,j}$  and  $\mu_{y,i,j}$  is “Simple Random Sampling” and samples will be randomly selected from the primary sampling units as illustrated above.

To ensure a random selection of ICS, random number generators shall be applied. Each ICS in the target population is uniquely identifiable by its unique ID number. Applying the random sampling, the ICS numbers are randomly chosen from the defined population up to the required sample size as calculated by the CME. The details of the selected samples are provided in the sample survey sheet along with the stove database.

To determine the parameters, sampling survey has been involved the following approaches (outcome in brackets):

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

$\mu_{y,i,j}$ : Pre project device only is in use then fraction to be used to calculate total number, however if pre project device is used along with project ICS, proportion of usage of each will be determined by cooking habits evaluated by survey questionnaire during the monitoring period.

Using the formulas as given in the section “Sample Size” below, the CME has randomly sampled the required number of ICS from the primary sampling units.

#### e) Sample size

In line with the registered sampling plan, for the estimation of the proportion or mean value of the parameters investigated, the minimum sample size for each sample frame has been calculated based on 95/10 confidence/precision which will suffice for biennial sampling.

The procedure to determine the sample of households will ensure that they adequately represent the broader project population, minimizing sampling error. Using, a 95 per cent confidence level, and a 10 per cent margin of error, random samples will be selected from each Primary Sampling Unit.

There are two parameters for survey that are estimated through sampling: the number of stoves still in operation during the monitoring period as determined by the monitoring survey ( $N_{y,i,j}$ ), and the continued use of old stoves ( $\mu_{y,i,j}$ ). In line with AMS-II.G version 11.0, both can be sampled in a single survey with a random sample of households using the above described confidence/precision levels depending on annual or biennial monitoring frequency.

The expected parameter values (mean, standard deviation and proportion) have been determined based on project developer’s knowledge and experience as per para 13(b) and 13(c) of the Sampling and surveys for CDM project activities and programmes of activities, Version 08.0. In 1<sup>st</sup> monitoring period, this value is 1.0 so based on previous experience, CME used an expected value of 0.95 for this 2<sup>nd</sup> monitoring period as the sample size calculation with a value of 1.0 is not possible.

#### Parameters $N_{y,i,j}$

To estimate the sample size for parameters  $N_{y,i,j}$  the following equation is used:

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

Where:

- N : Sample size
- N=N<sub>y</sub> : Number of ICS in SSC-CPA installed in year y = total number of households
- p : Our expected proportion ([proportion] assuming [proportion] of the installed (ICS) will be in use and operating at the specified efficiency)
- 1.96 : Represents the 95 % confidence required
- 0.1 : Represents the 10 % relative precision

Based on the above assumptions, the resulting sampling size for a 95/10 confidence/precision is calculated for the total population size, the result below:

Monitoring parameter(s)		Stove Operating Fraction for determination of N <sub>y</sub>				
Sampling frame(s)		Given stove model and age population				
Sampling approach		Simple random sampling across stove models and age				
Sampling Population	Age	Stove population	Expected value	Calculated Sample Size (n)	Minimum Sample Size	Actual sample size
3G Cookstove	1	30,000	0.95	3	4	5
4G Cookstove	1	166,000	0.95	15	22	26
TK90 Cookstove	1	28,000	0.95	3	4	5
Sample size determination						
Estimated Operation (p)				0.95		
V <sub>operation</sub> = p(1-p)/p <sup>2</sup>				0.053		
Calculated Sample Size				21		
Minimum Sample Size				30		

**Parameter  $\mu_{y,i,j}$**

Similarly, a sample size calculation has been conducted for the parameter  $\mu_{y,i,j}$ , the result is similar to parameter  $N_{y,i,j}$ .

Monitoring parameter(s)		Utilization of Project stoves - $\mu_{y,i}$				
Sampling frame(s)		Given stove model population				
Sampling approach		Simple random sampling across stove models and age				
Sampling Population	Age	Stove population	Expected value	Calculated Sample Size (n)	Minimum Sample Size	Actual sample size
3G Cookstove	1	30,000	0.95	3	4	5
4G Cookstove	1	166,000	0.95	15	22	26
TK90 Cookstove	1	28,000	0.95	3	4	5
Estimated results based sample size determination						
Estimated utilization (p)				0.95		
$V_{Utilization} = p(1-p)/p^2$				0.053		
Calculated Sample Size				21		
Minimum Sample Size				30		

Thus, the sample size finalized for all the two parameters are as follows:

Parameter	Calculated Sample Size	Minimum Sample Size	Actual monitored sample size
$N_y = N_{y,i,j}$	21	30	36
$\mu_y = \mu_{y,i,j}$	21	30	36

Additionally, as per registered sampling plan, it's recommended that the CME may choose to use the same samples to monitor more than one parameter, where parameters have same units. Sampling more than one parameter within the same sample (household) helps reduce travel needs for monitoring and the associated costs. At the same time this approach ensures the random selection of samples for every parameter. Also, oversampling is strongly encouraged, not only to compensate for any attrition, outliers or nonresponse associated with the sample, but also to prevent a situation at the analysis stage where the required reliability is not achieved and additional sampling efforts would be required. The minimum sample size required shown above was adjusted upwards to account for non-responses. CME shall determine the appropriate non-responses rate based on previous experience.

Therefore, even though the particular parameters are surveyed and tested based on the above samples sizes and selected randomly from the stove database, CME had collected some more data for the parameter  $\mu_y$  for backup reference purposes. Over and above the 30 samples, the monitoring survey data for  $\mu_y$  has been collected for the 30 samples also which were selected for parameters  $N_y$ . To safety and avoid the non - response rate, CME calculated an additional 20% of the sample to be surveyed. A total of 36 samples were selected.

**Parameter  $\eta_{new,i,j}$**

For determination of efficiency of the project ICS ( $\eta_{new,i,j}$ ) an across CPA sampling based on the ICS model and its vintage with the applied 95/10 confidence precision level was performed by the Viet Charcoal Production Company Ltd.

The standard deviation used for the calculation of initial sample size is based on previous WBTs carried out during previous verification (Verification 1). Since the standard deviation of those tests is much lower than the one assumed at the time of CPA-DD writing, also the resulting initial sample size is lower than the one stated in the CPA-DD. The initial sample size using the lower standard deviation was calculated with 1. Since the calculated sample size is lower than 30, the Sampling Standard requires to apply the Student’s t-distribution. However, the t-distribution cannot be applied in this case, since the degrees of freedom would result in 0 (1-1) for which the t-Table does not provide any t value. Hence, the CME decided to choose as initial sample size 3 for each model of ICS (3G, 4G and TK90) model and their vintage (1 year old) and calculated the precision level. The 95/10 confidence/precision level was met for all of the 3 stove models, hence 3 was considered as an appropriate initial sample size for each stove model.

The WBT for determination of thermal efficiency ( $\eta_{new,i,j}$ ) has been performed by Viet Charcoal Production Company Ltd (manufacturer of ICS) in accordance with WBT Protocol (version 4.2.3) and 95/10 precision requirement was met. This is also in accordance with point 2 of data parameter table 12 of applied methodology AMS-II.G (Version 11.0).

**f) Analysis of data collected and confidence/precision achieved**

Analysis of the data monitored through sampling revealed the following results:

**Parameters  $N_{y,i,j}$**

ANALYSIS for parameter $N_y$	
Samples Monitored	36
Operation fraction Measured	1.000
Standard Error of operation	0.000
Upper Boundary Level	100.00%
Lower Boundary Level	100.00%
Relative precision (Margin of error)	0.00%
Check precision	0.00%
Result	Ok, reliability level met
Lower Bound confidence value	Not applicable

**Parameter  $\mu_{y,i,j}$**

ANALYSIS for parameter $\mu_{y,i}$	
Samples Monitored	36
Utilization Measured	0.9683
Standard Error of Utilization	0.03
Upper Boundary Level	1.026
Lower Boundary Level	0.911
Relative precision (Margin of error)	5.91%
Check precision	5.91%
Result	Ok, reliability level met



Lower Bound confidence value	Not applicable
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**Parameter  $\eta_{new,i,j}$** • **3G cookstove**

RESULT 3G				
Sampling Population	Sampling frame size	Monitored Sample Size	Monitored efficiency (%)	Monitored standard deviation
3G	30,000	3	28.03%	0.08%
Reliability Check				
Samples Monitored				3
Mean efficiency				28.03%
Standard Error of Mean				0.0473%
Upper Boundary Level				28.23%
Lower Boundary Level				27.82%
Relative precision (Margin of error)				0.73%
Check precision				0.73%
Result				Ok, reliability level met
Lower Bound confidence value				Not applicable

**4G Cookstove**

RESULT 4G				
Sampling Population	Sampling frame size	Monitored Sample Size	Monitored efficiency (%)	Monitored standard deviation
4G	166,000	3	29.02%	0.03%
Reliability Check				
Samples Monitored				3
Mean efficiency				29.02%
Standard Error of Mean				0.0153%
Upper Boundary Level				29.08%
Lower Boundary Level				28.95%
Relative precision (Margin of error)				0.23%
Check precision				0.23%
Result				Ok, reliability level met
Lower Bound confidence value				Not applicable

**TK90 Cookstove**

RESULT TK90				
Sampling Population	Sampling frame size	Monitored Sample Size	Monitored efficiency (%)	Monitored standard deviation
TK90	28,000	3	27.37%	0.12%
Reliability Check				
Samples Monitored			3	
Mean efficiency			27.37%	
Standard Error of Mean			0.0675%	
Upper Boundary Level			27.66%	
Lower Boundary Level			27.08%	
Relative precision (Margin of error)			1.06%	
Check precision			1.06%	
Result			Ok, reliability level met	
Lower Bound confidence value			Not applicable	

For detailed calculations refer ER calculator sheet.

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

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

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

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

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According to paragraph 24 of methodology AMS-II.G, Version 11.0, emission reductions shall be calculated as:

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

Where:

i Indices for the situation where more than one type of project device is introduced to replace the pre-project devices

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>2e</sub>

$ER_{y,i,j}$  Emission reductions by project device of type  $i$  and batch  $j$  during year  $y$  in t CO<sub>2e</sub>

$LE_y$  Leakage emissions in the year  $y$

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

$B_{y,savings,i,j}$	: Quantity of woody biomass that is saved in tonnes per cookstove 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 (fNRB)
$NCV_{biomass}$	: Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.0156 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 85.7 t CO <sub>2</sub> /TJ
$N_{y,i,j}$	: 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 equation 7 (fraction).

$B_{y,savings,i,j}$  is calculated using the following formulae in accordance with equation 7 of the approved methodology AMS-II.G Version 11.0:

$$B_{y,savings,i,j} = B_{old,i,j} \times L_y \times [1 - (\eta_{old,i,j} / \eta_{new,i,j})]$$

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 $j$
$L_y$	: Leakage adjustment factor or 0.95 (as per default value) of AMS-II.G version 11.0
$\eta_{old,i,j}$	: Efficiency of the old devices being replaced by project devices of type $i$ and batch $j$
$\eta_{new,i,j}$	: Efficiency of the project device $i$ and batch $j$ .

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

Leakage as per para 39 of AMS II G methodology has been considered. Thus, is being multiplied by a net to gross adjustment factor of 0.95 to account for both leakages mentioned in para 39 in which case surveys are not required.

$$B_{old,i,j} = B_{old,HH} = B_{old,p} \times N_{p,HH}$$

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.
$B_{old,p}$	: Annual quantity of woody biomass that would have been used per person in the household in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices
$N_{p,HH}$	: Average number of persons served per household prior to the project implementation

The detailed ER calculations are submitted in the ER sheet.

**F.3. Calculation of leakage emissions**

&gt;&gt;

Not applicable

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

CPA UNFCCC reference number	Baseline GHG emissions or baseline net GHG removals (t CO <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
10477-P1-0001-CP1	31,797	0	0	0	31,797	31,797
10477-P1-0002-CP1	31,759	0	0	0	31,759	31,759
10477-P1-0003-CP1	33,023	0	0	0	33,023	33,023
10477-P1-0004-CP1	32,340	0	0	0	32,340	32,340
10477-P1-0005-CP1	31,093	0	0	0	31,093	31,093
10477-P1-0006-CP1	30,267	0	0	0	30,267	30,267
10477-P1-0007-CP1	10,374	0	0	0	10,374	10,374
10477-P1-0008-CP1	10,582	0	0	0	10,582	10,582
<b>Total</b>	<b>211,235</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>211,235</b>	<b>211,235</b>

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

CPA UNFCCC reference number	Amount achieved during this monitoring period (t CO <sub>2</sub> e)	Amount estimated ex ante for this monitoring period in the CPA-DD (t CO <sub>2</sub> e)
10477-P1-0001-CP1	31,797	33,697
10477-P1-0002-CP1	31,759	34,338
10477-P1-0003-CP1	33,023	34,786
10477-P1-0004-CP1	32,340	34,495
10477-P1-0005-CP1	31,093	34,269
10477-P1-0006-CP1	30,267	33,266
10477-P1-0007-CP1	10,374	32,182
10477-P1-0008-CP1	10,582	32,349
<b>Total</b>	<b>211,235</b>	<b>269,382</b>

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

&gt;&gt;

The emission reduction in this monitoring period from 01/09/2019 to 31/05/2020 (inclusive of both dates is 274 days) is ex-ante calculated as per registered PDD according to equation below:

Amount estimated for this monitoring period in the CPA-DD = (Amount estimated in the CPA – DD/365)\*274 = 269,382 tCO<sub>2</sub>e.

CPA	Amount estimated ex ante for one year in the CPA –DD (t CO <sub>2</sub> e) (365 days)	Amount estimated ex ante for this monitoring period in the CPA-DD (t CO <sub>2</sub> e) (274 days)
CPA 001	44,888	33,697
CPA 002	45,742	34,338
CPA 003	46,339	34,786
CPA 004	45,952	34,495
CPA 005	45,650	34,269
CPA 006	44,314	33,266
CPA 007	42,870	32,182
CPA 008	43,093	32,349
<b>Total</b>	<b>358,848</b>	<b>269,382</b>

Hence, the actual emission reductions achieved during the current monitoring period were  $(1-211,235/269,382) = 21.59\%$  smaller than the estimated value in registered PDD.

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

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There is no increase in the GHG emission reductions or net GHG removals by sinks achieved by these specific-case CPA(s) during this monitoring period.

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

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The CPAs apply Type II small-scale methodology AMS-II.G Version 10.0. According to paragraph 126 (b) of project standard for PoA, version 02.0, type II include “Energy efficiency improvement project activities that reduce energy consumption, on the supply and/or demand side, with a maximum energy saving of 60 GWh per year (or an appropriate equivalent) in any year of the crediting period. In this context, for project activities that improve thermal energy efficiency, the maximum energy saving of 60 GWh(e) per year is equivalent to 180 GWh(th) per year saving”. The ER spreadsheet shows that this limit was adhered to.

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**Document information**

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	31 May 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>
01.0	1 April 2015	Initial publication.

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