



**Programme of activities design document form  
(Version 08.1)**

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

**BASIC INFORMATION**

<b>Title of the PoA</b>	Improved cookstove program in Bangladesh supported by the Republic of Korea
<b>Version number of the PoA-DD</b>	4.0
<b>Completion date of the PoA-DD</b>	21/06/2018
<b>Coordinating/managing entity</b>	Ecoeye Co., Ltd.
<b>Host Parties</b>	Republic of Bangladesh
<b>Applied methodologies and standardized baselines</b>	AMS II.G. - Small-scale methodology: Energy efficiency measures in thermal applications of non-renewable biomass, version 08.0
<b>Sectoral scopes linked to the applied methodologies</b>	mandatory sectoral scopes: 3 conditional sectoral scopes: NA

## PART I. Programme of activities (PoA)

### SECTION A. Description of PoA

#### A.1. Purpose and general description of PoA

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##### **a) *The policy measure or stated goal that the PoA seeks to achieve***

The PoA involves distribution of biomass based improved cookstoves (“ICS”) (technology/measure) to households / SMEs in Bangladesh.

Biomass accounts for 90% of Bangladeshi households’ energy needs with fuelwood being used in around 84% households for cooking purposes (section 1.5, page 8, Country Action Plan for Clean Cookstoves). Also, more than 90% households still use traditional stoves for cooking<sup>1</sup>.

The current cooking practice in Bangladesh is the use of “three-stone” cooking stove, popularly known as traditional stoves. 98–99% of Bangladesh rural population burns biomass fuels by using traditional cookstoves for cooking and heating. Households generally construct traditional cookstoves themselves with locally available materials and use biomass fuels<sup>2</sup>.

As per World Bank Report, ~95 percent of Bangladeshi households collect or purchase biomass energy to cook all or part of their meals, mainly using fixed clay stoves. The inherent inefficiency of such stoves, combined with the high moisture content of biomass cooking fuels, results in incomplete combustion, producing IAP<sup>3</sup>. Thus, biomass combustion with traditional cookstoves causes substantial environmental and health harm.

The PoA attempts to address the aforesaid issue, by effecting widespread adoption of ICS to households across Bangladesh. These ICS burn fuel more efficiently and are designed to reduce smoke, PM and other gaseous emissions, thus creating cleaner indoor air for women and children. Due to their higher thermal efficiency relative to traditional stoves, ICS reduce the amount biomass fuel consumption for meeting similar thermal energy needs.

In the absence of this PoA households/SMEs would cook primarily using traditional inefficient stoves, perpetuating environmental and health degradation. Thus, replacement of traditional stoves by ICS reduces non-renewable biomass fuel consumption and hence equivalent amount of GHG emissions.

##### **b) *Framework for the Implementation of the PoA***

This PoA will be managed by Ecoeye Co., Ltd. (EECL) as the Coordinating/Managing Entity (CME). EECL is a company registered in the Republic of Korea, under company number 314 81 73570, whose registered office is at B-1503, 70 Dusan-ro, Geumcheon-gu, Seoul, Korea. EECL will coordinate with the CPA Implementers for managing the PoA. The CPA Implementers will coordinate with local partners for manufacturing and installation of ICS at a subsidized cost to users, in exchange for the rights to the Emission Reductions.

The local partners will be trained to manufacture the stove as per specifications communicated by CME/CPA Implementer. CPA Implementer will be responsible for ensuring that end user information is captured at the point of installation, to facilitate the monitoring of stoves over the CPA crediting period. The local partners will be trained to capture the requisite data during the installation process, including but not limited to unique reference number of the stove and its location to avoid any double

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<sup>1</sup> Country Action Plan for Clean Cookstoves, November 2013, Power Division, Ministry of Power, Government of the People’s Republic of Bangladesh, page 39

<sup>2</sup> Peer review paper published in PNAS, July 3, 2012, vol. 109, no. 27, 10815–10820, “Low demand for nontraditional cookstove technologies” by Mobarak et al

<sup>3</sup> Special Report - Restoring Balance: Bangladesh’s Rural Energy Realities, Executive Summary, page xx

counting. The data collected during the installation will be captured and archived in a data management system, or CPA database.

EECL will also provide all the implementation costs including the operation and maintenance costs for the CPA implementation to ensure that the ICS are available at an affordable price to the potential users. EECL will also be responsible for communications with CDM Executive Board and coordinate the work relating to validation, verification, registration and issuance of carbon credits generated by the program.

**c) Confirmation that the PoA is a voluntary action by CME**

The proposed PoA is a voluntary action by EECL. There is no local regulation or law that mandates EECL to implement the PoA in Bangladesh.

**d) PoA Contribution to sustainable development of host party**

The PoA's contribution to sustainable development is as discussed below:

Environmental benefits:

- *Air quality:* Children and mothers will be exposed to fewer air pollutants through reduced emission of not only CO<sub>2</sub>, but also CO and PM. Air pollution from cooking with solid fuel is a key risk factor for childhood pneumonia as well as many other respiratory diseases and cancer<sup>4</sup>.
- *Biodiversity:* will be improved as the programme reduces pressure on remaining forest reserves in Bangladesh.

Social and Economic benefits:

- *Employment:* The PoA gives rise to employment opportunities for new ICS technicians, assistants, office staff and other related jobs.
- *Livelihood of the poor:* The standard of living of poor families will be improved as the ICS will reduce fuel expenses in case the biomass is purchased. Otherwise, reduction in fuel consumption shall provide relief from drudgery of fuel collection and more time for productive activity, arising from less time spent collecting fuel.
- *Access to energy services:* The ICS will be distributed via local partners across Bangladesh, making the ICS technology available and accessible to larger and far scattered population.
- *Technological self-reliance:* The introduction of a locally manufactured technology with optimized energy efficiency helps to build technological self-reliance.

**A.2. Physical/geographical boundary of PoA**

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The CPAs under the PoA will be limited to Bangladesh (physical boundary of PoA).

**A.3. Technologies/measures**

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The PoA will disseminate high efficiency biomass fired ICS (technology/measure) to replace the existing traditional cookstoves in beneficiary households/SMEs. The ICS will be constructed by local partners, trained and acting under a contractual basis, on behalf of the CPA Implementer to install the ICS and offer post installation maintenance services. ICSs are designed to increase heat transfer to the cooking pot, while being suitable for traditional utensils and cooking habits of people in Bangladesh. The improvement in thermal efficiency is achieved by optimizing the dimensions of the ICS combustion chamber and ensuring effective air flow to aid complete combustion of biomass.

**A.4. Coordinating/managing entity**

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Ecoeye Co., Ltd.

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<sup>4</sup> <http://www.who.int/mediacentre/factsheets/fs292/en/index.html> - World Health Organization, 2005

**A.5. Parties and project participants**

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Republic of Bangladesh (host)	Bangladesh Bondhu Foundation (Private)	No

**A.6. Public funding of PoA**

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No public funding is involved in the PoA.

**SECTION B. Management system**

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EECL will be the CME of the PoA. Their main responsibilities include identification of CPA implementers. CPA implementers will be responsible for the distribution/installation of technology through a network of local partners for manufacturing and installation of ICS under their CPA. Also, the local partners will be involved in collection and recording the installation data (As instructed by CPA implementer). Subsequently the CME will be responsible for annual / biennial monitoring of the PoA as per the registered monitoring plan.

As CME, EECL will be responsible<sup>5</sup> for:

- General management and financing of the PoA;
- Communications with the CDM EB, including on matters related to PoA/CPA inclusion, validation, verifications and emission reductions
- Identification of CPA implementers and selection and preparation of CPAs for their inclusion in the PoA, ensuring that any CPAs under the PoA are neither registered as an individual CDM project activity nor included in another registered PoA
- To ensure that the same approved baseline and monitoring methodology is applied to all the CPAs;
- To establish CER ownership agreements with the CPA implementer;
- To ensure that the CPA implementer have CER transfer agreements with each local partner
- To establish and manage the data base (document control for each CPA) for calculating ERs based on data received from the CPA implementer; and
- Assessment of competency of entities (external consultant/partner, if any) involved in CPA inclusions as well as ensure that project documents are technically reviewed (either internally or externally outsourced)
- To facilitate validation and verification of the program by a Designated Operational Entity.
- Training and capacity development of CPA implementer, EECL staff and maintaining training records.
- Improvement in Management system as and when required.

The role of CPA Implementer is detailed below:

- To identify local partners, who'll manufacture ICS as per specifications and materials as communicate by CME/CPA Implementer.
- To execute agreement with the local partners, for transfer of emission reductions in favour of themselves / CME.
- To execute agreement with the ICS beneficiary, for transfer of emission reductions in favour of themselves / CME.
- Disbursement of incentives/subsidies to the local partner (according to their role and as per CME instructions, if any).
- Inspection of installed ICS, Collection of ICS data from the field and recording / archiving of collected data.

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<sup>5</sup> The CME may outsource all or a part of their responsibilities to competent agencies, firms / institutions.

- EX-post Monitoring of ICS installed for performance, usage as per monitoring requirements set out in the registered monitoring plan.
- Training of local partners on production, installation, maintenance and after-sales services of ICS and maintaining records.
- Any other task and responsibilities assigned by CME to the CPA implementer, as and when required.

The role of local partner<sup>6</sup> is detailed below:

- manufacture / install ICSs at beneficiary households.
- To execute agreement with the ICS beneficiary, for transfer of emission reductions in favour of themselves / CME.
- Collect and record the end user information, including but not limited to, date of ICS installation, its location and baseline information.
- To provide after sales maintenance services to ICS beneficiaries as per the terms and conditions agreed with CME / CPA implementer.
- Adequate record keeping systems for the compilation, computation and storage of installation data collected as per CME/CPA implementer instructions.

## **SECTION C. Demonstration of additionality of PoA**

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The additionality of the PoA is being demonstrated using the Tool: Demonstration of additionality of small scale project activities, Version 11.0. Para 11(c) of the Tool specifies the following:

*Project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size of each unit is no larger than 1%cent of the small-scale CDM thresholds;*

The applied small-scale methodology threshold is annual thermal energy savings of 180GWh<sub>th</sub>. Thus, 1% threshold is annual thermal energy savings of 1.8GWh<sub>th</sub> for each unit. Refer section K below. The above has been developed as an eligibility criterion for inclusion of CPA in the PoA to ensure that the CPAs under the PoA remain additional throughout the lifetime of the PoA.

## **SECTION D. Start date and duration of PoA**

### **D.1. Start date of PoA**

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15/02/2018

The PoA DD was published on 15/02/2018 on UNFCCC CDM website for global stakeholder consultation: <https://cdm.unfccc.int/ProgrammeOfActivities/Validation/DB/0CQ93VYA03J9GMXFUTLWFTBNSBAIWO/view.html>

The notification to DNA and secretariat was submitted on 09 March 2018: <https://cdm.unfccc.int/Projects/PriorCDM/notifications/index.html>

### **D.2. Duration of PoA**

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28 years 0 months

## **SECTION E. Environmental impacts**

### **E.1. Level at which environmental impacts analysis is undertaken**

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<sup>6</sup> Several local partners may jointly serve the mentioned responsibilities

Programme Level

## **E.2. Analysis of environmental impacts**

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The Government of Bangladesh, with a view to conserving and protecting the environment from unplanned development activities, enacted the Environmental Conservation Act (ECA) 1995 which necessitated obtaining an Environmental Clearance Certificate (ECC) from the Department of Environment (DoE) for any industries to be established or projects to be undertaken in Bangladesh (ECA, 1995). The Environmental Conservation Rules, 1997 outlines the procedures, formalities and requirements for obtaining the ECC for different projects (ECR, 1997). Environmental Impact Assessment (EIA) is one of the necessary documents required to be submitted for getting environmental clearance. However, for improved cookstove EIA is not required as it is not listed in any of the three categories (Green, Orange and Red) of projects that need Environmental Clearance.

## **E.3. Environmental impact assessment**

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Not applicable

## **SECTION F. Local stakeholder consultation**

### **F.1. Level at which local stakeholder consultation is undertaken**

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Programme Level

### **F.2. Modalities for local stakeholder consultation**

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#### **a) The scope of local stakeholder consultation**

The scope of local stakeholder consultation was to discuss and invite feedback on the direct indirect positive or negative impacts of the PoA. There are no specific host party rules for conducting stakeholder consultation.

#### **b) The minimum group of stakeholders involved**

Various group of stakeholders were invited including the following:

- Local people impacted by the project or official representatives
- Local policy makers and representatives of local authorities
- Local non-governmental organizations working on topics relevant to your project
- The local DNA representative
- Relevant national / International Non-Governmental Organizations (NGOs)

The aforesaid constitute the stakeholders that are deemed directly / indirectly impacted by the PoA.

#### **c) Means of inviting stakeholders' participation**

Various means of communication were used for inviting stakeholders.

- Notice were published in local newspapers alerting stakeholders about the consultation for the PoA, encouraging them to participate and share comments and feedback during the physical meeting on 12/01/2018.
- Email invitations were sent to various stakeholders asking them to participate in the physical meeting. A non-technical summary of the PoA and a feedback form (questionnaire) were also shared with them requesting them to return their feedback in the forms, in case they are not able to attend the meeting.
- Letters were also sent to various stakeholders inviting them to the physical meeting to share their feedback and concerns.
- Phone based invitations were also sent to specific distinguished stakeholders.
- Posters were displayed at local markets, schools etc.

**d) The information made available to stakeholders**

A non-technical summary of the PoA was made available to the stakeholders to make them understand the PoA with ease. The non-technical summary was circulated in English and local language (Bangla) to ensure maximum acceptance. The non-technical summary included an impact scorecard (+ve, -ve and neutral) on various environmental, socio economic and technological issues to assist the stakeholders in comprehending the impacts of the Programme as well as a questionnaire feedback form.

**e) The conduct of consultation**

During the physical meeting on 12 Jan 2018 at Narsingdi, Dhaka, the stakeholders present were explained about the PoA via a presentation. The non-technical summary was explained and the impacts of the PoA were discussed. During the meeting, the questions raised by stakeholders were answered and the proceedings were recorded. Also, the stakeholders were requested to submit the questionnaire feedback form appended to non-technical summary. Around 200 people participated in the consultation.

**F.3. Summary of comments received**

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The participants were appreciative of the Programme. No negative comments were received.

Question raised by stakeholder	Response by CME
How much reduction in price will the customers get?	With proposed ICS models people can get a one-pot stove at 350 BDT and two-pot stove at 550 BDT from local partners. And the carrying cost and installation cost will be added with it. More ICS units may be launched in future with attractive pricing.
What type of fuel do we need?	We can use any types of biomass. But fire-wood gives the best performance in the proposed stoves
Can we also use dry leaves or rice straw as fuel in Bondhu Chula?	Yes, we can use dry leaves as well as other fuels in the proposed Bondhu Chula (ICS).
Please tell me about the process of getting a Bondhu Chula.	You can easily get a Bondhu Chula (ICS) by contacting with the local staff and partner.
I want to be an entrepreneur (partner) of Bondhu chula. How can I be?	By contacting with the local staff of Bangladesh Bondhu Foundation (proposed CPA implementer).
This program was really beneficial for the local people. Will such types of program occur again?	This program is just the beginning of this project and will continue all over Bangladesh.
In the leaflet, there is a picture of a colourful stove. Can we purchase this stove?	Yes, our partner produces also this colorful stove. But it is a little more expensive.

**F.4. Consideration of comments received**

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No action is required by CME against the comments received as they were generic in nature and non-negative comments.

**SECTION G. Approval and authorization**

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Republic of Bangladesh (host party) has approved and authorized the PoA vide approval cum authorization letter dated 21/06/2018.

Bangladesh Bondhu Foundation (project participant) and Ecoeye Co., Ltd. (CME) have been authorized by Republic of Bangladesh (host party) to participate in the PoA.

## PART II. Generic component project activity (CPA)

### SECTION H. Description of generic CPA

#### H.1. Title of generic CPA

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Improved cookstove program in Bangladesh supported by the Republic of Korea – CPA #

#### H.2. Reference number of generic CPA

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Generic CPA 01

Version 4.0

21/06/2018

#### H.3. Purpose and general description of generic CPA

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##### **a) Purpose of the CPA**

The CPA involves dissemination of high efficiency biomass (wood-fuel) fired ICS (technology/measure) to replace the existing traditional (wood-fuel) cookstoves/three stone fires in beneficiary households/SMEs in Bangladesh. [add more]

##### **b) Location the CPA**

The CPA will be located in Bangladesh.

##### **c) Technology**

The CPA will be limited to aggregate installation of XXX number of ICS units. Any ICS units over and above the specified number of units shall form subsequent CPAs under the PoA. [add more]

##### **d) Project Boundary**

The CPA boundary is limited to Republic of Bangladesh

##### **e) Baseline scenario**

In the absence of the CPA, project households/SMEs would cook primarily using traditional inefficient stoves, perpetuating environmental and health degradation. [add more]

##### **f) Annual Average GHG and total GGH reductions over the crediting period**

Annual average GHG reductions: XXX tCO<sub>2</sub>e

Total GHG reductions over CP: XXX tCO<sub>2</sub>e

##### **g) Small scale project type**

The CPA is a type II category CPA.

#### H.4. Technologies/measures

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The CPA includes dissemination of high efficiency improved wood-fuel based cooking stoves for meeting the thermal energy needs of beneficiary households'/SMEs. The ICS will replace traditional inefficient wood-fuel cookstoves. [add more]

The deemed service level of the ICS is domestic usage<sup>7</sup>

The lifetime of ICS is XXX years.

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<sup>7</sup> As a conservative measure, it is deemed that the ICS service level in case of installations at SME's is also equivalent to domestic usage.



The installed capacity of (number of ICS installed) the CPA shall be limited to XXX units

The rated/design thermal efficiency of ICS shall not be less than 20%.

In the baseline, equivalent thermal energy needs would have been met by open fire / three stone fire or traditional clay stoves.

## SECTION I. Application of selected methodologies and standardized baselines

### I.1. Reference to methodologies and standardized baselines

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AMS II.G: "Energy efficiency measures in thermal applications of non-renewable biomass" (Version 08.0)

[https://cdm.unfccc.int/filestorage/S/0/5/S05JFDNZBV9YMCQT2UE6XWO174PL3A/EB90\\_repan13\\_AMS-II.G\\_%28v08.0%29.pdf?t=MVR8cGFwdDdufDA3NMJLwI5J2qZi8c0liXXp](https://cdm.unfccc.int/filestorage/S/0/5/S05JFDNZBV9YMCQT2UE6XWO174PL3A/EB90_repan13_AMS-II.G_%28v08.0%29.pdf?t=MVR8cGFwdDdufDA3NMJLwI5J2qZi8c0liXXp)

Standard: Sampling and surveys for CDM project activities and programmes of activities, version 7.0

[https://cdm.unfccc.int/filestorage/e/x/t/extfile-20170509173059588-Methodology\\_standard05\\_EB94a02-ver07.0-4may17-.pdf/Methodology\\_standard05\\_EB94a02%28ver07.0%2C%204may17%29?t=VEh8cGFwdDlqfDAfJGC9L70ik-CxyAjU0dFq](https://cdm.unfccc.int/filestorage/e/x/t/extfile-20170509173059588-Methodology_standard05_EB94a02-ver07.0-4may17-.pdf/Methodology_standard05_EB94a02%28ver07.0%2C%204may17%29?t=VEh8cGFwdDlqfDAfJGC9L70ik-CxyAjU0dFq)

Tool: Calculation of the fraction of non-renewable biomass version 1.0

<https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-30-v1.pdf>

### I.2. Applicability of methodologies and standardized baselines

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Methodology AMS-II.G. ver 8.0 Applicability Criteria	Justification
This methodology comprises efficiency improvements in thermal applications of non-renewable biomass. Examples of applicable technologies and measures include the introduction of high efficiency biomass fired project devices (cook stoves or ovens or dryers) to replace the existing devices and/or energy efficiency improvements in existing biomass fired cook stoves or ovens or dryers.	The CPA includes dissemination of high efficiency biomass fired ICS to replace the existing traditional cookstoves in beneficiary households / SMEs. The same has been developed as an eligibility criterion for inclusion of CPA in the PoA.
In the case of cook stoves, the methodology is applicable to introduction of single pot or multi pot portable or in-situ cook stoves with rated efficiency of at least 20 per cent.	The CPA shall include only those ICS that have a rated thermal efficiency of at least 20%. The same has been developed as an eligibility criterion for inclusion of CPA in the PoA.
The aggregate energy savings of a single project activity shall not exceed the equivalent of 60 GWh per year or 180 GWh <sub>th</sub> per year in fuel input	The CPA is a type II category CPA. The General Guidelines for SSC methodologies, version 22.1 dated 15 April 2016, paragraph 4.17 states the following: In the case of CPAs solely composed of "microscale CDM units", the coordinating/managing entity is not required to demonstrate compliance with the small-scale CDM thresholds at the aggregate level of the CPA. In such cases:

	<p>a) The definition of 'microscale CDM units' provided under section "5.1 Application of microscale thresholds at unit level for CPAs" of the methodological tool "Demonstration of additionality of microscale project activities" shall apply;</p> <p>b) 95/10 precision shall be applied for sampling surveys in accordance with the standard for "Sampling and surveys for CDM project activities and programmes of activities".</p> <p>Further section 5.1 of the Tool: Demonstration of additionality of microscale project activities, version 8, dated 22 Sep 2017 mentions the following:</p> <p>For CPAs applying microscale thresholds at the unit level rather than at the aggregate level of the CPA, the term 'project activities' in paragraphs 8 - 12 and 14 above shall be read as 'units'. If each of the units contained in the CPA satisfies the condition to qualify as a 'microscale CDM unit', then the coordinating/managing entity is not required to demonstrate compliance of the CPA with the microscale or small-scale thresholds at the aggregate level of the CPA. In such cases, the requirements related to de-bundling stated in paragraphs 13 and 16 above do not apply either.</p> <p>Para 9(b)(i) of the aforesaid Tool refers to micro-scale unit as those reducing not more than 1.8GWhth thermal energy savings per year (derived by multiplying by a factor of 3 to convert electrical units to thermal units as per footnote 19).</p> <p>Furthermore, the criteria for demonstrating additionality shall render only those units eligible under the CPA whose annual thermal energy savings is limited to 1.8GWhth per annum. Thus, all units will remain under the micro-scale limit throughout the year.</p> <p>Thus, compliance with the requirement of methodology is not required as per aforesaid and para 120(m) of Standard: CDM project standard for programmes of activities, version 1.0</p>
<p>Non-renewable biomass has been used in the project region since 31 December 1989, using survey methods or referring to published literature, official reports or statistics</p>	<p>As per section 5.2.3 of methodology, paragraph 29, the following two supporting indicators demonstrating use of non-renewable biomass exist in Bangladesh</p> <ol style="list-style-type: none"> <li>1. Increasing trends in fuel wood prices indicating a scarcity of fuel-wood; The Statistical Year Book Bangladesh 2015, published in September 2016, Chapter 10: Prices and Wages Section 10.09 gives annual average retail prices of selected consumer goods in Bangladesh. As per the same, the annual average retail price of fuelwood has been increasing steadily over last 10 years (from 271.01 Taka in 2006-07 to 524.73 Taka in 2014-15)<sup>8</sup>.</li> <li>2. Trends in the types of cooking fuel collected by users that indicate a scarcity of woody biomass Peer reviewed paper by Hassan et al. in Springer 'Energy, Sustainability and Society 2013'<sup>9</sup>, <u>Rural households' preferences and attitudes towards biomass fuels - results from a comprehensive field survey in Bangladesh</u> mentions that "The results revealed that branches, leaves, cow dung, rice straw and stem wood were the most commonly used biomass fuels, whereas the most preferred biomass fuels were firewood (branches and stem wood) followed by cow dung, bamboo and jute stalk. Due to the short supply of firewood, the rural households opted for inferior types of biomass such as leaves, twigs, rice straw and other crop residues. Samanea saman, Albizia procera and Mangifera indica are the main preferred firewood tree species. The study demonstrated that firewood was the</li> </ol>

<sup>8</sup> <http://203.112.218.65:8008/WebTestApplication/userfiles/Image/SubjectMatterDataIndex/YearBook15.pdf>

<sup>9</sup> <https://link.springer.com/content/pdf/10.1186%2F2192-0567-3-24.pdf>

	<p>most preferred biomass fuel and, as a consequence, the current consumption was not sustainable.”</p> <p>Thus, <math>f_{NRB,y} = NRB / (NRB + DRB)</math></p> <p>Further, an assessment of non-renewable usage of biomass is given below at 1990 and 2010 levels indicating a high degree of non-renewable biomass extraction since 31 Dec 1989.</p>				
	<b>Description</b>	<b>Units</b>	<b>1990</b>	<b>2010<sup>10</sup></b>	<b>Reference, Global FRA 2015, Country Report, Bangladesh</b>
	Total removals (H)	1000 m <sup>3</sup>	28383.09	27568.83	Table 4c on page 55
	Forest Area (FA)	1000 ha	1494	1442	Section 1.4, Table 1a, page 32
	Other Wooded Land (OWL)	1000 ha	269	289	Section 1.4, Table 1a, page 32
	Protected area within Forests (P <sub>forest</sub> )	1000 ha	110	248	Section 6.4, Table 6, page 72
	Protected area within other wooded land(P <sub>OWL</sub> ) <sup>11</sup>	1000 ha	0	0	This has been conservatively considered as 0 to maximize RB
	Net annual Increment (MAI)	m <sup>3</sup> /ha/yr	1.15	2.91	Table 3c on page 45
	Renewable Biomass(RB)	1000 m <sup>3</sup>	1900.95	4315.53	= MAI*(FA + OWL - P <sub>forest</sub> - P <sub>OWL</sub> )
	$f_{NRB,ys}$	Fraction	0.933	0.843	= 1 – RB / H
For cases where the biomass is sourced from renewable sources, the project participants should use a corresponding Type I methodology	Not Applicable (refer $f_{NRB}$ assessment above)				

### I.3. Application of multiple methodologies

&gt;&gt;

not applicable

### I.4. Project boundary, sources and greenhouse gases (GHGs)

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As per para 13 of the methodology, the CPA project boundary is the physical, geographical site of the efficient devices that utilize biomass.

<sup>10</sup> The data for 2010 has been used as FRA 2015 report mentions the removal data only till 2011

<sup>11</sup> The FAO FRA report does not give any information on protected areas under OWL category.

Source		GHG	Included?	Justification/Explanation
Baseline	Combustion of non-renewable biomass for cooking in baseline devices	CO <sub>2</sub>	Yes	Major emission source
		CH <sub>4</sub>	No	Minor emission source, excluded as conservative measure
		N <sub>2</sub> O	No	Minor emission source, excluded as conservative measure
Project activity	Combustion of non-renewable biomass for cooking in project devices	CO <sub>2</sub>	Yes	Major emission source
		CH <sub>4</sub>	No	Minor emission source, excluded as conservative measure
		N <sub>2</sub> O	No	Minor emission source, excluded as conservative measure

## I.5. Establishment and description of baseline scenario

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The methodology para 14 mentions the following:

*“It is assumed that in the absence of the project activity, the baseline scenario would be the projected use of fossil fuels to meet similar thermal energy needs as those provided by the project devices.”*

Biomass accounts for 90% of Bangladeshi households’ energy needs with fuelwood being used in around 84% households for cooking purposes (section 1.5, page 8, Country Action Plan for Clean Cookstoves). Also, more than 90% households still use traditional stoves for cooking<sup>12</sup>. Thus, the prevalent baseline technology in Bangladesh is deemed as fuelwood based traditional /three stone fires for cooking. This is further substantiated by the following:

The current cooking practice in Bangladesh is the use of “three-stone” cooking stove, popularly known as traditional stoves. 98–99% of Bangladesh rural population burns biomass fuels by using traditional cookstoves for cooking and heating. Households generally construct traditional cookstoves themselves with locally available materials and use biomass fuels<sup>13</sup>.

As per World Bank Report, ~95 percent of Bangladeshi households collect or purchase biomass energy to cook all or part of their meals, mainly using fixed clay stoves. The inherent inefficiency of such stoves, combined with the high moisture content of biomass cooking fuels, results in incomplete combustion, producing IAP<sup>14</sup>. Thus, biomass combustion with traditional cookstoves causes substantial environmental and health harm.

Lastly, there are no relevant national/sectoral policies (E+ implemented before 1997 or E-implemented before 2001) that affects the baseline scenario as described above. All relevant policies

## I.6. Estimation of emission reductions

### I.6.1. Explanation of methodological choices

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$B_{y,savings,i,j}$  shall be determined using option 3 (equation 6 in particular) as per para 20 of the methodology.

The loss in efficiency of the project device type  $i$  shall be determined based on para 25(c) or 25(d) of the methodology to be specified in the specific case CPA.  $B_{old,i,j}$  shall be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, thereby eliminating the need for ex-post surveys to determine leakages, as per para 42 (c) of the methodology.

<sup>12</sup> Country Action Plan for Clean Cookstoves, November 2013, Power Division, Ministry of Power, Government of the People’s Republic of Bangladesh, page 39

<sup>13</sup> Peer review paper published in PNAS, July 3, 2012, vol. 109, no. 27, 10815–10820, “Low demand for nontraditional cookstove technologies” by Mobarak et al

<sup>14</sup> Special Report - Restoring Balance: Bangladesh’s Rural Energy Realities, Executive Summary, page xx

**I.6.2. Data and parameters fixed ex ante***(Copy this table for each piece of data and parameter.)*

<b>Data/Parameter</b>	$B_{old,p}$
Data unit	tonnes/person/year
Description	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
Source of data	AMS II.G. version 8.0
Value(s) applied	0.50
Choice of data or Measurement methods and procedures	Default value specified by the methodology.
Purpose of data	To calculate baseline emission (For parameter $B_{old,HH}$ )
Additional comment	<p>The value may be updated during the crediting period with applicable value from approved standardized baseline.</p> <p>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.</p>

<b>Data/Parameter</b>	$N_{p,HH}$
Data unit	Number
Description	Average number of persons served per household prior to the project implementation
Source of data	Ex-ante baseline survey records of households or published information / literature defining the average household size in the project region
Value(s) applied	[XX]
Choice of data or Measurement methods and procedures	-
Purpose of data	To calculate baseline emission (For parameter $B_{old,HH}$ )
Additional comment	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.

Data/Parameter	$B_{old,HH}$
Data 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	Calculated or determined using ex-ante baseline surveys/ published information / literature
Value(s) applied	[XX]
Choice of data or Measurement methods and procedures	Calculated as $B_{old,p} * N_{p,HH}$ or Ex-ante baseline surveys conducted to determine $B_{old,HH}$
Purpose of data	To calculate baseline emission (For parameter $B_{old,i,j}$ )
Additional comment	<p>Assessments, information and results established in initial CPA may be used in subsequent CPAs in lieu of conducting fresh assessments at each CPA level in absence of new data.</p> <p>Further as CME plans distribution of only one ICS unit per household, <math>B_{old,HH} = B_{old,i,j}</math></p> <p>During the stove installation, the presence of existing project ICS, if any, shall be monitored and in case an existing project ICS is found installed in the same household, the subsequent (second) ICS will not be included in the CPA. Alternatively, the presence of multiple project ICS in a household may be determined ex-post during surveys and the total ICS population shall be discounted by the fraction of sampled household found using more than one project ICS.</p>

Data/Parameter	$f_{NRBy}$
Data 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	<ol style="list-style-type: none"> <li>1. Country specific default values suggested by the CDM EB / DNA; or</li> <li>2. Default Values of Fraction of Non-Renewable Biomass for Least Developed Countries and Small Island Developing States, Information Note – SSC WG 35 meeting report Annex 20 (approved in EB 67, Annex 22)</li> <li>3. Calculated as per Tool: Calculation of the fraction of non-renewable biomass, EB 97, Annex 9</li> </ol>
Value(s) applied	[XX]
Choice of data or Measurement methods and procedures	As per para 27 – 30 of AMS II.G. version 08.0
Purpose of data	To calculate baseline emission
Additional comment	<p>Fixed ex-ante at CPA level.</p> <p>Assessments, information and results established in initial CPA may be used in subsequent CPAs in lieu of conducting fresh assessments at each CPA level in absence of new data.</p>

<b>Data/Parameter</b>	$EF_{project\_fossilfuel}$
Data unit	tCO <sub>2</sub> e/TJ
Description	Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers
Source of data	AMS-II.G. ver 08.0 equation (2), 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	To calculate baseline emission
Additional comment	The parameter value is fixed ex ante at PoA level

<b>Data/Parameter</b>	$LAF_y$
Data unit	Fraction
Description	Leakage adjustment factor
Source of data	AMS II.G. version 08.0 Para 42 (c)
Value(s) applied	0.95
Choice of data or Measurement methods and procedures	As per the methodology AMS II.G ver 08.0, Gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required
Purpose of data	Leakage calculation
Additional comment	The parameter value is fixed at PoA level

$SC_{old}$  and  $HC_{i,j}$  are not applicable in light of methodological choices made under the CPA.

The following parameters are part of section 6.1 “parameters to be monitored” as per AMS II.G. version 08.0. However, these have been fixed ex-ante at the generic CPA 1 level as the Generic CPA 1 aims at distribution of wood-fuel ICS replacing traditional wood-fuel stoves in the baseline.

<b>Data/Parameter</b>	$NCV_{biomass}$
Data 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	To calculate baseline emission
Additional comment	Fixed at ante for all CPAs following generic CPA 1

Data/Parameter	$\eta_{old,i,j}$			
Data unit	Fraction			
Description	Efficiency of pre - project device, which is a three-stone fire using fuelwood (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation			
Source of data	AMS.II-G ver 08.0. Data/parameter table 17 on page 19			
Value(s) applied	0.11			
Choice of data or Measurement methods and procedures	Default value suggested in AMS.II-G ver 08.0 for a three-stone fire using fuelwood (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation = 0.10			
	Default value suggested in AMS.II-G ver 08.0 for other types of devices = 0.20			
	Population using Three Stone Fire / conventional stoves	90%	fraction (%)	Country Action plan for clean cookstoves, Nov 2013
	Population using other baseline Cookstoves	10%	fraction (%)	Calculated (100% - 90%)
	Efficiency of Three Stone Fire Stove / conventional stoves	10%	fraction (%)	AMS II.G. default value
	Efficiency of other baseline Cookstoves	20%	fraction (%)	AMS II.G. default value
<b>Weighted average baseline stove efficiency</b>		<b>11.00%</b>	fraction (%)	Calculated
Purpose of data	To calculate baseline emission			
Additional comment	Fixed at ante for all CPAs following generic CPA 1			

### I.6.3. Modalities for ex ante calculation of emission reductions

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As per applicable meth, AMS-II.G. version 08.0; formula to calculate emission reductions (ERs)<sup>15</sup> is:

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

Where

- $i$  = Indices for the situation where more than one type of project device is introduced to replace the pre-project devices<sup>16</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
- $LE_y$  = Leakage emissions in the year  $y$

<sup>15</sup> The methodology directly gives formulae for emission reductions without giving separate algorithms for baseline, project and leakage emissions. Hence  $ER_y = BE_y$  and  $PE_y = LE_y = 0$ . The purpose of data in parameter tables is therefore mentioned as 'to calculate baseline emissions'

<sup>16</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)



Where

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

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
- $N_{y,i,j}$  = 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 (fraction).

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

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  $j$
- $\eta_{new,i,j}$  = Efficiency of the device of each type  $i$  and batch  $j$  implemented as part of the project activity.
- $\eta_{old,i,j}$  = Efficiency of pre - project device, which is a three-stone fire using firewood (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney;

$$B_{old,i,j} = B_{old,HH} = B_{old,p} \times N_{p,HH} \times LAF_y \quad (10)$$

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<sup>17</sup>

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<sup>17</sup>  $B_{old,i,j} = B_{old,HH}$  has been considered as the CPA envisages distributing only one project ICS per household. The presence of existing project devices, if any, shall be monitored at the time of installation and subsequent project ICS in the same household will not be included in the CPA.

$B_{old,p}$  = 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

$LAF_y$  = Leakage adjustment factor

Sample Calculations (only for illustration purposes) for one unit of project stove:

$B_{old,i,j}$	=	$B_{old,p}$	×	$N_{p,HH}$	×	$LAF_y$
Tonnes/HH/year		tonnes/person/year		person/HH		fraction
2.19		0.50		4.60		0.95

$B_{y, savings,i,j}$	=	$B_{old,i,j}$	×	$(1 - \eta_{old,i,j} / \eta_{new,i,j})$
Tonnes/year		Tonnes/year		--
1.48		2.19		(1-0.11/0.34)

$ER_y$	=	$B_{y,savings}$	×	$N_{y,i,j}$	×	$\mu_y$	×	$f_{NRB,y}$	×	$NCV_{bio, mass}$	×	$EF_{projected\_fossilfuel}$	×	$Stove_y$
tCO <sub>2</sub> e/year		Tonnes/year		number		fraction		fraction		TJ/Tonne		tCO <sub>2</sub> e/TJ		fraction
1.53		1.48		1		1		0.84		0.015		81.60		1

## I.7. Monitoring plan

### I.7.1. Data and parameters to be monitored

(Copy this table for each piece of data or parameter.)

Data/Parameter	$N_{y,i,j}$
Data unit	Number
Description	Number of project devices of type i and batch j operating during year y
Source of data	Sales database and monitoring survey
Value(s) applied	[XX]
Measurement methods and procedures	<p>CME shall maintain the database of all stoves installed. The number of operating stoves for each device i and batch j shall be determined on a sampling basis. 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>
Monitoring frequency	At least once every two years (biennial)
QA/QC procedures	<p>A 95 /10 confidence / margin of error shall be achieved for the sampling parameter irrespective of annual / biennial monitoring frequency as per para 22 of Standard: Sampling and surveys for CDM project activities and programmes of activities, Version 07.0</p> <p>In the case the desired precision is not met, lower bound values shall be used against repeating the survey to determine the operational fraction of stoves</p>
Purpose of data	To calculate baseline emissions
Additional comment	<p>All data sources will be archived for two years</p> <p>During the stove installation, the presence of existing project ICS, if any, shall be monitored and in case an existing project ICS is found installed in the same household, the subsequent (second) ICS will not be included in the ER calculations. Alternatively, the presence of multiple project ICS in a household may be determined ex-post during surveys and the total ICS population shall be discounted by the fraction of sampled household found using more than one project ICS.</p>

Data/Parameter	$\mu_y$
Data unit	Fraction
Description	Adjustment to account for any continued use of pre-project devices during the year y
Source of data	Monitoring survey report
Value(s) applied	[XX]
Measurement methods and procedures	<p>Option 2 has been selected to determine <math>\mu_y</math>.</p> <p>The sampled households will be checked for presence of baseline stove and if it was being used along with project stove for cooking. For samples where baseline stove was found not being used, <math>\mu_y = 1.0</math></p> <p>For samples where the baseline stove is found to be in use, <math>\mu_y</math> shall be determined as:</p> <ul style="list-style-type: none"> <li>ratio of frequency of usage (i.e. number of meals cooked on ICS Vs Total number of meals cooked on ICS and baseline stove)</li> </ul> <p>For example, during the survey if was found that total average use of project ICS is 3 times per day and that of baseline stove is 5 times per week, <math>\mu_y = 3*7 / (3*7 + 5)</math>.</p> <p>If not information is available on relative usage levels of baseline stove and ICS a default adjustment fraction of 50:50 shall be applied to those samples.</p>
Monitoring frequency	At least once every two years (biennial)
QA/QC procedures	<p>A 95 /10 confidence / margin of error shall be achieved for the sampling parameter irrespective of annual / biennial monitoring frequency as per para 22 of Standard: Sampling and surveys for CDM project activities and programmes of activities, Version 07.0</p> <p>In the case the desired precision is not met, lower bound values shall be used against repeating the survey to determine the operational fraction of stoves</p>
Purpose of data	To calculate baseline emissions
Additional comment	All data sources will be archived for two years

Data/Parameter	$\eta_{\text{new},i,j}$
Data unit	Fraction
Description	Efficiency of the project device of each type i and batch j
Source of data	Certificate or Manufacturers specification
Value(s) applied	[XX]
Measurement methods and procedures	<p>Efficiency shall be measured/estimated as per the following:</p> <ol style="list-style-type: none"> <li>1. The efficiency of the project devices shall be based on certification by a national standards body or an appropriate certifying agent recognized by that body</li> <li>2. 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 95/10 precision in accordance with the "Standard for sampling and surveys for CDM project activities and programme of activities</li> <li>3. However, the following simplified approach may be used, when the efficient cook-stoves are produced by a manufacturer 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, critical dimensions): <ol style="list-style-type: none"> <li>(i) Conduct a sample test on three cook stoves with three tests conducted for each stove;</li> <li>(ii) If the standard deviation of the nine test results indicated above is very small and 95/10 precision requirement is met (in this case, the value of the t-distribution for 95 per cent confidence shall be used instead of Z value), the efficiency determined is acceptable, otherwise more sample tests would be required until 95/10 precision is met</li> </ol> </li> </ol> <p>CPAs can use any one of the above option to determine thermal efficiency</p>
Monitoring frequency	Recorded at the time of commissioning/distribution
QA/QC procedures	Manufacturer's thermal energy efficiency specification or certification must be based on WBT protocol
Purpose of data	To calculate baseline emissions
Additional comment	<p>For subsequent monitoring periods to calculate efficiency loss, CPAs can use any one of the following options given in para 25 of AMS II.G. version-08</p> <p>(c) Determine the rate of efficiency drop for a representative sample of the first batch of project device i in year y and assume that same rate of loss in efficiency applies to all other batches. In other words, it may be assumed that the degradation of efficiency measured in a representative sample of the first batch of project devices i apply to all subsequent batches. The efficiency of the project devices in the first batch has to be monitored annually through representative samples and this rate of loss in efficiency may be applied correspondingly to all batches</p> <p>(d) Determine the loss in efficiency annually from a representative sample of each batch and use the actual loss rate that is measured</p>

<b>Data/Parameter</b>	Date of commissioning of project device i
Data unit	Date
Description	Actual date of commissioning of project device
Source of data	Sales database
Value(s) applied	[XX]
Measurement methods and procedures	Each sale will be recorded in sales database along with the name of recipient, contact details, location of household (village, district etc)
Monitoring frequency	Recorded at the time of installation of project devices
QA/QC procedures	NA
Purpose of data	To calculate baseline emissions
Additional comment	Record will be archived for 2 years

The following parameters as per section 6.1 of the methodology are deemed not applicable:

$t_{y,i,j}$  = applicable only in case of use of equation (4)

$NCV_{biomass}$  = fixed ex-ante for the generic CPA 1 as the CPA only involves wood-fuel stoves

$SC_{new,i,j}$  = applicable only in case of use of equation (8)

$f_{NRB,y}$  = fixed ex-ante as per page 17 of the methodology

$B_{y=1,new,i,j,survey}$  = applicable only in case of use of equation (7)

$B_{new,KPT,i,j}$  = applicable only in case of use of equation (5)

Life Span = applicable only in case of use of para 25(a)

Date of commissioning of batch j = not applicable<sup>18</sup>

$N_{d,HH}$  = not applicable as only one project device is deemed distributed in a project household/SMEs<sup>19</sup>.

### I.7.2. Sampling plan

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The CPA shall follow the following sampling plan:

#### Sampling Plan across CPAs within the PoA

Representative sampling will be undertaken as part of a cross-CPA Sampling Plan that is designed in line with the requirements of the methodology applied and the Standard: Sampling and surveys for CDM project activities and programmes of activities, version 7.0

Sample sizes will be sufficient to ensure that the precision of the sample means/proportions are in accordance with the methodological / standard requirements. In cases where survey results indicate that desired precision is not achieved, the lower bound value of corresponding confidence interval of the parameter value may be used as an alternative to repeating the survey. Alternatively, the survey may be expanded to reach the required confidence/precision.

The sampling methodology will be in accordance with the representative sampling methods provided by the methodology AMS-II.G. and other CDM sampling guidelines and standards as indicated along

<sup>18</sup> The project ICS are manufactured using standard material and design specification by CME, in a decentralized approach, by various local partners, established under the PoA. For each installation, the date of commissioning of ICS (deemed as date of installation) is recorded and ERs shall be calculated accordingly from corresponding date of installation. However, for the purpose of sampling and determining ex-post thermal efficiency, project devices of type *i* installed in one calendar year will be deemed under one sampling frame or strata.

<sup>19</sup> As per PoA design and operational framework, only one device is envisaged in one household. At the time of installation, presence of existing project stove will be checked and recorded and any additional project device in a household will not be credited.

this section, with the applicable methodology having precedence. The Standard (paragraph 22) mandates application of 95/10 confidence/precision for CPAs solely composed of micro-scale CDM units hence the same shall be applied as a conservative measure despite the methodology taking precedence.

### Sampling Methodology

**Sampling Objective** – The sampling objective for each parameter is to determine, via sampling survey / test, a statistically significant parameter value for the emission reduction calculations. These parameters are as listed I.7.1 above.

**Field Measurement Objective and data to be collected** – As listed in Section I.7.1.

**Target population and sampling frame** – The target population is the total population served under the PoA, and the sampling frame consists of aggregated data of end-users of the ICS as recorded in the CPA Databases. The sampling frame will be kept for 2 years following the crediting period or the last issuance of the CERs of the project activity.

**Sample method** – Sampling will be conducted using stratified random sampling techniques over the sampling frame, and detailed calculations are provided below as per CDM guidelines “Sampling and surveys for CDM project activities and programmes of activities” the ICS in the sampling frame shall be stratified by ICS model type i and batch j.

Stratified Random Sampling will be used to select samples from the Project Database for monitoring parameters. Optionally, other sampling approaches may be used in accordance with Standard “Sampling and surveys for CDM project activities and programmes of activities” and Guideline for Sampling and Surveys for CDM Project Activities and Programme of Activities, when sampling techniques or statistical analysis necessitates it.

The sample size shall be determined using the following formula:

$$n \geq \frac{z^2 * N * V}{(N - 1) * precision^2 + z^2 * V}$$

Where,

n = number of ICS to be sampled

N = Total number of ICS in the population

Z = Constant referring to level of confidence (1.96 for 95 % confidence)

Precision = Required precision (e.g. 10% = 0.1)

For Proportion based parameters

$$V = \frac{SD^2}{p^2} \text{ Where:}$$

$$SD^2 = \frac{\sum_{i=1}^k g_i * p_i * (1 - p_i)}{N}$$

$$p = \frac{\sum_{i=1}^k g_i * p_i}{N}$$

Where,

$g_i$  = weight of strata i in the population

$p_i$  = expected proportion of strata i in the population

k = total number of strata in the population

For Mean based parameters

$$V = \left( \frac{SD}{Mean} \right)^2$$

Where

$$SD^2 = \frac{\sum_{i=1}^k g_i * SD_i^2}{N}$$

$$Mean = \frac{\sum_{i=1}^k g_i * m_i}{N}$$

Where

$SD_i$  = expected standard deviation of strata i in the population

$m_i$  = expected mean of strata i in the population

To ensure a random stratified sample selection, random number generators shall be applied. Each ICS in the target population is uniquely identifiable by its Serial ID number. Each ICS can thus be allocated a Sample Selection Number in each monitoring period, starting at 1 and increasing up to the total number of ICS in the Database for that pre-defined stratified sampling frame. Applying the random number generators, the ICS can then be randomly chosen from the defined population up to the required sample size as calculated by the CME.

During sampling, there may be non-response from the target population. Over-sampling may be used to avoid non-response, however, sampling may be cease once required confidence/precision is met.

In the case of parameters monitored for the first time the expected variation for that measure in the sample may be based on results from similar studies, pilot studies, or from the project planner's own knowledge / experience of the data (as per para 12 of Standard)

### 1.7.3. Other elements of monitoring plan

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Each CPA will have a specific CPA Database where information on ICS installed under that CPA will be recorded. An individual sales record will be collected from each stove user at the point of sale. The CME makes every effort to retrieve this information (paper form or electronically (eg. SMS)) but cannot guarantee the collection of information for each ICS due to challenges such as high rates of illiteracy and logistical challenges. ICS with end-user details recorded will serve as the sampling frame for monitored parameters.



To reduce monitoring efforts, a single sample set is drawn based on which various parameters shall be monitored. The CME will determine the number of samples to be monitored for each of the parameters separately. The CME may decide to stop monitoring of a parameter during the campaign once the required precision for this parameter is achieved. The monitoring team may continue to monitor appliances in the sample with respect to the remaining parameter(s) until again the required precision for these parameters is achieved. The design of the survey questionnaire will ensure that the questions are non-intrusive and easy to understand for both the interviewee and interviewer.

Also, for determining thermal efficiency, the CME may select sub-sample within the common survey sample (as per stratification requirements) in line with para 41 of the methodology.

Training will ensure that all monitoring staff has the appropriate skills and experience to administer relevant surveys / tests and quality checks will ensure the integrity of information flow to the CME. The CME shall review the efficacy of information gathering techniques and information flow and assess enumerator and partner feedback to make improvements as deemed necessary.

Any third parties hired by the CME, if any, to carry out sampling should have requisite skills and appropriate experience with data entry and data management. The CME will ensure that contractors are adequately trained for the tasks they are contracted for (eg. carrying out of WBTs). Training will also be provided on how to deal with non-responses, refusals and other problems should these occur.

## **SECTION J.     Crediting period type and duration**

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10 years and 0 months, fixed.

**SECTION K. Eligibility criteria for inclusion of CPAs**

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Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
1. Geographic Boundary	The ICS under the CPA must operate within the geographical boundary of the PoA i.e. Republic of Bangladesh	Sales database listing the country of installation of ICS under the CPA
2. Double Counting	Carbon emission reductions claimed by the CPA should be unique and not counted more than once	Each ICS shall be assigned a unique serial number which shall be displayed at the beneficiary location to identify each stove uniquely.
3. Exclusiveness of CPA	The CPA shall not be previously: <ol style="list-style-type: none"> <li>1. Registered as a CDM project activity</li> <li>2. Included as a CPA in any other registered PoA, or deregistered as a CPA of a PoA</li> </ol>	Confirmation by CME
4. Specifications of Technology/Measure	<ol style="list-style-type: none"> <li>1. <b>Type</b> - The program will promote dissemination of wood-fuel ICS in Bangladesh.</li> <li>2. <b>Capacity</b> - The rated annual thermal energy savings of ICS included under the CPAs shall not be more than 1.8GWh<sub>th</sub>.</li> <li>3. <b>Key Design Features</b> – <ol style="list-style-type: none"> <li>a. The stoves shall have a fuel grate and/or a chimney</li> <li>b. The stove shall be fixed or portable type.</li> </ol> </li> <li>4. The rated efficiency of technologies included under the program will be at least 20 per cent.</li> </ol>	Technical details of the ICS (including thermal efficiency) will be provided in the specific CPA. As specific CPA may have progressive sales and new models may be introduced during the course of the CPA, this may be checked at the time of subsequent verification wrt for new models / incremental installations.
5. Start Date	Date on which first ICS was installed under the CPA. The start date of any proposed CDM CPA will be on or after the start date of the proposed CDM PoA	End user agreement / voucher / installation report etc for the first ICS installed in the CPA.
6. Applicability of the methodologies	CPA must follow AMS.II-G ver 08.0.  The applicability of methodology at CPA level has already been demonstrated in section I.2 above. Technology related requirements have been specified in criteria #3 above.	CPA-DDs applying AMS II.G. Version 8.0

7. Additionality	<p>1. ICS shall be installed at households or SMEs</p> <p>2. The rated annual thermal energy savings of ICS included under the CPAs shall not be more than 1.8GWh<sub>th</sub></p>	<p>1. ICS shall be installed at households or SMEs substantiated via sales database.</p> <p>2. The CPA-DD shall include a demonstration of ICS meeting the 1.8GWh<sub>th</sub> annual energy savings based on design specifications of stoves. As specific CPA may have progressive sales and new models may be introduced during the course of the CPA, this may be checked at the time of subsequent verification wrt to new models.</p>
8. LSC and EIA	<p>The local stakeholder consultation is conducted at the PoA level (Section F of the PoA-DD).</p> <p>An environmental impact analysis is not required (section E of the PoA-DD)</p>	--
9. Public Funding	Affirmation that funding from Annex I Parties, if any, does not result in a diversion of official development assistance	Please refer Annex [XX]. Declaration from CME and CPA that no funds for official development assistance will be used for program implementation
10. Target Group and Distribution Mechanism	<p>Target Group: Households / SMEs</p> <p>Distribution Mechanism: Via local partners</p>	Sales database listing the installation of PoA ICS
11. Sampling	CPAs under the program will adhere to all requirements as mentioned in <i>Standard: Sampling and surveys for CDM project activities and programme of activities</i>	CPAs will follow monitoring plan described in CPA-DD section I.7.2
12. SSC Threshold	Not applicable as per section I.2 above	--
13. Debundling Check	Not applicable as per section I.2 above	--

## Appendix 1. Contact information of coordinating/managing entity and project participants

<b>Coordinating/managing entity and/or project participants</b>	<input type="checkbox"/> Coordinating/managing entity <input checked="" type="checkbox"/> Project participant
<b>Organization name</b>	Bangladesh Bondhu Foundation
<b>Country</b>	Republic of Bangladesh
<b>Address</b>	House # 3/2 (1st Floor), Block # B, Lalmatia, Dhaka - 1207
<b>Telephone</b>	0088-02-9127487
<b>Fax</b>	0088-02-8154229
<b>E-mail</b>	khaleq.zaman@bondhufoundation.org
<b>Website</b>	
<b>Contact person</b>	Md. Khalequzzaman

<b>Coordinating/managing entity and/or project participants</b>	<input checked="" type="checkbox"/> Coordinating/managing entity <input type="checkbox"/> Project participant
<b>Organization name</b>	Ecoeye Co., Ltd.
<b>Country</b>	Republic of Korea
<b>Address</b>	#1503, Hyundai Knowledge Industrial Center B, 70 Dusan-ro, Geumcheon-gu, Seoul. South Korea
<b>Telephone</b>	+82- 2-6480-7346
<b>Fax</b>	
<b>E-mail</b>	<a href="mailto:sangsun_ha@ecoeye.com">sangsun_ha@ecoeye.com</a>
<b>Website</b>	<a href="http://www.ecoeye.com">www.ecoeye.com</a>
<b>Contact person</b>	Sangsun Ha

## Appendix 2. Affirmation regarding public funding

No public funding is involved in the PoA

## Appendix 3. Applicability of methodologies and standardized baselines

Not Applicable

## Appendix 4. Further background information on ex ante calculation of emission reductions

Not Applicable

**Appendix 5. Further background information on monitoring plan**

Not Applicable

**Appendix 6. Summary report of comments received from local stakeholders**

Refer section F.3 above

**Appendix 7. Summary of post-registration changes**

Not Applicable

**Appendix 8. Person/entity responsible for completing the CDM-PoA-DD-FORM**

<b>Organization name</b>	Climate-Secure Services
<b>Address</b>	65, Pragati Apartments, Club Road, Paschim Vihar, West Delhi, Delhi – 110063
<b>Country</b>	India
<b>Telephone</b>	+91 11 2521 3080
<b>E-mail</b>	<a href="mailto:info@climate-secure.com">info@climate-secure.com</a>
<b>Website</b>	<a href="http://www.climate-secure.com">www.climate-secure.com</a>
<b>Contact person</b>	Rohit Lohia

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**Document information**

<i>Version</i>	<i>Date</i>	<i>Description</i>
08.1	28 June 2017	Revision to: <ul style="list-style-type: none"> <li>Remove a duplicated instruction;</li> <li>Make editorial improvement.</li> </ul>
08.0	7 June 2017	Revision to: <ul style="list-style-type: none"> <li>Improve consistency with the “CDM project standard for programmes of activities” and with the PDD and CPA-DD forms;</li> <li>Make editorial improvement.</li> </ul>
07.0	25 May 2017	Revision to: <ul style="list-style-type: none"> <li>Ensure consistency with the “CDM project standard for programmes of activities” (CDM-EB93-A07-STAN) (version 01.0);</li> <li>Incorporate the “Programme design document form for small-scale CDM programmes of activities” (CDM-SSC-PoA-DD-FORM);</li> <li>Make editorial improvement.</li> </ul>

<i>Version</i>	<i>Date</i>	<i>Description</i>
06.0	15 April 2016	Revision to ensure consistency with the "Standard: Applicability of sectoral scopes" (CDM-EB88-A04-STAN) (version 01.0).
05.0	9 March 2015	Revision to: <ul style="list-style-type: none"> <li>• Include provisions related to choice of start date of PoA;</li> <li>• Include provisions related to delayed submission of a monitoring plan;</li> <li>• Provisions related to local stakeholder consultation;</li> <li>• Add exception for generic CPA where technology is under positive lists;</li> <li>• Make editorial improvement.</li> </ul>
04.1	5 August 2014	Editorial revision to correct the document information table.
04.0	25 June 2014	Revision to: <ul style="list-style-type: none"> <li>• Include the Attachment: Instructions for filling out the project design document form for CDM programme of activities (these instructions supersede the Guideline: Completing the programme design document form for CDM programme of activities (Version 04.0));</li> <li>• Include provisions related to standardized baselines;</li> <li>• Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the PoA in B.4 and Appendix 1;</li> <li>• Add general instructions on post-registration changes in paragraphs 2 and 3 of general instructions and Appendix 6;</li> <li>• Change the reference number from F-CDM-PoA-DD to CDM-PoA-DD-FORM;</li> <li>• Make editorial improvement.</li> </ul>
03.0	3 December 2012	EB 70 Revision to reflect changes to the <i>Guideline: Completing the programme design document form for CDM programmes of activities</i> (EB 70, Annex 6).
02.0	13 March 2012	EB 66 Revision required to ensure consistency with the "Guidelines for completing the programme design document form for CDM programmes of activities" (EB 66, annex 12).
01.0	27 July 2007	EB 33, Annex 41 Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Registration Keywords: programme of activities, project design document		