



**Programme of activities design document form
(Version 09.0)**

BASIC INFORMATION	
Title of the PoA	IDCOL Improved Cook Stove Program
Version number of the PoA-DD	03
Completion date of the PoA-DD	17/09/2019
Coordinating/managing entity	Infrastructure Development Company Limited
Host Parties	Republic of Bangladesh
Applied methodologies and standardized baselines	AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass, Version 10.0
Sectoral scopes	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

Bangladesh is an agricultural country with majority of the population residing in rural areas. Solid fuels accounts for 90% of Bangladeshi households' energy needs with fuelwood being used in around 84% households for cooking purposes. Cooking by rural households is predominantly done in traditional stoves using fuel wood. Burning solid fuels for cooking releases emissions of carbon dioxide, methane, black carbon, and other short-lived climate pollutants, some of the most important contributors to global climate change, along with deforestation and unsustainable wood harvesting. In addition, incomplete combustion of biomass fuels in inefficient traditional stoves produces Household Air Pollution (HAP) resulting in negative health impacts, particularly for women and children. In Bangladesh, about 145 million people are exposed to HAP and this contributes to 46,000 casualties per annum¹. Despite efforts by various organizations to introduce cleaner and more efficient cooking solutions since the 1980s, only 3-5 percent of households have access to an improved cookstove (ICS) in Bangladesh.

(a) The policy/measure or stated goal that the PoA seeks to achieve

The objectives of the IDCOL ICS program is to reduce GHG emissions, solid fuel use for cooking and the impact of HAP - which disproportionally affects women and children - by creating a sustainable market-based approach towards adoption of higher efficiency cook-stoves in the country. The program aims to develop a sustainable market for ICS by supporting development of a supply chain in rural Bangladesh and creating demand for ICS with the goal of achieving 100% coverage of ICS by 2030 as per Bangladesh Government's Country Action Plan for Clean Cookstoves.

(b) A framework for the implementation of the PoA

The proposed program will be implemented by the Infrastructure Development Company Limited (IDCOL), a development financial institution established by Bangladesh Government in 1997. IDCOL as the coordinating and managing entity (CME) for the PoA will work with Partner Organisations (POs), who are mostly Non-Government Organizations (NGOs), Micro Finance Institutions (MFIs) and some private sector companies who produce/procure and install cooking systems as per technical standards set by IDCOL. The POs also provide after sales services to the households using those cooking systems.

The program adopts a cluster-based approach where each Upazila (Sub-district) consists a cluster and only one PO works in a particular cluster. The POs are expected to generate demand for ICS in the clusters allocated to them through social mobilization, develop and train local entrepreneurs in the supply chain for ICS and their components (or establish their own production centers). POs may work with industrial stove producers as well as artisanal ones. These POs could be NGOs/MFIs/Private Entities, which will be responsible for supporting and overseeing the work of the entrepreneurs, technicians and stove production centers engaged in the supply chain side. IDCOL will conduct training and capacity building of POs at different levels. IDCOL will test ICS in field as well as laboratory using its own technical monitoring facility to understand stove performances. IDCOL will also carry out national level awareness raising and demand creation activities to enhance demand of ICS.

¹Source: Bangladesh Country Action Plan for Clean Cookstoves

(c) A confirmation that the PoA is a voluntary action by the CME

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

(d) How the PoA contributes to the sustainable development of the host Party

The project will have multiple environmental, economic, and women's empowerment co-benefits as well as health benefits depending on HAP emission reductions.

Environment: The direct beneficiaries will be the members of households using ICS as a result of the program, whereby the household air pollution would be reduced. Programme will also reduce the pressure on remaining forest reserves in Bangladesh.

Socio & Economic: The program will also contribute to local market creation and economic development because the stoves are expected to be made by local stove production centers, either by own staffs of the POs or by local entrepreneurs and sold by local POs. The programme would give rise to employment opportunities for new ICS technicians, assistants, office staff and other related jobs in Bangladesh. The awareness raising, and demand creation activities are supported by IDCOL and the POs usually appoint local staffs for conducting these activities. Almost all of the raw material, like concrete and grates, being procured locally would result in more jobs. The conditions of poor families will be improved since the stoves reduce fuel cost. Reduction in wood consumption implies relief from additional efforts and more opportunity for productive activity, arising from less time spent collecting fuel. In addition to the mitigation impact, the widespread uptake of ICS will have the potential to increase resilience of the most vulnerable populations in Bangladesh by increasing their adaptive capacity and reducing vulnerability at the local scale.

Technological: The ICS require less fuel, which in many areas can be a scarce resource or very expensive to buy; also, users have found ICS more convenient, shortening the cooking time. While the Program does not discriminate against imported models (subject to efficiency and acceptability tests), the imported models may require a local production base to remain cost competitive. The introduction of a locally manufactured technology with optimized energy efficiency helps to build technological self-sufficiency.

A.2. Physical/geographical boundary of PoA

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

A.3. Technologies/measures

A number of types of stoves are included in the program: portable stoves, single and double mouth chimney stoves including commercial stoves and metallic stoves. In the proposed PoA IDCOL intends to increase the share of higher efficiency stoves, which have greater impact in terms of reducing GHG emissions and household air pollution.

In order to offer a menu of options that will suit different market segments with varying preferences and affordability, IDCOL ICS program is open to different models of stoves after rigorous testing of efficiency and acceptability. Higher tier stoves² offering greater benefits in terms of reduced HAP

²The ISO/International Workshop Agreement (IWA) Guidelines for evaluating Cookstove Performance provides measurements and indicators of performance standards for cookstoves, measuring their performance along four dimensions: efficiency, safety, total emissions, and indoor emissions. For each dimension, stoves are ranked from Tier 0 to Tier 4 (4 being the best) based upon laboratory test results.

but also are relatively more expensive that will require more efforts at demand creation, will be preferred under the PoA.

A.4. Coordinating/managing entity

Infrastructure Development Company Limited

A.5. Parties and project participants

Partiesinvolved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Republic of Bangladesh (host)	Infrastructure Development Company Limited (Private); and World Bank as the Trustee of the CF-Assist ³	No

A.6. Public funding of PoA

The PoA does not receive any public funding from Parties included in Annex I to the Convention.

SECTION B. Management system

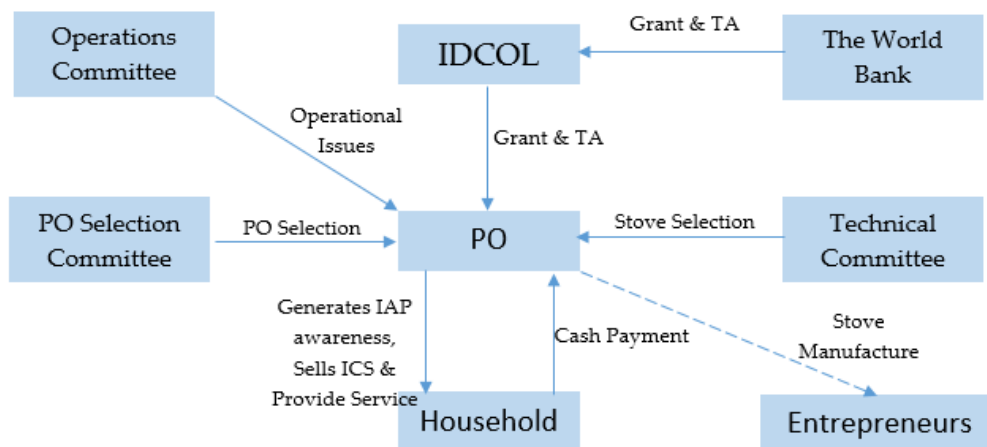
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IDCOL as the CME of the PoA has a dedicated Project Management Unit (PMU), whereas IDCOL Board is responsible for oversight, policy guidance and monitoring of the PMUs. IDCOL will implement the PoA with the help of Partner Organizations (PO) who are mostly NGOs or MFI or Private entity. IDCOL channels grant and capacity building supports to the POs for implementation of the program with the financial assistance from the World Bank. POs conduct demand creation activities and sell ICS and provide after sales services to the households. The POs may engage local entrepreneurs in ICS Manufacturing and Installation activities.

An independent PO Selection committee selects the POs to work under the program as per an approved selection criterion whereas an independent Technical Committee (TC) determines technical standards, approves eligible stove models to be sold under the program and provides technical guidance. An Operational Committee (OC) consisting representatives from IDCOL and POs sits monthly to discuss implementation status and operational issues under the program. IDCOL adopted a cluster-based approach for program implementation where each Upazila (Sub-district) consists of a cluster and preferably only one PO working in a particular cluster.

The overall structure of the PoA is depicted in the following figure:

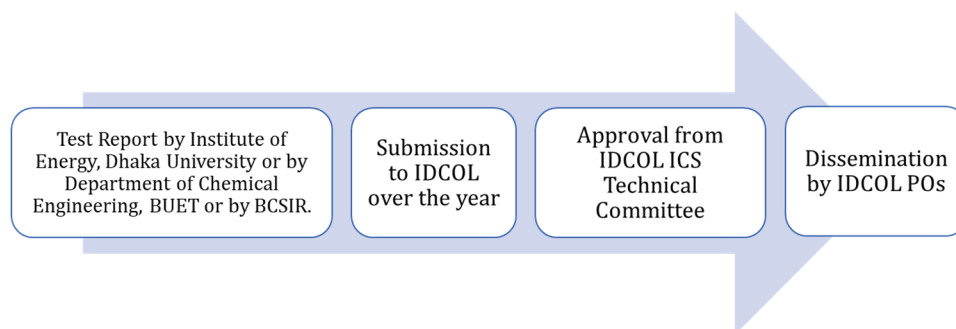
³World Bank as the Trustee of the CF-Assist is a project participant with the sole purpose of preparing the programme of activity for Validation and Verification under the Clean Development Mechanism



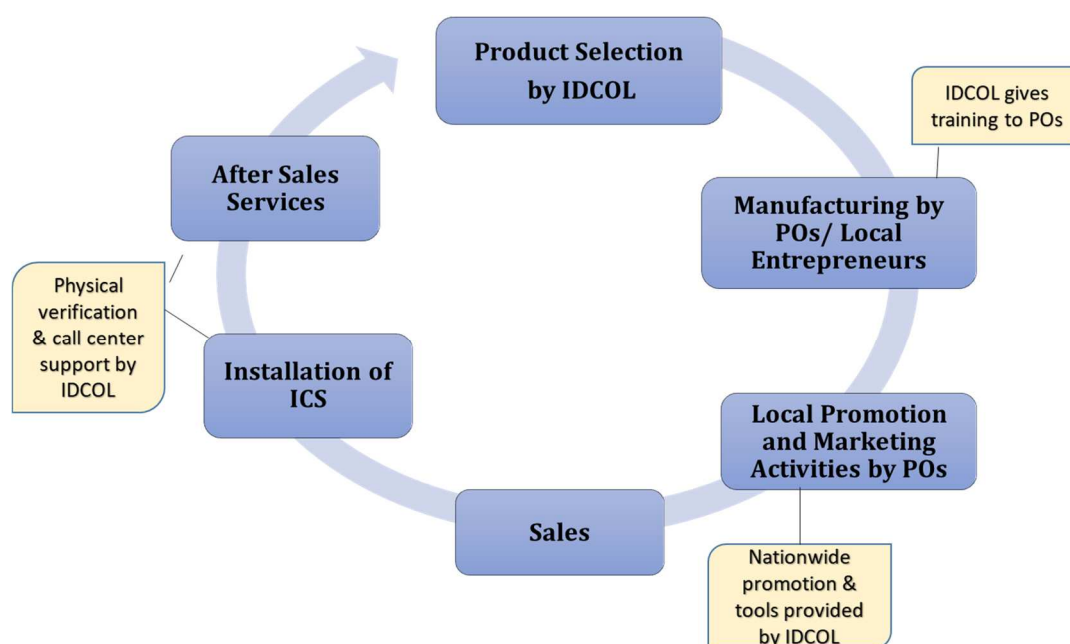
PO is responsible for the following:

- Promotion and awareness campaign in the cluster;
- Capacity development at cluster level with a view to ensuring 100% penetration of ICS.

The selection of the ICS is done as per the following stove inclusion procedure:

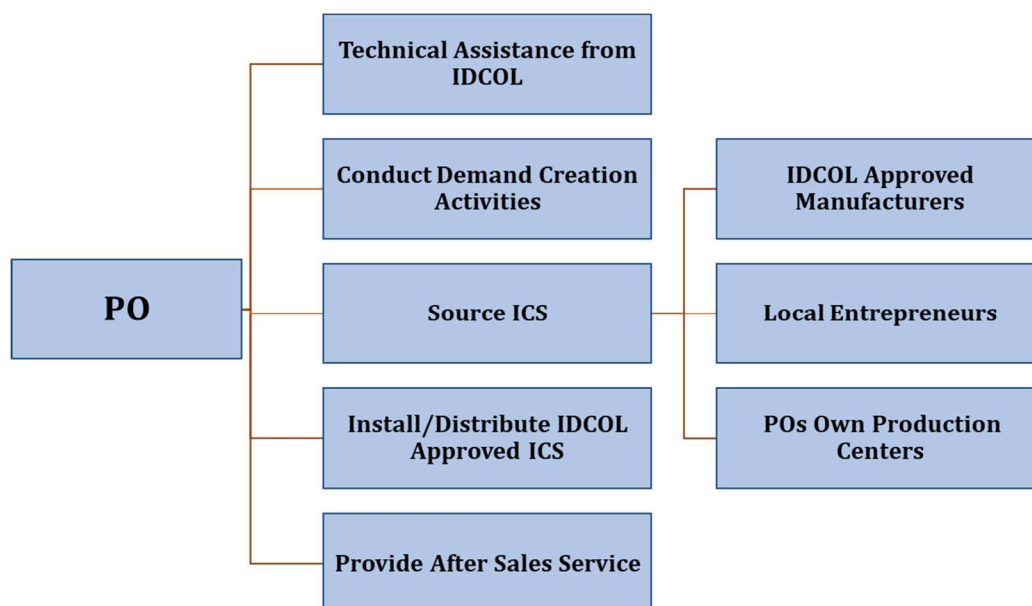


For stove distribution and in particular the fixed type concrete stoves, the supply chain is as follows:



IDCOL would use a web-based software to keep track of each installed stove having unique serial number. POs use the software to record installation while IDCOL monitoring team enter the inspection findings.

The activities to be carried out by the Partner Organisations is depicted in the graphic below:



As CME, IDCOL will be responsible 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 POs 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.
- 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.
- To carry out national level awareness raising and demand creation activities.
- Any other task and responsibilities assigned by CME to the CPA implementer, as and when required.

The role of local partner 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 has been demonstrated using Option 1 (Positive list), as per the methodology AMS-II.G, Version 10, indicated as follows:

As per Bangladesh Government's Country Action Plan for Clean Cookstoves, current market penetration represents just 3% of the target population. At present, about 1 million stoves are thought to be in use, amongst over 30 million households in Bangladesh. Therefore, the ICS PoA is considered to be automatically additional.

Also using Option 3 of the methodology AMS-II.G, Version 10, applying the "TOOL19: Demonstration of additionality of microscale project activities", para 12:

Energy efficiency project activities that aim to achieve energy savings at a scale of no more than 20 gigawatt hours per year are additional if any one of the conditions below is satisfied:

- The geographic location of the project activity is in an LDC/SIDS or SUZ of the host country;
- The project activity consists of one or more of the following technology/measures related to energy efficiency where end users of the technology/measure are households, communities or SMEs:
 - High efficiency biomass fired devices (e.g. energy efficient cookstoves);
 - Micro-irrigation systems;
 - Energy efficient pump-set for agriculture.

Thus, given that the PoA is located in Bangladesh, an LDC⁴ and also the penetration of proposed technology is less than 5%, thus the PoA is additional.

Further section 6 of the TOOL19 mentions the following:

For CPAs applying microscale thresholds at the unit level rather than at the aggregate level of the CPA, the term 'project activities' in paragraphs 4, and 11 to 13 above shall be read as 'units'. If

⁴ <https://unfccc.int/topics/resilience/workstreams/national-adaptation-programmes-of-action/ldc-country-information>

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 paragraph 6 above do not apply.

SECTION D. Start date and duration of PoA

D.1. Start date of PoA

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16/09/2018

The notification to DNA and secretariat was submitted on 16 September 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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1. Environmental Analysis is done at PoA level
2. Environmental Analysis is done at CPA level

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Environmental analysis as per requirements of the CDM modalities and procedures is undertaken at PoA level. The installation of millions of ICSs in Bangladesh is best assessed from a macro perspective, therefore the environmental analysis is undertaken at a PoA level.

E.2. Analysis of environmental impacts

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There are no major impacts on the environment due to the installation of the ICS. The local ecology is not likely to get impacted by this type of programme activity. On the contrary, the improved cook stove programme will help in reducing the consumption of the firewood thus reducing the pressure on forest, reducing indoor air pollution and benefits with the use of crop residue and dung cakes as fuel farmyard manure thus having positive environmental impacts.

E.3. Environmental impact assessment

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Not applicable, as implementation of improved cookstove activities are not listed in any of the categories requiring environmental clearance.

The Environmental Conservation Act (ECA) 1995 of Government of Bangladesh necessitates 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. 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.

SECTION F. Local stakeholder consultation

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

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1. Local stakeholder consultation is done at PoA level ☒

2. Local stakeholder consultation is done at CPA level ☐

The CPAs will be implemented dispersedly in all Districts and Upazilas of Bangladesh, which is also the geographical boundary. The impact of individual CPAs will be minimal compared to the objective of the PoA, hence it is appropriate to conduct a stakeholder consultation at a PoA level.

F.2. Modalities for local stakeholder consultation

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A local stakeholder consultation meeting was conducted by IDCOL on 19th September 2018 at its head office (Level 16, UTC Building, 8, Panthapath, Kawran Bazar, Dhaka) to discuss on different aspects of registering IDCOL Improved Cook Stove (ICS) Program as a CDM PoA.

All interested stakeholders, community members, suppliers, regulators, NGOs, Research institutions, local citizens, and others were invited for the LSC meeting.

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 19/09/2018. Also, email invitations were sent to various stakeholders asking them to participate in the physical meeting. Letters were also sent to various stakeholders inviting them to the physical meeting to share their feedback and concerns. Further, phone-based invitations were also sent to specific distinguished 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 presented in English and local language (Bangla). The non-technical presentation included different aspects of the proposed PoA including program objectives, benefits, environmental, socio economic and technological issues to assist the stakeholders in comprehending the impacts of the Programme.

During the physical meeting on 19 September 2018 at IDCOL head-office in 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. Around 59 people participated in the consultation.

Representatives from Department of Environment, Sustainable and Renewable Energy Development Authority, Local Government Engineering Department, NGOs, Universities, Research institutes and renewable energy forums of the country, among others, were present in the meeting.

Participants:

1. Department of Environment (DoE) – DNA
2. Local Government Engineering Departments (LGED)
3. Sustainable and Renewable Energy Development Authority (SREDA)
4. Economic Relations Divisions
5. IDCOL ICS POs (RSF, VERC, SARPV, DESHA, DUS)
6. Chairman of IDCOL CIS Technical Committee
7. Bangladesh Center for Scientific and Industrial Research (BCSIR)
8. GIZ
9. Bangladesh University of Engineering and Technology (BUET)
10. Bangladesh Atomic Energy Commission (BAEC)
11. Global Alliance for Clean Cookstoves (GACC)
12. IDCOL PO Forum
13. Bangladesh Solar and Renewable Energy Association (BSREA)

F.3. Summary of comments received

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Stakeholder comments	CME response
The stoves disseminated under the program have significant carbon emission reduction potential and IDCOL can earn CERs if the stoves are operational for the intended period of time. IDCOL needs to ensure the monitoring of the stoves that are going to be registered under CDM PoA.	IDCOL has a strong monitoring system in place and will strive to verify at least 25% of the installed ICS at household level to ensure quality and users of the stoves. IDCOL keeps a database of each customers of the program and also have a call centre to listen to their complaints and take necessary actions.
For the emission reduction data, lab-based results are considered. The in-field data may also be incorporated to have a proper scenario of emission reduction. Representative from Bangladesh Atomic Energy Commission, who conducted an Indoor Air Pollution (IAP) study under the program, mentioned that field test data on IDCOL stoves are congruent with lab results.	IDCOL has tested the stoves in two renowned universities of the country as well as in Center for Rural Technology, Nepal. IDCOL also conducted an Indoor Air Pollution (IAP) study to check the performance of the stoves in the field. IDCOL has established a technical monitoring facility to check the performance of the stoves through testing both in lab and fields. Actual realised emission reductions however would be based on actual efficiency of the stoves observed ex-post.
Verification process of the stoves are very important. Under CDM PoA, the stoves will be verified by an independent third party. This has an advantage for the program to get an international recognition for the GHG emission reduction PoA.	IDCOL has a strong monitoring system in place and will strive to verify at least 25% of the installed ICS at household level to ensure quality and users of the stoves. IDCOL keeps a database of each customers of the program and also have a call center to listen to their complaints and take necessary actions.
Woodlot plantation on the private lands can also be added to make the PoA more attractive option.	IDCOL is currently working on developing a socio-cultural program for woodlot plantation. IDCOL will work with Forest Department in this regard.
Alternative fuels such as briquettes and pellets can be a good source of alternative fuel. Crop residues, agricultural waste, leaves, twigs etc. should be processed to improve their burning characteristics.	IDCOL will explore the possibility of establishing small scale pellet plant in the country.
Different associations/forums must come forward to promote this PoA to create an impact at all level towards the goal of achieving 100% clean cooking solution by 2030.	IDCOL is currently working with key stakeholders of the sector. IDCOL will also identify other relevant stakeholders and work with them.
The representative from the Economic Relations Division noted that, this PoA- "IDCOL ICS Program" is a successful program and several other countries are interested to learn more about this PoA. However, some stakeholders of ICS have concerns about LPG in Bangladesh.	It is seen during field visits that, even the families with LPG stoves do not use it for all of their cooking. LPG price is high, and it is supposed to increase further in the coming years. Considering that and the total market size of 30 million households, this will not be a major concern.
Representative from Department of Environment suggested utilizing local	IDCOL POs are currently working with them. IDCOL will take steps to aware them on ICS.

government, UP chairman and members etc. in promoting improved cooking.	SREDA will help IDCOL in this regard.
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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 02 September 2019. The Memo No: 22.02.0000.065.79.006.11.

Infrastructure Development Company Limited (CME) has been authorized by Republic of Bangladesh (host party) to participate in the PoA. The project will be jointly implemented by the Infrastructure Development Company Limited (IDCOL); and World Bank as the Trustee of the CF-Assist. World Bank as the Trustee of the CF-Assist is a project participant with the sole purpose of preparing the Project for Validation and Verification.

PART II. Generic component project activity (CPA)

SECTION H. Description of generic CPA

H.1. Title of generic CPA

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IDCOL Improved Cook Stove Program – CPA #

H.2. Reference number of generic CPA

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Generic CPA 01

Version 1.0

DD/MM/YYYY

H.3. Purpose and general description of generic CPA

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The CPA involves commercial dissemination of [X] high efficiency biomass fired cook stoves (ICS) to replace the traditional inefficient cook-stoves in Bangladesh. IDCOL as the coordinating and managing entity (CME) for the PoA will work with Partner Organisations (POs), who are mostly Non-Government Organizations, Micro Finance Institutions and some private sector companies who produce/procure and install cooking systems as per technical standards set by IDCOL.

Majority of the population in Bangladesh is not aware of the fuel saving potential of ICS or that the use of traditional biomass fuels is associated with GHG emissions and health hazards through household air pollution. In the absence of the CPA, the rural households would continue to use the traditional inefficient cook-stoves using traditional biomass fuels, the emissions of which particularly harms women and children, who are disproportionately exposed to it.

The CPA will result in an estimated annual average GHG reductions of [XXXX] tCO₂e and total GHG emission reductions of [XXXX] tCO₂e over a 10-year crediting period.

The CPA is a small scale 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'. The ICS will replace traditional inefficient wood-fuel cookstoves. [add more]

The deemed service level of the ICS is domestic usage.

Type of ICS used:

Tiers	Tier 2	Tier 3	Tier 4
Thermal Efficiency (%)	≥ 25%	≥ 35%	≥ 45%
ICS Model Type ⁵	1. 10" Single mouth concrete 2. 9-8" Double mouth concrete	1. 8" Concrete portable 2. 10-9" Double mouth concrete	1. 6-9" Metal portable 2. 6-4" Metal portable

Design of ICS:

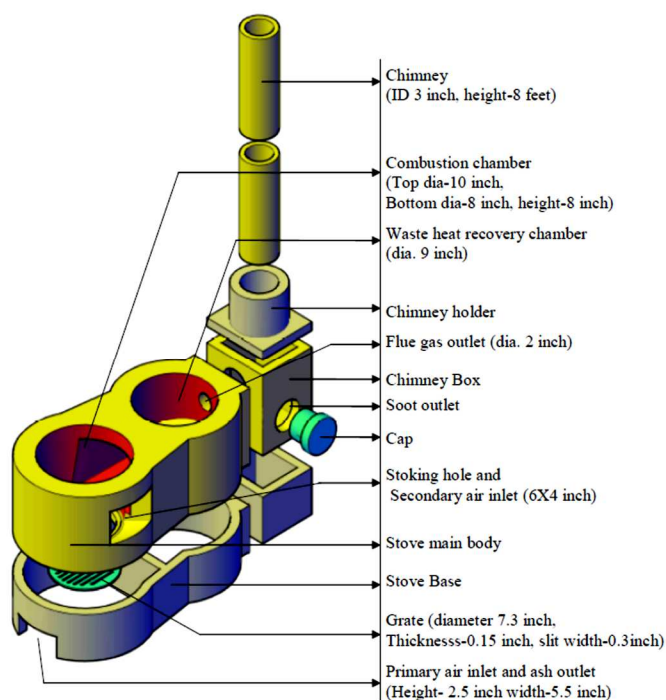


Figure 1. Double Mouth (10" & 9") with chimney

- 1.25" thick outer concrete layer of stove body
- 1 mm thick GI sheet metal lining for combustion, secondary chamber and combustion gas passage from combustion chamber to secondary chamber
- 1" thick rock wool insulation in the annular section
- Total stove wall thickness: 2.25"
- Primary air inlet: 2.5" (H) x 5.5" (W)
- Stocking hole: 4" (H) x 6.0" (W)
- Combustion chamber height: 8"
- Combustion chamber diameter: 8" at grate level and 10" at top level
- Grate: 7.3" made of Cast Iron
- Flue gas exit diameter: 2" diameter (circular instead of elliptical shape)

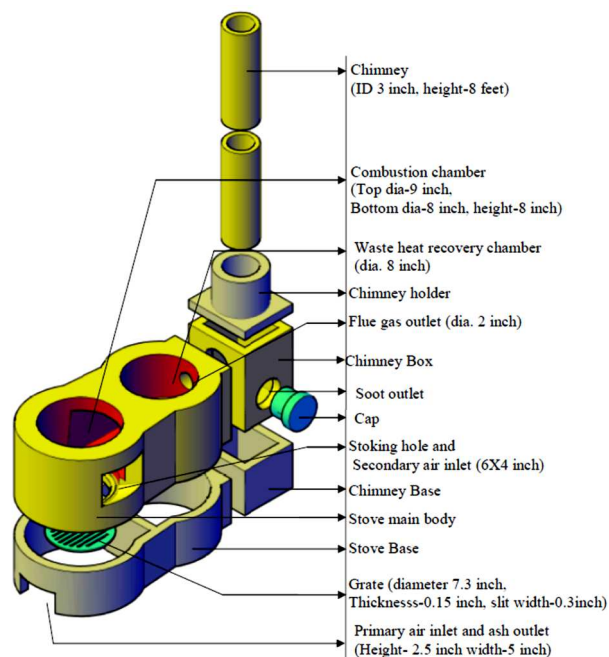


Figure 2. Double Mouth (9" & 8") with chimney

- 1.25" thick outer concrete layer of stove body
- 1 mm thick GI sheet metal lining for combustion, secondary chamber and combustion gas passage from combustion chamber to secondary chamber
- 1" thick rock wool insulation in the annular section
- Total stove wall thickness: 2.25"
- Primary air inlet: 2.5" (H) x 5" (W)
- Stocking hole: 4" (H) x 6.0" (W)
- Combustion chamber height: 8"
- Combustion chamber diameter: 8" at grate level and 9" at top level
- Grate: 7.3" made of Cast Iron

⁵The model type is not limited to the existing models, further ICS models could be included in the programme.

CDM-PoA-DD-FORM

- Chimney height: 8' made of concrete
- Chimney ID: 3"
- Cookstove base: hollow shape; concrete wall thickness: 1"; height: 5.5"
- Chimney holder made of concrete

- Flue gas exit diameter: 2" diameter (circular instead of elliptical shape)
- Chimney height: 8' made of concrete
- Chimney ID: 3"
- Cookstove base: hollow shape; concrete wall thickness: 1"; height: 5.5"
- Chimney holder made of concrete

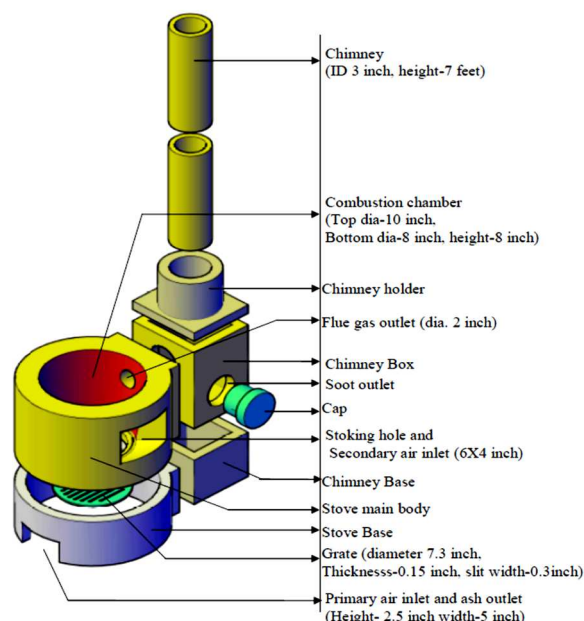


Figure 3. Single Mouth (10'') with chimney

- 1.25" thick outer concrete layer
- 1 mm thick GI sheet metal lining for combustion chamber
- 1" thick rock wool insulation in the annular section
- Total stove wall thickness: 2.25"
- Primary air inlet: 2.5" (H) x 5" (W)
- Stocking hole: 4" (H) x 6.0" (W)
- Combustion chamber height: 8"
- Combustion chamber diameter: 8" at grate level and 10" at top level
- Grate: 7.3" made of Cast Iron
- Flue gas exit diameter: 2" (circular shape)
- Chimney height: 7' made of concrete
- Chimney ID: 3"
- Cookstove base: hollow shape; concrete wall thickness: 1"; height: 5.5"
- Chimney holder made of concrete

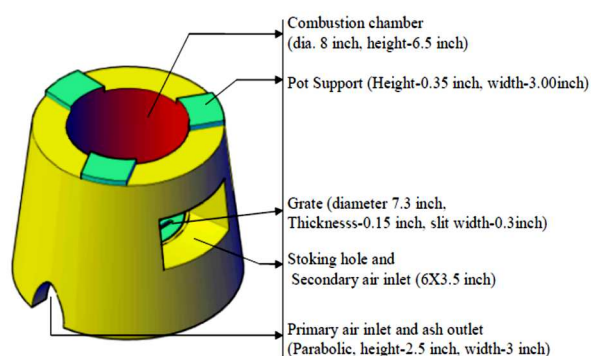


Figure 4. Single Mouth (8'') portable

- 1.25" thick outer concrete layer
- 1 mm thick GI sheet metal lining for combustion chamber
- 1" thick rock wool insulation in the annular section
- Total stove wall thickness: 2.25" at the top and increases gradually up to grate level
- Primary air inlet: two parabolic holes each having dimension 2.5" (H) x 3" (W)
- Stocking hole: 3.5" (H) x 6.0" (W)
- Combustion chamber height: 6.5" with 3 pot supports of 0.35" height and 3.0" width
- Combustion chamber diameter: 8"
- Grate: 7.3" made of Cast Iron

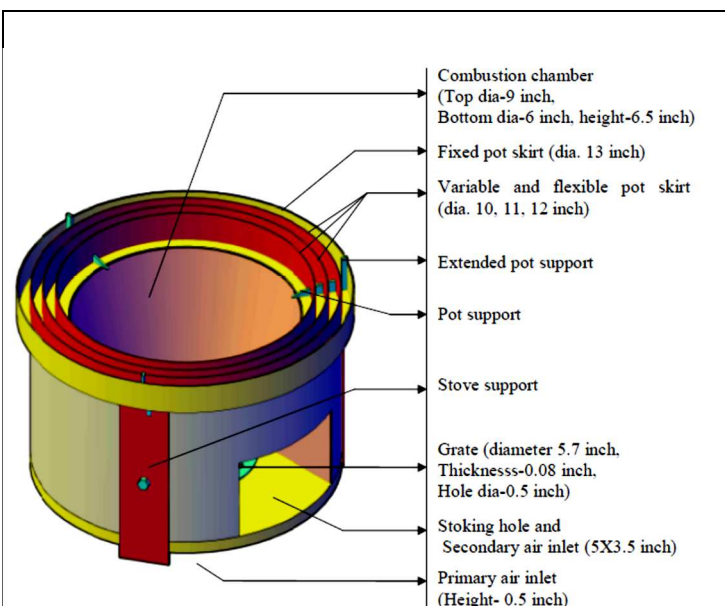


Figure 5. Metallic 6'-4" Stove

- Made of GI Sheet Metal and Ceramic Fiber as insulation.

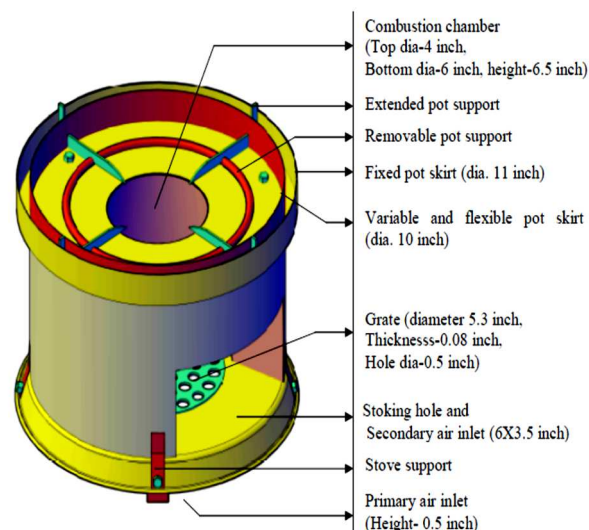


Figure 6. Metallic 6'-9" Stove

- Made of GI Sheet Metal and Ceramic Fiber as insulation.

The average lifetime of ICS is three to five years⁶.

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 methodologies and standardized baselines

I.1. Referencetomethodologies and standardized baselines

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AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass, Version 10.0⁷

Standard: Sampling and surveys for CDM project activities and programmes of activities Version 07.0⁸

Methodological tool: Demonstration of additionality of small-scale project activities, Version 12.0⁹

Methodological tool: Calculation of the fraction of non-renewable biomass, Version 01.0¹⁰

Methodological tool: Demonstration of additionality of microscale project activities¹¹

I.2. Applicability of methodologies and standardized baselines

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Methodology AMS-II.G. version 10.0
Applicability Criteria

Justification

⁶Depends upon the type, tier and usage of ICS.

⁷<https://cdm.unfccc.int/UserManagement/FileStorage/1FSPVQM7JWELKHB5U94DXR23TOC6AZ>

⁸https://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20170509173058940/Methodology_standard05_EB94a02%28ver07.0%2C%204may17%29.pdf

⁹<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-21-v12.pdf>

¹⁰<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-30-v1.pdf>

¹¹<https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-19-v9.pdf>

<p>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 (cookstoves or ovens or dryers) to replace the existing devices and/or energy efficiency improvements in existing biomass fired cookstoves or ovens or dryers.</p>	<p>The CPA includes dissemination of high efficiency biomass fired ICS to replace the existing traditional cookstoves in beneficiary households. The same has been developed as an eligibility criterion for inclusion of CPA in the PoA.</p>
<p>In the case of cookstoves, the methodology is applicable to the introduction of single pot or multi pot portable or in-situ cookstoves with rated efficiency of at least 20 per cent.</p>	<p>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.</p>
<p>The aggregate energy savings of a single project activity shall not exceed the equivalent of 60 GWh per year or 180 GWh thermal per year in fuel input.</p>	<p>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: 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; 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 6 of the Tool: Demonstration of additionality of microscale project activities, version 9, dated 29 Nov 2018 mentions the following: For CPAs applying microscale thresholds at the unit level rather than at the aggregate level of the CPA, the term ‘project activities’ in paragraphs 4 and 11 to 13 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 paragraph 6 above do not apply. Para 12 of the aforesaid Tool refers to energy savings at a scale of no more than 20 GWh per year and the distributed units are reducing not more than 1.8GWh_{th} thermal energy savings per year ¹² (derived by</p>

¹²Refer Appendix of TOOL21, Methodological tool: Demonstration of additionality of small-scale project activities Version 12.0

	<p>multiplying by a factor of 3 to convert electrical units to thermal units).</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>										
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>The following two supporting indicators demonstrate use of non-renewable biomass existing in Bangladesh</p> <ol style="list-style-type: none">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).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', Rural households' preferences and attitudes towards biomass fuels - results from a comprehensive field survey in Bangladesh 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. The study demonstrated that firewood was the most preferred biomass fuel and, as a consequence, the current consumption was not sustainable. <p>Further, an assessment of forest area at 1990 and 2010 levels indicates depletion of forest carbon stock levels since 31 Dec 1989 in Bangladesh.</p> <table><tr><th>Description</th><th>Units</th><th>1990</th><th>2010¹³</th><th>Reference: Global FRA 2015, Country Report Bangladesh</th></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>	Description	Units	1990	2010 ¹³	Reference: Global FRA 2015, Country Report Bangladesh					
Description	Units	1990	2010 ¹³	Reference: Global FRA 2015, Country Report Bangladesh							

¹³The data for 2010 has been used as FRA 2015 report mentions the removal data only till 2011

	Forest Area (FA)	1000 ha	1494	1442	Section 1.4, Table 1a, page 32
	Furthermore, the fraction of woody biomass saved that can be established as non-renewable biomass is calculated following the “TOOL30: Calculation of the fraction of non-renewable biomass”, EB 97, Annex 9. As per the tool, the fraction of woody biomass that can be established as non-renewable is presented in the following table:				
	Description	Units	2010	Reference Global FRA 2015, Country Report Bangladesh	
	Total removals (H)	1000 m3	27568.83	Table 4c on page 55	
	Forest Area (FA)	1000 ha	1442	Section 1.4, Table 1a, page 32	
	Other Wooded Land (OWL)	1000 ha	289	Section 1.4, Table 1a, page 32	
	Protected area within forests (P _{forest}) ¹⁴	1000 ha	248	Section 6.4, Table 6, page 72	
	Protected area within other wooded land (P _{OWL})	1000 ha	0	Conservatively taken as zero to maximize RB	
	Net annual increment (MAI)	m ³ /ha/yr	2.91	Table 2c on page 45	
	Renewable Biomass (RB)	1000 m ³	4315.53	=MAI*(FA + OWL - P _{forest} - P _{OWL})	
	f _{NRB}	Fraction	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				
If the project device requires a specific fuel for this device (e.g. briquettes, pellets, woodchips), the consumption of the fuel should be monitored during the crediting period.	In case of deployment of higher efficiency stoves (for e.g., Tier 4 ICS) if they require a specific fuel for this device (e.g. briquettes, pellets, woodchips), the consumption of the fuel would be monitored during the crediting period.				

¹⁴The FAO FRA report does not give any information on protected areas under OWL category.

I.3. Application of multiple methodologies

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Not applicable.

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

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As per para 14 of the methodology, the CPA project boundary is the physical, geographical site of the efficient devices that utilize biomass.

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

I.5. Establishment and description of baseline scenario

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The methodology para 21 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. 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. 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 indoor air pollution. 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.

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 32(c) or 32(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 34 of the methodology. Further, in case of switching from baseline device using firewood to efficient project device using processed biomass

(briquette, pellets, and woodchips) the leakage effects related to the processed biomass production shall be taken into account.

The ex-ante calculation of emission reductions is described in section I.6.3.

I.6.2. Data and parameters fixed ex ante

Data/Parameter	<i>B_{old,p}</i>
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 10.0
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
Additional comment	-

Data/Parameter	<i>N_{p,HH}</i>
Data unit	Number
Description	Average number of persons served per household prior to 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
Additional comment	-

Data/Parameter	<i>B_{old,HH}</i>
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	Use one of the following options: 1. <i>B_{old,p}</i> times <i>N_{p,HH}</i> or; 2. Based on the historical data or a sample survey conducted as per the latest version of "sampling and surveys for CDM project activities and programme of activities". If the monitoring period is shorter or longer than one year, the result may be extrapolated for the monitoring period
Purpose of data	To calculate baseline emission

Additional comment	Bold,i,j equals <i>Bold,HH</i> when only one project device per household is distributed. 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.
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Data/Parameter	$f_{NRB,y}$
Data unit	-
Description	Fraction of woody biomass saved by the project activity during year y that can be established as non-renewable biomass
Source of data	Calculated as per Tool: Calculation of the fraction of non-renewable biomass, EB 97, Annex 9
Value(s) applied	84.3
Choice of data or Measurement methods and procedures	As per the "TOOL30: Calculation of the fraction of non-renewable biomass"
Purpose of data	To calculate baseline emission
Additional comment	-

Data/Parameter	$EF_{projected_fossilfuel}$
Data unit	tCO ₂ e/TJ
Description	Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers
Source of data	AMS II.G. version 10.0
Value(s) applied	63.7
Choice of data or Measurement methods and procedures	Default value specified by the methodology
Purpose of data	To calculate baseline emission
Additional comment	-

Data/Parameter	$NCV_{biomass}$
Data unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass that is substituted
Source of data	AMS II.G. version 10.0
Value(s) applied	0.0156
Choice of data or Measurement methods and procedures	IPCC default for wood fuel, 0.0156 TJ/tonne, based on the gross weight of the wood that is 'air-dried', as indicated in the methodology
Purpose of data	To calculate baseline emission
Additional comment	-

Data/Parameter	$\eta_{old,i,j}$
Data unit	Fraction

Description	Efficiency of the old devices being replaced by project devices of type i and batch j
Source of data	AMS II.G. version 10.0
Value(s) applied	0.11
Choice of data or Measurement methods and procedures	As per the Bangladesh Country Action Plan for Clean Cookstoves, more than 90% households use Three Stone Fire Stove / conventional stoves in Bangladesh. Therefore, following the approved CDM methodology AMS II.G/v10, a default value of 10% has been used for the 90% conventional stoves and for other types of baseline stoves a default value of 20% has been used. Thus, a weighted average efficiency of 11% with a 90:10 mix has been considered.
Purpose of data	To calculate baseline emission
Additional comment	-

Data/Parameter	NTG
Data unit	Fraction
Description	Net to gross adjustment factor
Source of data	AMS II.G. version 10.0
Value(s) applied	0.95
Choice of data or Measurement methods and procedures	As per the methodology AMS II.G Version 10.0, para 34, $B_{y,savings,i,j}$ is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.
Purpose of data	To calculate leakage
Additional comment	-

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

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As per applicable meth, AMS-II.G.version10,Emission reductions are 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 CO₂e
- $ER_{y,i,j}$ = Emission reductions by project device of type i and batch j during year y in t CO₂e
- LE_y = Leakage emissions in the year y
- $$ER_{y,i,j} = B_{y,savings,i,j} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil\ fuel}$$

Where:

- $B_{y,savings,i,j}$ = Quantity of woody biomass that is saved in tonnes per 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')
- $EF_{projected_fossilfuel}$ = Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers. Use a value of 63.7 t CO₂/TJ
- $N_{y,i,j}$ = Number of project devices of type i and batch j operating during year y
- μ_y = Adjustment to account for any continued use of pre-project devices during the year y (fraction). Use 1.0 in other cases

Option 3: water boiling test (WBT):

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

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
- $\eta_{old,i,j}$ = 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

As only one project device is envisage to be installed per household, the baseline woody biomass consumption per household ($B_{old,HH}$) is used as the total annual quantity of woody biomass that would have been used in the absence of the project activity in each device ($B_{old,i,j}$).

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

Accordingly, the Emission reductions could be presented as:

$$ER_y = B_{y,savings,i,j} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossilfuel} \times NTG$$

I.7. Monitoring plan

I.7.1. Data and parameters to be monitored

Data/Parameter	$N_{y,i,j}$
Data unit	Number
Description	Number of project devices of type i and batch j operating during year y
Source of data	Sales database and monitoring survey
Value(s) applied	[xx]

Measurement methods and procedures	Measured directly or based on a representative sample. Sampling standard shall be used for determining the sample size to achieve 90/10 confidence precision. A discount shall be applied based on the percentage of devices operational as determined by the sample survey, e.g. if survey shows that 10% of the devices is non-operating, an adjustment factor of 0.9 shall be applied to number of project devices commissioned in a particular batch. Separate samples shall be taken for each batch
Monitoring frequency	At least once every two years (biennial)
QA/QC procedures	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. 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.
Purpose of data	To calculate baseline emissions
Additional comment	-

Data/Parameter	μ_y
Data unit	Fraction
Description	Adjustment to account for any continued use of pre-project devices during the year y
Source of data	Fraction based on monitoring results
Value(s) applied	[xx]
Measurement methods and procedures	<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, $\mu_y = 1.0$.</p> <p>The surveys would be designed to capture the cooking habits and stove usage of households in the region, including quantification of use of baseline devices, by formulating questions and/or collecting evidences to determine the frequency of usage of both the project devices and baseline devices. For example, if there were 3 pre-project devices per household and it was determined during the survey that use of one of them continues during the crediting period then a conservative adjustment factor of 0.66 is applied for the relevant monitoring period. Another example would be the case where there was only one pre-project device per household and its use during the project period continues along with the project stove to meet 25% of the cooking needs of the household in which case the adjustment factor will be 0.75.</p>
Monitoring frequency	At least once every two years (biennial)
QA/QC procedures	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. 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.
Purpose of data	To calculate baseline emissions
Additional comment	-

Data/Parameter	$\eta_{\text{new},i,j}$
Data unit	Fraction
Description	Efficiency of the device of each type i and batch j implemented as part of the project activity
Source of data	Certificate or Manufacturers specification
Value(s) applied	[xx]
Measurement methods and procedures	<p>Efficiency shall be measured/estimated as per either of the following: 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. Manufacturer specifications on efficiency based on water boiling test (WBT) may be used. The WBT shall be carried out in accordance with national standards (if available) or international standards or guidelines (e.g. the WBT procedures specified by the partnership for clean indoor air (PCIA):<http://www.pciaonline.org/testing>. 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". The following simplified approach may be used, when the efficient cookstoves 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): Conduct a sample test on three cookstoves with three tests conducted for each stove. The test can be carried out by project proponents by themselves or stove manufacturers; 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.</p>
Monitoring frequency	Recorded at the time of commissioning/distribution; Adjusted for the loss of efficiency as paragraph 32
QA/QC procedures	-
Purpose of data	To calculate baseline emissions
Additional comment	<p>Following provisions in paragraph 32 of AMS II.G. version-10, to account for loss in efficiency of the project devices, CPAs can use any one of the following options</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>

Data/Parameter	Date of commissioning of project device i
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Data unit	Date
Description	Actual date of commissioning of the project device
Source of data	Internal records
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	Fixed and recorded at the time of commissioning/distribution
QA/QC procedures	-
Purpose of data	To calculate baseline emissions
Additional comment	-

1.7.2. 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. The survey will be conducted to achieve the confidence/precision of 95/10 and this is in accordance with the requirements set out as per methodology and sampling standard.

Sampling Methodology

Sampling Objective – The sampling objective for each parameter is to determine, via samplingsurvey / 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 formulae for calculating the required sample size (n) for these parameters will vary because the parameters number of ICS in operation and displacement of traditional stoves are binary in nature (proportions/percentage) and the efficiency of the stove is a continuous variable (mean value).

In order to calculate the required sample size for binary values (i.e. the number of ICS in operation and displacement of tradition stoves), value of proportion (p) is required. Similarly, to calculate the sample size for continuous variable (efficiency of the ICS), the mean value and standard deviation (SD) are required.

For the first monitoring period, the values as described below will applied. For the following monitoring periods, the estimates shall be adjusted with reference to the results of previous monitoring period(s).

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 stoves to be sampled

N = Total number of ICS in the population

z = Constant referring to level of confidence (e.g. 1.645 for 90 %; 1.96 for 95 % confidence)

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

For Proportion based parameters:

$$V = \frac{SD^2}{p^2}$$

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

Sample sizes will be sufficient to ensure that the precision of the sample means/proportions are in accordance to the Sampling Frame established for the CPA within the PoA to estimate emissions reductions. 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 repeat the survey. Alternatively, the survey may be expanded to reach the required confidence/precision.

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). 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 42 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 (e.g. 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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No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
1	Geographic boundary	All CPAs included in this PoA will be located in the host country - Bangladesh.	Sales database
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: 1. Registered as a CDM project activity 2. Included as a CPA in any other registered PoA, or deregistered as a CPA of a PoA	Confirmation by CME
4	Specifications of Technology/Measure	1. Type - The program will promote dissemination of wood-fuel ICS in Bangladesh. 2. Capacity - The rated annual thermal energy savings of ICS included under the CPAs shall not be more than 1.8GWhth. 3. Key Design Features – a. The stoves shall have a fuel grate and/or a chimney b. The stove shall be fixed or portable type. 4. The rated efficiency of technologies included under the program will be at least 20 per cent.	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 with respect to new models / incremental installations.
5	Start date	Conditions that the start date of CPA will be after the PoA start date.	End user agreement / voucher / installation report etc for the first ICS installed in the CPA.

6	Applicability of the methodology	Each CPA complies with the applicability and other requirements outlined in AMS II G version 10.	CPA-DDs applying AMS II.G. Version 10.0
7	Additionality	1. ICS shall be installed in Bangladesh. 2. The rated annual thermal energy savings of ICS included under the CPAs shall not be more than 1.8GWh _{th}	1. Sales database 2. The CPA-DD shall include a demonstration of ICS meeting the 1.8GWh _{th} 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 with respect to new models.
8	Local stakeholder consultation/ Environmental impact analysis	PoA specific requirements related to undertake local stakeholder consultation and environmental impact analysis	Not applicable as performed at PoA level
9	Public funding	Affirmation that public funding from annex 1 parties doesn't result in a diversion of official development assistance.	Declaration from CME and CPA that no funds for official development assistance will be used for program implementation
10	Target group	Target Group: Households / SMEs Distribution Mechanism: Via Partner Organizations	<input type="checkbox"/> ICS installation form filled up by the stove installer <input type="checkbox"/> CPA database
11	Sampling	CPAs under the program will adhere to all requirements as mentioned in Standard: Sampling and surveys for CDM project activities and programme of activities	CPAs will follow monitoring plan described in CPA-DD section I.7.2
12	Threshold check	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

Coordinating/managing entity and/or project participants	<input checked="" type="checkbox"/> Coordinating/managing entity <input type="checkbox"/> Project participant
Organization name	Infrastructure Development Company Limited
Country	Republic of Bangladesh
Address	Level 16, UTC Building, 8, Panthapath, Kawran Bazar, Dhaka
Telephone	9102171-8
Fax	+880-2-9102084
E-mail	Junaed@idcol.org
Website	http://www.idcol.org/
Contact person	JunaedTazdik

Coordinating/managing entity and/or project participants	<input type="checkbox"/> Coordinating/managing entity <input checked="" type="checkbox"/> Project participant
Organization name	World Bank as the Trustee of the CF-Assist
Country	USA
Address	The World Bank, 1818 H Street, NW, Washington, DC 20433, USA
Telephone	202-473-9189
Fax	202-522-7432
E-mail	cfassist@worldbank.org
Website	www.worldbank.org
Contact person	

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

Refer section I.7 above

Appendix 6. Summary report of comments received from local stakeholders

Refer section F.3 above

Appendix 7. Summary of post-registration changes

Not Applicable

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
09.0	31May 2019	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 02.0 of the “CDM project standard for programmes of activities” (CDM-EB93-A07-STAN); • Make editorial improvements.
08.1	28 June 2017	Revision to: <ul style="list-style-type: none"> • Remove a duplicated instruction; • Make editorial improvement.
08.0	7 June 2017	Revision to: <ul style="list-style-type: none"> • Improve consistency with the “CDM project standard for programmes of activities” and with the PDD and CPA-DD forms; • Make editorial improvement.
07.0	25 May 2017	Revision to: <ul style="list-style-type: none"> • Ensure consistency with the “CDM project standard for programmes of activities” (CDM-EB93-A07-STAN) (version 01.0); • Incorporate the “Programme design document form for small-scale CDM programmes of activities” (CDM-SSC-PoA-DD-FORM); • Make editorial improvement.
06.0	15 April 2016	Revision to ensure consistency with the “Standard: Applicability of sectoral scopes” (CDM-EB88-A04-STAN) (version 01.0).

Version	Date	Description
05.0	9 March 2015	Revision to: <ul style="list-style-type: none"> • Include provisions related to choice of start date of PoA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Add exception for generic CPA where technology is under positive lists; • Make editorial improvement.
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"> • 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)); • Include provisions related to standardized baselines; • 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; • Add general instructions on post-registration changes in paragraphs 2 and 3 of general instructions and Appendix 6; • Change the reference number from F-CDM-PoA-DD to CDM-PoA-DD-FORM; • Make editorial improvement.
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		
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Business Function: Registration		
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