



**Programme design document form for
small-scale CDM programmes of activities**

(Version 03.0)

Complete this form in accordance with the Attachment "Instructions for filling out the programme design document form for small-scale CDM programmes of activities" at the end of this form.

PROGRAMME DESIGN DOCUMENT (PoA-DD)

Title of the PoA	Fuel Efficient Stoves for Ethiopia Programme of Activity
Version number of the PoA-DD	2.2
Completion date of the PoA-DD	07/08/2014
Coordinating/ managing entity	World Food Programme Ethiopia
Host Party(ies)	Ethiopia
Sectoral scope(s) and selected methodology(ies), and where applicable, selected standardized baseline(s)	Sectoral Scope 3: Energy Demand AMS-II G, ver. 5, "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass"

PART I. Programme of activities (PoA)

SECTION A. General description of PoA

A.1. Title of the PoA

>> Fuel Efficient Stoves for Ethiopia Programme of Activity

Version number of the PoA-DD: 2.2

Completion date of the PoA-DD: 07/08/2014

A.2. Purpose and general description of the PoA

>> a) Policy/measure or stated goal that the PoA seeks to promote

The objective of the Programme of Activities (PoA) is to distribute over 200,000 fuel efficient cooking stoves (improved cookstoves, called "ICSs" further on) to particularly rural households or institutions in Ethiopia.

Besides saving greenhouse gases, the programme aims at

- bringing wood consumption down so as to allow natural recovery of forests and/or reforestation to take place (Fuel Wood Use is the main driver for deforestation and greenhouse gas emissions in Ethiopia¹),
- diminishing Indoor Air Pollution from wood smoke and avoiding its harmful health consequences,
- diminishing the fuel wood bill for households

b) Framework for the implementation of the proposed PoA

The Fuel Efficient Stoves for Ethiopia Programme of Activity is a voluntary initiative of the World Food Programme Ethiopia (WFP), who will act as CME. For the implementation of the programme, the WFP will cooperate with different governmental institutions of Ethiopia, such as Environmental Protection Agency (EPA), the Ministry of Agriculture and Rural Development (MoARD) and its local offices at the level of *Woredas* (administrative units at the municipal level), the Ministry of Water and Energy, the Ministry of Education, and the Ministry of Finance and Economic Development.

The PoA will facilitate the procurement of ICSs from domestic production so that the end user can obtain them for free or at prices below 50% of the unsubsidized price. Carbon revenues will be used to fund ICS distribution and to cover monitoring costs.

Households and possibly also institutions will be targeted, for example by using the infrastructure within *Woredas* that are participating in the successful long-running MERET WFP programme (Managing Environmental Resources to Enable Transitions to more sustainable livelihoods). In case of households under the MERET framework, the MoARD at the *Woreda* level will buy ICSs, and development agents working for the MoARD will distribute the stoves in the *Kebeles* (administrative units at the village level). The WFP will provide 100% of funding to buy the ICSs from the producers. End users will receive ICSs for free or pay only a small contribution far below 50% of the unsubsidized price into a fund for the maintenance of stoves and community issues to be managed by *Woreda* offices.

¹ Environmental Protection Authority. 2003. *State of the Environment Ethiopia*. Addis Ababa: Environmental Protection Authority. <http://www.epa.gov.et/Download/Publications/State%20of%20Environment%20Report%20of%20Ethiopia-%202003.pdf>.

A.3. CMEs and participants of PoA

>> The CME is the World Food Programme Ethiopia.

World Food Programme Office of Ethiopia, P.O. Box 25584 Code 1000 Tel. No. 00251 11 551 5188, Fax No. 00251 11 551 4433

The World Food Programme (WFP) is the world's largest humanitarian agency fighting hunger worldwide.

A.4. Party(ies)

Name of Party involved (host) indicates host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Federal Democratic Republic of Ethiopia (host)	World Food Programme Ethiopia	No

A.5. Physical/ Geographical boundary of the PoA

>> The geographical area within which all CPAs included in the PoA will be implemented is the territory of the Federal Democratic Republic of Ethiopia.

All CPAs will be implemented considering all applicable national/sectoral policies and regulations of Ethiopia.

A.6. Technologies/measures**A.1. >> Technologies and measures**

The PoA consists in the distribution of different fuel efficient wood stoves that are designed particularly for Ethiopian cooking habits. The PoA is open for different technologies, but the two main stove types to be disseminated are fixed Mirt stoves designed for *injera* baking (Figure 1a) and Tikikil portable household cookstove for household cooking other than *injera* baking (Figure 1b). These two stove types are distributed to households in pairs (one Mirt and one Tikikil stove).



Figure 1: a) and b): Stove types disseminated within this PoA²

² GIZ (2011):GIZ Stove Projects in Kenya, Ethiopia, Uganda, Improved cookstove Colloquium, Nairobi, <https://energypedia.info/images/a/a6/GIZ.pdf>

Specific stoves may also be distributed to institutions. The technology deployed to institutions will highly depend on the type of institution and will thus be specified in detail in the CPA DD at time of CPA inclusion.

Mirt stoves – Stoves for injera baking

Injeras are large flat breads made of teff flour or other cereals such as maize or barley. They are baked on a large ceramic plate called *mitad*, which is traditionally heated over a three stone fire with very low thermal efficiency. The Mirt stove (Figure 2) is a closed stove that allows for *injera* baking at highly improved efficiency; additionally, it allows for the simultaneous preparation of sauces. The Mirt stove is a structure of ~0.6 x 1.0 m made out of cement, sand and mud with an enclosed heating chamber and a biomass fuel inlet opening in its front (Figure 4). It has two heating zones: a big one for baking *injera* and a small one for cooking sauces or stews. Smoke is led out via an opening above the stove. The Mirt stove is locally manufactured in six pieces using metal moulds. The MoARD Woreda offices will buy the Mirt stoves and subsequently distribute the stoves to the end users. End users transport and install the stoves inside the kitchens after having been instructed by the MoARD staff. The mitad is not part of the Mirt stove; it is bought separately by end users and then attached to the Mirt stove.

Currently, Mirt is appearing in two varieties on the market: classic and slim Mirt. The difference is mainly on the wall thicknesses of their respective parts. Classic Mirt has quadrant parts and 'U' chimney stack, with a wall thickness of all 6 cm, whereas the corresponding size for slim Mirt is 4 cm. The type of Mirt stove distributed under the CPAs (slim or classic) will be defined in the specific CPA. The chimney stack releases the smoke next to the wall where it rises and escapes through the roof. This leads to a significant reduction of indoor air pollution since traditionally, *injera* baking is done on three stone fires inside the house³; thereby larger quantities of smoke are generated and distributed all around the hut. Mirt stoves with integrated chimney releasing the smoke directly to the outside do exist as prototypes, but have a much higher cost⁴. The average lifetime of Mirt is about five to seven years⁵.



Figure 2: Mirt stove with baking plate (“mitad”) and cover⁶

³ Kebede, Faris. 2002. “Survey of Indoor Air Pollution Problems in the Rural Communities of Jimma, Southwest Ethiopia.” *Ethiopian Journal of Health Science* 12 (1).

⁴ Anteneh Gulilat. 2011. Stove Testing Results. A Report on Controlled Cooking Test Results Performed on “Mirt with Integrated Chimney” and “Institutional Mirt” Stoves. energypedia.info/images/5/50/Stove_testing_results,_A_report_on_controlled_cooking_test_results_performed_on_Mirt_with_integrated_chimney_and_Institutional_mirt_stoves,_Report_by_Anteneh_Gulilat,_May_23,_2011..pdf.

⁵ Bewket, Woldeamlak. 2011. Ethiopia’s Climate-Resilient Green Economy and the Importance of Fuel Efficient Stoves. Submitted to WFP- Ethiopia Addis Ababa.

⁶ GIZ HERA (2011): “Mirt Stove Ethiopia.” https://energypedia.info/images/a/a0/GIZ_HERA_2012_Mirt_stove.pdf.



Figure 3: Slim Mirt stove on the left and classic Mirt on the right⁷

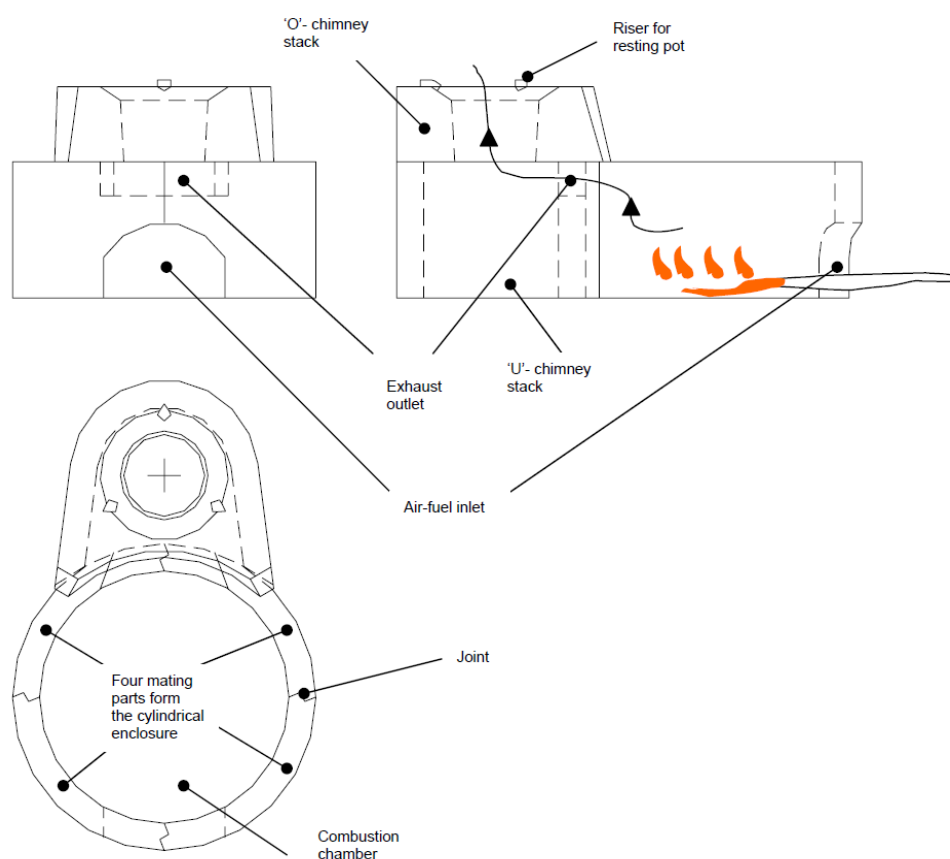


Figure 4: Orthographic views of Mirt stove (not to scale)⁶

Tikikil stove - Portable household cook stove

Tikikil stove is a rocket stove, which is used for cooking (**Figure 5 a**). It uses firewood as fuel, which is continuously fed to the combustion chamber. Tikikil is available in two types: single-skirt and double-skirt. Single-skirt Tikikil is designed to accommodate a 25 cm diameter pot (hence fixed size), which is a typical size used in most Ethiopian households. Double-skirt Tikikil can accommodate 27 cm and 31 cm diameters of pots. Smaller sized pots can also be accommodated

⁷ GTZ SUN ENERGY (2011)_Memo, Result of stove testing

but not with as much efficiency. Either of the types can be used for up to a 10 liters pot so long as it fits within the skirt⁸.

The stove has a cylindrical inner clay liner as combustion chamber, covered with galvanized sheet metal on the outside. The 4 cm thick liner has internal diameter of 11 cm and is 23.5 cm high. At its bottom is an 11 cm x 11 cm opening as fuel and air inlet. A fuel shelf made of a 6 mm steel round bar also constitutes part of the stove. The clay liner is produced by local potters while the metal cladding is done by metal artisans. The stove has a non-removable skirt. The fuel shelf is made up of a 5 mm radius round metal bar (Figure 5 b). Slight variations of the measures given here or small design changes are possible.

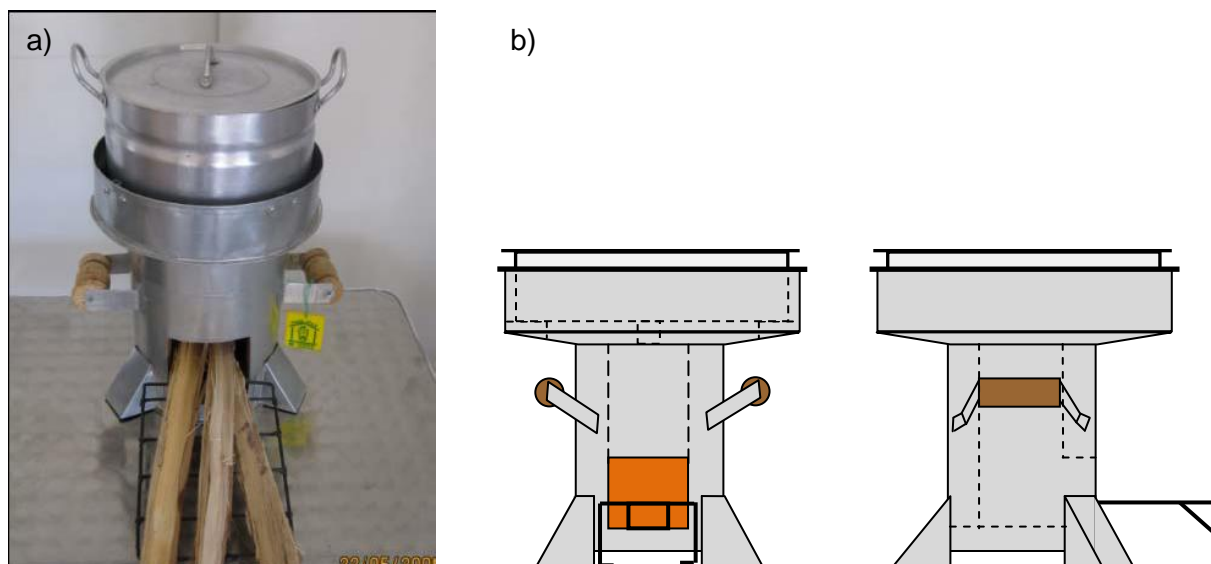


Figure 5: Photograph (a) and technical drawing (b) of Tikikil portable household cook stove.⁸

The Tikikil stove will be bought at the *Woreda* level and distributed to interested households at *Kebele* level along with the built in Mirt stove.

Other types of cooking stoves may also be distributed under the PoA, including the distribution to institutions, as long as they are based on the efficient combustion of biomass and replace other, less efficient biomass stoves.

A.7 Public funding of PoA

Since the WFP is a UN organization, its budget mainly consists in ODA funding. Also the funds are used for pre-funding the project costs which will later need to be recovered by CER revenues. On the CPA level, ODA funding will be transparently tracked and evidence will be provided on the non-diversion of ODA. For information about the type of ODA as well as the party providing public funding please refer to Appendix 2.

SECTION B. Demonstration of additionality and development of eligibility criteria

B.1. Demonstration of additionality for PoA

>> *The proposed PoA is a voluntary coordinated action*

⁸ GIZ HERA. 2011. "Tikikil Stove Ethiopia."

The PoA is a voluntary coordinated action by WFP Ethiopia. There is no mandatory programme in Ethiopia to foster the dissemination of Improved Cooking Stoves (ICSs).

>> *The proposed voluntary coordinated action would not be implemented in the absence of the PoA*

The voluntary coordinated action would not be implemented in the absence of the PoA, due to the high financial barriers. Since ICSs are distributed for free or at subsidized costs, the voluntary coordinated action is not financially viable in the absence of the CDM. CERs will be needed to fund and refund expenditures.

The additionality of the SSC-CPAs does not need to be demonstrated by barrier analysis in line with EB 68, Annex 27, "Guidelines on the demonstration of additionality of small-scale project activities" (version 9) where it says as follows:

According to para. 2 of the guidelines "Documentation of barriers [...] is not required for the positive list of technologies and project activity types that are defined as automatically additional for project sizes up to and including the small-scale CDM thresholds (e.g. installed capacity up to 15 MW). The positive list comprises of:

[...]

(c) 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 5% of the small-scale CDM thresholds;"

As demonstrated under Section C. iii), debundling check, it is obvious that all possible ICSs to be included cannot even exceed 1% of the SSC threshold.

B.2. Eligibility criteria for inclusion of a CPA in the PoA

>> The following criteria need to be fulfilled by each CPA to be included in the PoA:

Eligibility criteria (EC) for CPA inclusion

Nr	Eligibility Criteria		Mean of proof / Evidence Document (to be checked at CPA inclusion)
	Category	Description	
1	CDM-EB65-A03-STAN version 3.0 Par.16 (a): Geographical boundary and location of the CPA	The CPA is located within the project boundary. The geographical area within which all small-scale CDM programme activities (SSC-CPAs) included in the PoA, will be implemented is the Federal Democratic Republic of Ethiopia. During verification, locations of all ICS belonging to the CPA will be checked.	Location and boundary are specified in the specific CPA-DD stating that the location is limited to the Federal Democratic Republic of Ethiopia. Document: CPA-DD
2	CDM-EB65-A03-STAN version 3.0 Par.16(b): Conditions to avoid double counting of stoves	A unique numbering or identification system for the ICSs disseminated is applied.	The specific numbering or identification regime is included in the specific CPA DD. Document: CPA-DD.
3	CDM-EB65-A03-	The CPA is exclusively bound to the	A statement is included in the

	STAN version 3.0 Par.16 (b): Conditions to avoid double-counting of CPAs	PoA; there will be a confirmation that the programme activity has not been and will not be registered either as a single CDM project activity or as a CPA under another PoA.	CPA-DD that the specific CPA will not be part of another single CDM project activity or CPA under another PoA. The numbering system will be unique to the PoA. Document: CPA-DD
4	CDM-EB65-A03-STAN version 3.0 Par.16 (c): Specification of technology	The CPA consists in the distribution of ICSs, e.g. fixed Mirt stoves, portable Tikikil stoves, and portable institutional rocket stoves as described in section A6 of the PoA DD part I, with efficiency improvements in thermal applications of non-renewable biomass as per AMS-II.G, ver. 5	Stove type, its specifications and compliance with the technological requirements of AMS-II G will be described in the specific CPA-DD. Document: CPA-DD
5	CDM-EB65-A03-STAN version 3.0 Par.16(c): Performance specifications of technology including compliance with testing	The stove disseminated under the CPA has a specified efficiency of at least 20%	The water boiling test of the stove applied or of any other stove testing protocol which is in compliance with the applied methodology will be described in the specific CPA-DD. Document: CPA-DD
6	CDM-EB65-A03-STAN version 3.0 Par.16 (d): Conditions to check start date of the CPA	CPA start date shall not be before the PoA webhosting date. The ICS sales dates will be checked during verification. In case any deployed stove will be found not in line with CPA start date requirement, those stoves will not be counted for emission reduction calculation.	Starting date as stated in the CPA-DD is after PoA webhosting date. Document provided at the time of inclusion: Evidence on start date, such as approval of funding. Document provided at the time of first verification: Distribution contract of the first stove deployed under the CPA, including exact distribution date.
7	CPA crediting period	The CPA starting date of the crediting period is the date of inclusion into the registered PoA or any date thereafter and the crediting period cannot exceed the PoA end date.	A statement is included in the CPA-DD that the crediting period starting date is the date of CPA inclusion into the registered PoA or any date thereafter, the end of the crediting period in a CPA-DD will not exceed the PoA end date. Document: CPA-DD
8	CDM-EB65-A03-STAN version 3.0 Par.16 (e): Compliance with applicability and other requirements of single or multiple	CPAs shall comply with the applicability criteria and meet all requirements of the applied methodology AMS-II.G ver. 5.	The CPA consists in the distribution of ICSs with efficiency improvements in thermal applications of non-renewable biomass as per AMS-II.G, ver. 5. The compliance with methodology AMS-II.G ver. 5 will be

	methodologies applied by CPAs		demonstrated in the specific CPA-DD. Document: CPA-DD
9	CDM-EB65-A03-STAN version 3.0 Para 16 (f) and EB 68 Annex 27 (Guidelines on the demonstration of additionality of small-scale project activities v.9.0)	Additionality of the PoA and the included CPAs is demonstrated as described in detail in Section B.1 of the PoA DD part I, by applying paragraph 2. (c) of EB 68 Annex 27 (Guidelines on the demonstration of additionality of small-scale project activities v.9.0).	Since the PoA and all included CPA activities are composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises, the additionality of each CPA will be demonstrated, by demonstrating that:[...] the size of each unit is no larger than 5% of the small-scale CDM thresholds according to Section B1. of the PoA DD part I This is in accordance with EB 68 Annex 27 par. 2.c. Document: CPA-DD
10	CDM-EB65-A03-STAN version 3.0 Par.16 (g): Conditions related to undertaking local stakeholder consultations and environmental impact analysis g	The local stakeholder consultation will be conducted at the PoA level. According to the analysis on environmental impacts done in Section E of this PoA DD part I, an environmental impact analysis is not required.	The results and measures of the stakeholder consultation are given in Section F of the PoA-DD part I According to the analysis on environmental impacts done in Section E of this PoA DD part I an environmental impact analysis is not required.
11	CDM-EB65-A03-STAN version 3.0 Par.16 (h): Non-diversion of ODA in case of Public funding	The CME and the CPA operator (in case of being different from the CME) shall confirm that in case of public funding there shall not be diversion of Official Development Assistance.	In case of ODA involved in funding or pre-funding parts of a CPA, a confirmation that no diversion of ODA occurs will be provided. Document: Statement of CME and the CPA operator (in case of being different from the CME).
12	CDM-EB65-A03-STAN version 3.0 Par.16 (i): Target group and distribution mechanisms	Target groups are particularly rural households e.g. for the Mirt and Tikikil stove types and institutions (e.g. prisons, schools) for the institutional rocket stove. Target group of one CPA may only be institutions or households. The distribution mechanism is the direct distribution of ICSs through the CME or regional partners such as the <i>Woreda</i> offices of the Ministry of Agriculture and Rural Development.	The target group will be described in the specific CPA-DD. Target group of one CPA may be only institutions or only households, in particular rural households. Document: CPA-DD
13	CDM-EB65-A03-STAN version 3.0 Par.16 (j): Ability to carry out monitoring and	The monitoring plan included in the PoA DD part II and III should be in accordance with the latest approved version of the Standard for sampling and surveys for CDM project	The monitoring plan included in the specific CPA-DD should be in accordance with the latest approved version of the Standard for sampling and

	sampling requirements	activities and programme of activities (EB 50, Annex 30 STAN version 4.1, including Amendment to version 4.1 EB 80 Annex 07).	surveys for CDM project activities and programme of activities (EB 50, Annex 30, STAN version 4.1 including Amendment to version 4.1 EB 80 Annex 07).). In case the CPA is not implemented by the CME itself, an agreement will be signed with the CME defining responsibilities and duties of the implementing agent and acceptance of the terms of the PoA. Document: CPA-DD
14	Approval of CPA by CME and awareness and agreement of those operating a CPA on PoA subscription.	CME approved each CPA to be included into its registered PoA. Contractual provisions between the CPA operator and the CME will ensure that those operating the CPA are aware and have agreed that their activity is being subscribed to the PoA.	Statement of CME giving approval for the CPA to be included into its registered PoA. Document: Statement of approval for CPA inclusion from CME In case CPA operators are different from the CME: A declaration from CPA operators, stating that they are aware and have agreed that their activity is being subscribed to the PoA will be provided for each CPA. Document: A declaration from CPA operators
15	CDM-EB65-A03-STAN version 3.0 Par.16 (k): Conditions that ensure that CPAs meets SSC threshold criteria	The CPA will remain under the thermal threshold of 180 GWh _{th} /a thermal energy savings (threshold as per clarification request SSC_233) throughout the crediting period of the CPA.	The estimated maximum number of stoves will be defined in the CPA-DD according to a calculation of the total energy savings, where it will be shown that total energy savings. of each CPA will not exceed 180GWh _{th} /a. Document: CPA ex ante Emission reduction spreadsheet
16	CDM-EB65-A03-STAN version 3.0 Par.16 (l): Requirements for the De-bundling check	According to EB 54 Annex 13 (Guidelines on Assessment of Debundling for SSC Project Activities“ /Version 03): A CPA of the PoA is exempted from performing de-bundling check, if each of the independent	It will be shown in the CPA-DD that energy savings of each ICS type included are always below 1% of the SSC threshold. Document: CPA-DD

		subsystems/measures included in the CPA of a PoA is no larger than 1% of the small-scale thresholds defined by the methodology applied.	
17	CER ownership	End users receiving ICSs under the specific CPA contractually cede their rights to claim and own emission reductions under the Clean Development Mechanism of the UNFCCC to the CME of the PoA.	A default sales agreement for end users including the provision that emission reductions generated by the stove are owned by the CME will be provided for each CPA. Document: Sample sales agreement At the time of verification, the DOE will check that the default sales agreement has been used for stove distribution.
18	Definition of CPA Baseline	1. if the CPA is only including ICS for household level (as defined in Section B4 of this PoA-DD part II): The CPA applies the baseline fuel consumption as defined in this PoA-DD 2. if the CPA is only including institutional ICS (as defined in Section in Section B4 this PoA-DD part III): the baseline fuel consumption is to be defined in the specific CPA and validated by the DOE prior to CPA inclusion.	1. CPA states that only household ICS are to be implemented under the CPA Document: CPA-DD 2. Baseline fuel consumption is defined in the specific CPA-DD according to the regulations specified in AMS-II.G. and validated by a DOE before inclusion into the CPA. Document: CPA-DD

B.3. Application of technologies/measures and methodologies

>> The only approved SSC baseline and monitoring methodology applied to all CPAs under the PoA is AMS-II G, ver. 5, "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass"⁹, Sectoral Scope 3: Energy Demand

The Sampling Plan described in section B.7.2 of the PoA-DD part II and part III is in accordance with sampling standard, EB 50, Annex 30 STAN version 4.1 including Amendment to version 4.1 EB 80 Annex 07.

B.4. Date of completion of application of methodology and standardized baseline and contact information of responsible person(s)/ entity(ies)

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1. Date of completion of study on application of the selected methodology(ies)

⁹ UNFCCC Methodologies: AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass - Version 5.0 <http://cdm.unfccc.int/methodologies/DB/REQC2MYZJJ6I7BC9SKCS32T2K87AOW>

23/11/2012, date of release of the applied version of methodology AMS-II.G (version 5.0) .

2. Contact information of responsible person/entity(ies)

The completion of the PoA-DD was done by the World Food Programme Ethiopia, who represents the CME of this PoA. For contact details please see Appendix 1 of this PoA-DD with the support of atmosfair gGmbH.

SECTION C. Management system

>> The following diagram represents the currently planned management structure of the PoA and refers to the planned distribution of Mirt and Tikikil stoves to households and the possible distribution of other ICS to institutions such as schools (Figure 6). When implementing future CPAs, the structure may be amended and adapted.

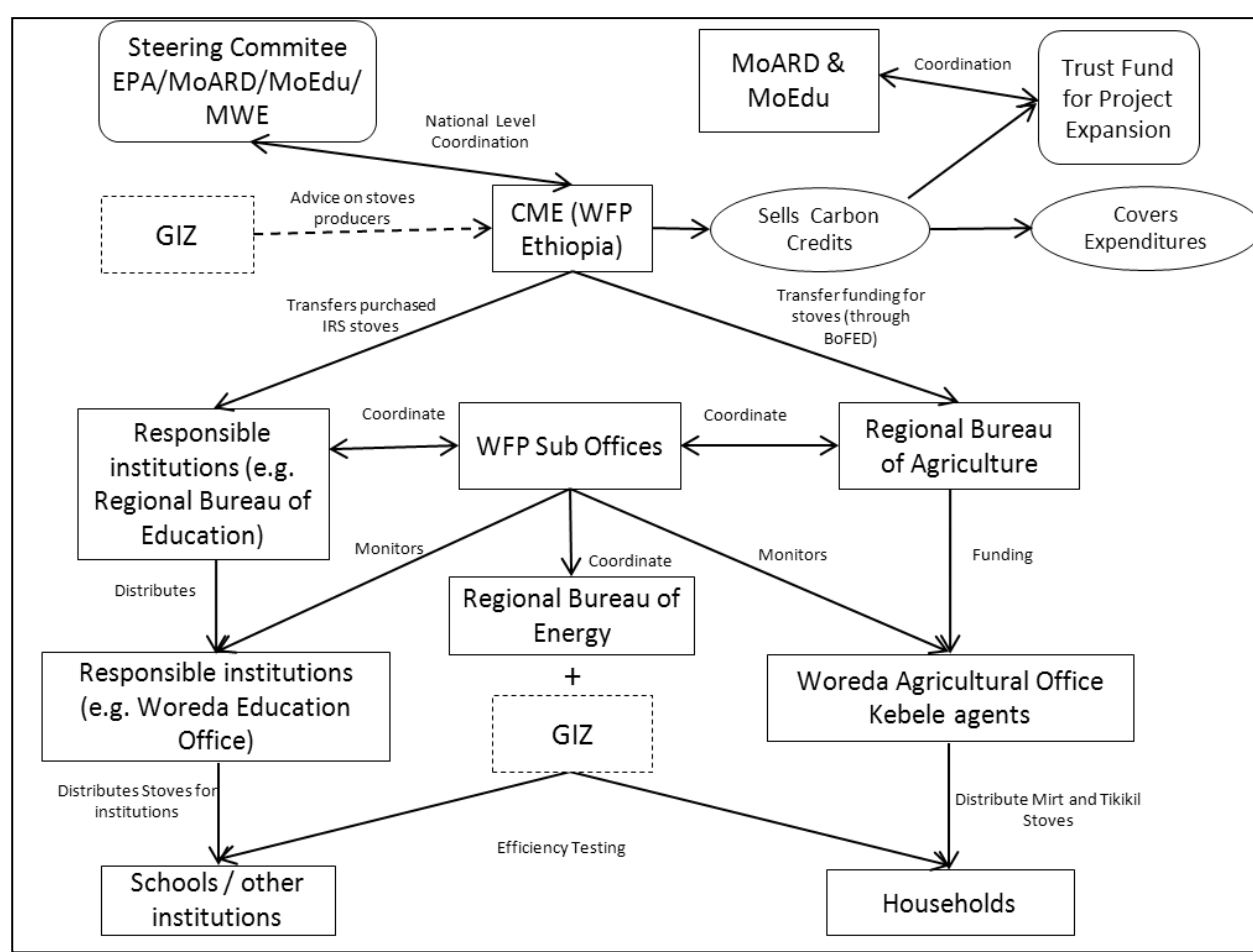


Figure 6: Management System of the PoA

WFP as the CME, will be, inter alia, the actor responsible for channeling funding for stove procurement, monitoring and selling CERs. EPA will facilitate coordination of the relevant stakeholders at national and regional level.

Funding will generally be channeled through the regional level bureaus, e.g. in coordination with the Regional Bureaus of the Ministry of Agriculture (MoARD) for household. The WFP sub offices

at the regional level will play a particularly important role in monitoring ICS distribution and will therefore directly interact with *Woreda* offices.

ICS distribution to households will be conducted in cooperation with the *Woreda* offices of the Ministry of Agriculture, through development agents at the *Kebele* level. ICS distribution to institutions will be done with specific partners depending on the nature of institutions.

This management structure may be adapted and amended during the duration of the PoA.

The CME has prepared a CPA Inclusion Management System that satisfies all criteria as outlined in EB 74 Annex 5, paragraph 19.

Roles and responsibilities:

- General CME manager: Approval of CPA inclusion and final decisions on annual procedures.
Required Competency: Proven experience in management and set up of complex programs, preferably related to CDM.
- CME Focal point for monitoring and data management: Coordination of all issues related to monitoring and record keeping, e.g. for numbering system of ICSs to avoid double counting.
Required Competency: Proven experience with data management systems.
- CME Focal point for training: CME coordinates training for all the staff of the CME and external CPA implementers.
Required Competency: Proven experience for efficiency test conduction training and general training

Procedure for CPA inclusion

0. Reception of CPA inclusion proposal from CPA implementers
1. Overall general completeness check of CPA eligibility by CME manager (technology, institutions involved, additionality, etc.)
2. Technical review of the proposed CPA, focused on:
 - technology (by general CME manager)
 - integration in centralized monitoring system (by CME monitoring and data focal point focal point)
 - CDM eligibility criteria as specified in the generic CPA-DD section B.5
3. Review to avoid double counting, by defining the numbering system for ICSs to be distributed (by CME monitoring and data focal point)
4. Review of capacities of the CPA implementer (CME training focal point)
5. Review of the CPA implementer's targeted population group to ensure the baseline scenario of the ICS end users (by general CME manager).

Annual procedures, to be conducted together with annual monitoring campaigns

Records and documentation control process for each CPA under the PoA (CME monitoring and data focal point)

Procedure for regular training (coordinated by CME training focal point)

Measures for continuous improvement of the PoA management system (General CME manager)

Version control of the document

A detailed description of specific parts of the management system:

- (i) **A record keeping system for each CPA under the PoA**

An electronic record keeping system will be operated and maintained by the managing entity for each CPA under the PoA, which contains at least the following information per CPA:

- Name and ID of the CPA
- Technology deployed (Name of the ICS type or types)
- Details of the agents/institutions distributing ICS at the local level for the CPA
- Date of inclusion of the CPA
- Serial numbers (Stove-ID) of the ICSs belonging to the CPA.
- Start of CPA crediting period

The following corresponding information to the stove IDs and ICS users required for monitoring, will be collected:

- o Stove type
- o Unique number (Stove-ID) of system
- o Commissioning date of appliance (at the user's place)
- o User details (Name, Address, etc.)
- o Distributing Entity /Contact Person

(please also refer to Section B.7.2 of the PoA DD part II and part III for details)

The record keeping system will be updated as per the progress of the CPA.

Each ICS will start to generate emission reductions after the date of implementation in the user's household/ institution or the date of CPA inclusion, whichever is later. Stove implementation date is conservatively defined as one week after stove sales date, since users may need a few days to transport and install ICSs in their houses/institutions in order to properly use it.

Data will be kept for the whole crediting period of the CPA and an additional two years.

(ii) A system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA

Procedure to avoid double counting:

Each CPA-DD will include a statement that the CPA has not been and will not be registered either as a single CDM project activity or as a CPA under another PoA.

The unique numbers allocated to each ICS under the PoA allow unique identification and tracking of the stove. Based on the serial numbers, a stove can only be allocated to one CPA.

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

According to the "Guidelines on assessment of debundling for SSC project activities, v03 (EB 54, Annex 13, par. 10 for determining the occurrence of debundling under a Programme of Activities (PoA))", the CPA of the PoA is exempted from performing a de-bundling check, i.e. considered as being not a de-bundled component of a large scale activity, if each of the independent subsystem/measures included in the CPA of a PoA is no larger than 1% of the small scale threshold defined by the methodology applied.

The small-scale threshold defined by the methodology applied, AMS-II.G ver. 5, is 180 GWh thermal energy savings per year (threshold as per clarification request SSC_233). Thus, 1% corresponds to 1.8 GWh thermal energy savings per year.

The calorific value of each ton of firewood is assumed as 15 GJ/t (or 4.17 MWh/t, source: AMS-II.G ver. 5). In order to reach the threshold of 1.8 GWh, an ICS would need to save over 400 tons of firewood ($1800 \text{ MWh} / 4.167 \text{ MWh/t} = 431.97 \text{ t}$) tons of firewood which is highly above the baseline values applied per household of 0.75 t annually (see PoA DD part II section B.6.1) and also higher than any reasonable value for institutional stove.

SECTION D. Duration of PoA

D.1. Start date of PoA

>> The starting date of the PoA was determined as 18/09/2013, the date of publication of the PoA-DD for global stakeholder consultation in accordance with CDM-EB65-A05-STAN Standard Version 07.0.

D.2. Duration of the PoA

>>28 years

SECTION E. Environmental impacts

E.1. Level at which environmental analysis is undertaken

The environmental analysis is done at the PoA level as the environmental impact does not depend on the specific geographical location where the ICS are used.

>>

E.2. Analysis of the environmental impacts

>>

According to the DIRECTIVE NO.2/ 2008 issued by the Environmental Council in accordance with Article 9(3) of the Environmental Protection Organs Establishment Proclamation No. 295/2002, no EIA is necessary¹⁰, since the project activity is not listed under the Types of Project Requiring Environmental Impact Assessment.

No negative environmental impacts of the programme, including transboundary impacts, are foreseen by the project participants or by the host country. In contrast, the programme will have positive environmental impacts, among these, improvement of air quality and forest protection.

Air quality

Indoor Air Pollution will be reduced since all ICSs distributed under the PoA will lead to more efficient and cleaner combustion of biomass, thereby reducing smoke generation. With the usage of, for example, the Mirt stove other harmful substances like CO are decreased by up to 92%¹¹.

Forest protection

Through the use of the ICSs, less fuel wood will be consumed; hence the PoA directly contributes to lowering the pressure on woody biomass. Indirectly, this also leads to a protection of water resources and to a decrease in soil erosion through decreased deforestation. Decreased deforestation will contribute to the conservation of the unique biodiversity of Ethiopia.

¹⁰ Directive No. 2/ 2008 issued to determine the Categories of projects subject to the Environmental Impact Assessment Proclamation No. 299/ 2002

¹¹ GTZ SUN ENERGY Project 2011, Stove testing results summary
https://energypedia.info/index.php/File:Stove_testing_results_summary.pdf

SECTION F. Local stakeholder comments

F.1. Solicitation of comments from local stakeholders

>> A stakeholder consultation process was conducted at the PoA level. A PoA-level Stakeholder Consultation is deemed most appropriate since all CPA will consist in similar activities distributing ICSs, so that all CPAs will deal with similar groups of stakeholders. Moreover, all beneficiaries will obtain ICSs on a voluntary basis. Therefore it is automatically guaranteed that there will be no unwanted impacts on local stakeholders.

Steps taken to engage stakeholders in the consultation process:

1. CDM stakeholder consultation in April 2012

In order to allow a broad participation of all relevant groups of stakeholder, several stakeholder meetings were organized at different places between 19th and 26th of April 2012, covering Addis Ababa, Hawassa and Halaba. Stakeholders were visited in their villages or in their offices.

The objective of the meetings was to explain the PoA to relevant stakeholders in Ethiopia at all levels, including grassroots level, and to gather their comments.

The invited stakeholders represented a national cross section of stakeholder groups: National, regional and local government representatives, pilot ICS users, possible future stove users, DNA representatives and international cooperation agents attended the meetings:

- Ministry of Agriculture and Rural Development (national, regional levels)
- Ministry of Education (national level)
- Environmental Protection Authority (DNA)
- Authority of Wildlife Protection (national level)
- Bureau of Agriculture (regional level, in Hawassa)
- Ministry of Water and Energy (national, regional levels)
- Agency of Mines and Energy (regional level, in Hawassa)
- Energy coordination office of the GIZ (German technical cooperation, national level)
- KfW (German financial cooperation)
- WFP (sub-)offices (national and regional levels)
- Development Agents of the Halaba Woreda who work with the village (Kebele) level
- ICS users in the rural areas of Halaba
- Possible future ICS users in the rural areas of Halaba
- The school Udasa Repae in Mareko Woreda, close to Koshe town and Butajira town

2. Face-to-face meetings in November 2013

- DNA representatives were met in November 2013 and already in April 2012.
- A representative of the Ministry of Water and Energy at the federal level (Ato Tadesse Eskihder) was met in Addis Ababa. He stressed that his ministry supported the PoA, that there had already been extensive coordination with the WFP regarding the PoA and that his ministry was fine with the organizational structure. He also emphasized that the PoA fitted into the government's Climate Resilient Green Economy (CRGE) strategy.
- A representative of World Vision Ethiopia (Hailu Tefere) was also met in November 2013. World Vision has a registered PoA in Ethiopia using the same stove technology. Cooperation between WFP and World Vision was accorded were such cooperation results in benefits for all stakeholders and the projects.
- In a meeting with GIZ representatives, their role in the PoA was determined to be a supporting one, especially in the field of trainings for stove producers and with technical stove testing.

- Two stove producers were met in Bahirdar. They are looking forward to the PoA which will provide an opportunity to sell many Mirt and Tikikil stoves.

3. Physical meeting in November 2013

The meeting was held on November 15th 2013 at 08:30 AM, at Bahirdar, Jacaranda Hotel, in Bahirdar, Amhara, Ethiopia.

F.2. Summary of comments received

1. >> Comments received from the CDM stakeholder consultation in April 2012

The programme is seen by all participants as an important way of tackling environmental degradation and climate change and alleviating poverty. The governmental institutions pointed out that the programme is in line with the recently launched Climate Resilient Green Economy Initiative.

Pilot users of the Mirt stove were all very satisfied with the stove; they all used it for all their *injera* baking and reported very important savings of fuelwood. They also pointed out that additional fuelwood savings are achieved since the Mirt stove is particularly suitable for burning waste biomass such as maize stems or Eucalyptus leaves. Due to increasing wood prices by using Mirt stoves they are able to save money and time formerly needed to collect wood. Households who had not been part of the pilot project all had heard of the Mirt stove and expressed great interest in obtaining one themselves.

Kitchen staff of the visited Udasa Repae School showed the large amount of fuelwood needed to feed children under the WFP school feeding programme. They also showed an efficient mud stove they tried to build but which was broken and out of use. They stated that they are very interested in obtaining an institutional rocket stove.

All governmental institutions expressed their will to support the programme according to their areas of expertise. During the meetings, several points regarding the operational framework were clarified. A frequent question was on the possibility of including additional ICS CPAs of other implementers than the CME under the PoA.

EPA (Environmental Protection Authority), the DNA, expressed its support for the programme. During the discussion with several ministries their representatives asked about the responsibilities in the distribution of ICSs.

The Wildlife Protection Authority offered its collaboration and asked for the incorporation of *Kebeles* (villages) close to protected areas

2. Comments Received from the face to face meetings and the physical meeting in November 2013:

Evaluation forms showed that the participants liked the meeting and the participatory approach; they felt well informed and appreciated the discussions. The PoA is highly welcomed, participants like the technology and the fact that it addresses energy issues at the local level. Many of the participants also mentioned that it is a suitable activity to fight climate change.

- Some participants criticized that the venue was rather small for the large number of participants. They also claimed that the program should be implemented more quickly.
- Some also questioned the assignment of responsibilities between the ministries of Water/Energy and Agriculture. Particularly some representatives of the Ministry of Water/Energy were not satisfied with the fact that the staff of the Ministry of Agriculture and its representations at the lower governmental levels will be the main responsible for stove distribution. This issue had already been discussed in former meetings at federal and regional level. Stove distribution and the necessity of providing continuous implementation support to the stoves users are critical parts of the project implementation. And although

efficient stoves are a matter of energy, the Ministry of Agriculture, is most suitable for these crucial tasks, since its organizational structures reach to village (Kebele) level. The discontent of the staff of the Ministry of Energy is understandable, however, due to practical reasons, the Ministry of Agriculture will necessarily play a more important role. This has also officially been agreed with the Ministry of Water/Energy in former discussions.

- The programme will take this comment into account by enabling each participating Woreda administration to decide independently on the question, who will be in charge of distributing stoves. Organizational structures will be adapted according to the specific conditions in each region and Woreda.
- Some participants criticized that the contact office for the project is in Addis Ababa and that more opportunities for input and trainings should be given on Woreda level.
- Another critical point was that there will only be carbon payment for the stove technology and that providing the stove for farmers for free is not good in terms of the sense of belongingness so that the farmers should pay some percentage.
- One participant mentioned that “some concerned persons didn’t participate for instance, women’s affairs, parties affairs, etc”. These stakeholders have been invited (e.g. mercycorps, Worl’s Vision), but did decide not to participate. However, since World Vision is also implementing a PoA on cookstoves in Ethiopia, there will be future collaboration with the organization.

Finally some participants criticized some general weaknesses of the CDM methodology and CDM rules, like that CO₂ emission is not fully avoided, the monitoring system is rather complicated and that therefore not all of the indicators can be measured.

F.3. Report on consideration of comments received

>>

- Still it is not clear if the PoA will include institutions. However if it is decided to do so, the Udas Repae school will be included in the stove programme.
- Regarding the offer of the Wildlife Protection Authority, it was decided that several *Kebeles* bordering protected areas will be taken into consideration in the cookstove dissemination plan.
- It was accorded to develop the PoA as an open programme to allow for different stakeholders to implement ICSs under its framework. Regarding the timeline of the implementation it was explained that not all woredas can be implemented at the same time. However the implementation of the project will get faster and reach more farmers once the production of the stoves has been secured.
- Regarding the responsibilities of ministries, it was clarified that the implementation of the project on nation level shall be in the responsibility of the same ministry in all regions. The Ministry of Agriculture and Rural Development (MoARD) will be in charge, since the national Climate Resilient Green Economy Initiative clearly points out that the implementation of cookstoves is under the agenda of the MoARD. The practical reason for this responsibility is that the MoARD has the best local network at *Woreda* and even *Kebele* level. However, the programme will take this comment into account by enabling each participating Woreda administration to decide on Woreda level independently on the question, who will be in charge of distributing stoves. Organizational structures will be adapted according to the specific conditions in each region and Woreda.
- It was accorded that in the framework of the grievance Mechanism of the Gold Standard, there will be contact persons and opportunities to give feedback will be implemented all woredas in the district offices of the bureau of agriculture. Furthermore at the time of implementation in the respective Woreda, staff will receive additional training.
-
- Regarding the comment on benefits from Carbon revenues, it was explained that the community will receive benefits in the form of efficient stoves that are given for free or against a very small fee used for local distribution only 20% of the market price (up to 50%

theoretically possible under the PoA). CER revenues will be used to recover the subsidies of the stove's end user price, moreover they will be used to further extend the PoA and allow more users to benefit from efficient stoves. It was explained that users are asked to allow the CME to use carbon credits in that sense by signing the sales contract.

- It was explained that the full avoidance of CO₂ would exceed the capacities of this project, but that the project already reduces a great part of the emissions. In the end the monitoring parameters included for Gold Standard monitoring were discussed and agreed on mutually.

SECTION G. Approval and authorization

>> A LoA of the Ethiopian DNA was issued on November 6. 2012, also authorizing the WFP to be the CME for the PoA.

PART II. Generic component project activity (CPA) on ICS for households

SECTION A. General description of a generic CPA

A.1. Purpose and general description of generic CPAs

>> The CPA entitled "Fuel Efficient Stoves for Ethiopia Programme of Activity CPA xxx" " consists in the distribution of a combination of two improved cookstoves (ICS) to households: Mirt stoves for *injera* baking and Tikikil rocket stoves for other cooking tasks. Both ICS types have efficiency improvements in thermal applications of non-renewable biomass as compared to the baseline technology, as per AMS-II.G, ver. 5. Generally, participating households will receive a pair of ICSs, consisting in a Mirt stove (slim type/classic type) and a Tikikil stove. However, the distribution of a single ICS to a household is possible under this CPA.

The purpose of the CPA is to reduce GHG emissions and indoor air pollution by the dissemination of efficient cookstoves in households in Ethiopia.

The boundary of the CPA will correspond to the national borders of the Federal Democratic Republic of Ethiopia.

In this CPA-DD, the subscript ICS is used frequently. It always refers to both Mirt and Tikikil stoves. For example, N_{ICS} , the number of ICS distributed, refers to the sum of N_{Mirt} , the numbers of Mirt stoves distributed, and $N_{Tikikil}$, the number of Tikikil stoves distributed.

SECTION B. Application of a baseline and monitoring methodology and standardized baseline

B.1. Reference of methodology(ies) and standardized baseline(s)

>> The methodology AMS-II.G "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass" (Version 5.0) will be used in this CPA.

The use of this methodology in a project activity under a programme of activities is permitted if leakages are estimated and accounted for. Here we will use option (c) of par. 29 for the accounting of leakages:

(c) As an alternative to subparagraphs (a) and (b), B_{old} can be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.

B.2. Applicability of methodology(ies) and standardized baseline(s)**>> Part I: Demonstration of the small scale limit for each CPA included in the PoA**

The CPA will distribute a number of XXX Mirt and Tikikil ICS. The CPA qualifies as Type II – energy efficiency improvement project and will remain under the limit of small-scale project activity type (annual energy savings below 180 GWh_{th}, threshold as per clarification request SSC_233) during each year of the crediting period. The number of disseminated ICSs is recorded in the database. Only the ICSs recorded in the database will be part of the CPA.

The calculation of the maximum number of ICSs to be disseminated under this CPA in order to remain under the limit was calculated according to the following formula:

Equation 1

$$180GWh/ year > (B_{savings, Mirt} + B_{savings, Tikikil}) * N_y * NCV_{biomass}$$

Where:

$B_{savings, Mirt+ Tikikil}$	Quantity of woody biomass saved by a combination of a Mirt and a Tikikil stove in a household
N_y	Adjusted total number of pairs of Mirt and Tikikil ICS deployed in period y
$NCV_{biomass}$	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne, which is 4.17 kWh/kg)

The formula above can be transformed into:

Equation 2

$$N_y < \frac{180GWh / year}{(B_{savings, Mirt} + B_{savings, Tikikil}) * NCV_{biomass}}$$

Since N_y , $B_{savings, Mirt}$ and $B_{savings, Tikikil}$ are monitoring parameters whose values will be obtained during verification, an ex-ante estimated limit of stove numbers will be defined according to the equation above at CPA inclusion stage in order to qualify for small scale threshold. If during verification it is found that the SSC limit has been surpassed, the most recently deployed stoves will not be counted for ER in order not to surpass the SSC limit.

As an example, the maximum quantity of ICSs of different types is calculated based on estimated parameters¹² (see also attached Excel sheet “preliminary ER calculation”):

For the combination of a Mirt and a Tikikil stove distributed to households as a pair, the maximum number of stove pairs that can be included without violating the SSC limit is calculated based on per-household savings of 2.34 tons of firewood (1.14 for Mirt and 1.20 for Tikikil, see B.6.3 of the PoA DD part II). A maximum number of approximately **18,000 pairs of Mirt and Tikikil stoves per SSC CPA** is obtained (see appendix 4, preliminary calculation of ER).

The maximum number of ICS that can possibly be included without violating the SSC limit depends on the performance found in monitoring. Therefore this number may vary in different CPAs. At the time of verification compliance with the SSC limit will be shown.

Part II: Applicability criteria of AMS-II.G (Technology/measure)

1. AMS-II.G, ver. 5 applies to “appliances involving the efficiency improvements in the thermal applications of non-renewable biomass. Examples of these technologies and measures include the

¹² Subject to change for individual CPAs

introduction of high efficiency biomass fired cook stoves or ovens or dryers and/or improvement of energy efficiency of existing biomass fired cook stoves or ovens or dryers.”

The improved cook stoves disseminated under the PoA and therefore under each SSC-CPA are high efficiency biomass fired cook stoves. Hence the category is applicable.

2. *“Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods”.*

Non-renewable biomass has been used since 31 December 1989. Justification:

Several studies and reports give evidence that NRB has been used on a large scale since that date and even before. This evidence concerns:

- “A number of documents indicate that around the late 1950s, 16 percent of Ethiopia's land area was covered by natural forest. The Ethiopian Forestry Action Programme has estimated that 150,000- 200,000 ha of forest is destroyed annually. This is calculated to be 6 percent of the total existing natural forest. This action program, which was prepared in 1993, cautions that if the trend continues, all the natural forests in the country will be fully depleted within 15 to 20 years. At present, forest resources are estimated to be not more than 3 percent because of the pressure on them to date”^{13,14}.
- “Overall it is estimated that the gap between the demand for wood products and the sustainable supply in the 20 years between 1992 and 2013 is expected to grow from 33 to 81 million m³. An extensive programme of study is currently in process as regards the current status of supply and demand for forest products”¹⁵.

Supply and demand for forest products in Ethiopia

Year	Demand in 1000 m ³			Projected incremental yield/supply in 1000 m ³	Difference demand-supply in 1000 m ³
	For industrial use and construction	For fuel	Total		
1	2	3	4=3+2	5	6=4-5
1992	2.500	44.953	47.453	14.339	33.114
1993	2.586	46.450	49.036	14.193	34.843
1994	2.683	47.958	50.641	14.045	36.596
1995	2.785	49.518	52.303	13.857	38.446
1996	2.895	51.192	54.087	13.717	40.370
1997	3.015	52.917	55.932	13.550	42.382
1998	3.135	54.693	57.828	13.503	44.325
1999	3.263	56.521	59.784	13.314	46.470
2000	3.396	58.403	61.799	13.136	48.663
2001	3.535	60.310	63.845	12.932	50.913
2002	3.677	62.269	65.946	12.798	53.148
2003	3.827	64.283	68.110	12.681	55.429
2004	3.984	66.350	70.334	12.738	57.596
2005	4.150	68.473	72.623	12.617	60.006
2006	4.319	70.583	74.902	12.452	62.450

¹³ Environmental Protection Authority. 2003. *State of the Environment Ethiopia*. Addis Ababa: Environmental Protection Authority. <http://www.epa.gov.et/Download/Publications/State%20of%20Environment%20Report%20of%20Ethiopia-%202003.pdf>.

¹⁴ Berry, Leonhard 2003. *Land Degradation in Ethiopia: Its Extent and Impact*. GM with WB support. http://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CFwQFjAA&url=ftp%3A%2F%2Fftp.fao.org%2Fagil%2Fagil%2Fadadocs%2FETHIOPIA_LD_CASE_STUDIES.doc&ei=NPogUIm6F4_JsgbKuoDoBg&usg=AFQjCNGBaZMf-AOYlgsO52-g79dpJQCcvA.

¹⁵ Environmental Protection Authority (2003): *State of the Environment Ethiopia*. Addis Ababa: Environmental Protection Authority., Annex 4

2007	4.495	72.745	77.240	12.108	65.132
2008	4.681	74.967	79.648	12.093	67.555
2009	4.875	77.222	82.097	11.852	70.245
2010	5.079	79.539	84.618	12.059	72.559
2011	5.286	81.812	87.098	11.559	75.539
2012	5.503	84.130	89.633	11.260	78.373
2013	5.731	86.439	92.170	11.054	81.116

- The Forestry Resources Assessment (FRA) 2010 Ethiopia Country Report estimates the decline of forest area to 2,817,656 ha¹⁶.

Using a linear extrapolation, the areas of forest (from 1990 to 2010) have been estimated and forecasted¹⁸.

Year	1990	2000	2005	2010
Forest area (1000 ha)	15114	13705	13000	12296

The Environmental Protection Authority Ethiopia states in their 2003 State of the environment Ethiopia report: "Increases in population and consequent expansion of settlement resulting in demand for farm lands near forest areas, increases in demand for fuel, construction and industrial wood, forest fires, low public awareness, pervasive poverty and failure to demarcate and protect the boundaries of forests are major, among the factors that impact the forest resources of the country"¹⁷

B.3. Sources and GHGs

According to the applied methodology AMS-IL.G ver. 5, par. 9: "The project boundary is the physical, geographical site of the efficient systems using biomass." The geographical area within which all small-scale CDM programme activities (SSC-CPAs) included in the PoA, including this CPA, will be implemented is the Federal Democratic Republic of Ethiopia. The assessment of sources and gases included in the SSC-CPA boundary is given below.

	Source	Gas	Included ?	Justification/ Explanation
Baseline	Combustion of non renewable biomass for cooking, Emission Factor for combustion of fossil fuels for cooking	CO ₂	Yes	Major source of emissions
		CH ₄	No	Not required by methodology, only CO ₂ Emission Factor for fossil fuels is considered.
		N ₂ O	No	Not required by methodology, only CO ₂ Emission Factor for fossil fuels is considered.
Project activity	Combustion of non renewable biomass for	CO ₂	Yes	Major source of emissions
		CH ₄	No	Not required by methodology, only CO ₂ Emission Factor for fossil fuels is

¹⁶ FAO (2010): Global Forest Resources Assessment 2010, Country Report Ethiopia, <http://www.fao.org/docrep/013/al501E/al501e.pdf>, last accessed on 27.03.2012

¹⁷ Environmental Protection Authority. 2003. State of the Environment Ethiopia. Addis Ababa: Environmental Protection Authority. [http://www.epa.gov.et/Download/Publications/State of Environment Report of Ethiopia 2003.pdf](http://www.epa.gov.et/Download/Publications/State%20of%20Environment%20Report%20of%20Ethiopia%202003.pdf).

	cooking, Emission Factor for combustion of fossil fuels for cooking			considered.
		N ₂ O	No	Not required by methodology, only CO ₂ Emission Factor for fossil fuels is considered.

CPAs may overlap geographically, but the ICSs will be clearly attributable to CPAs for their unique stove IDs. Hence is it not possible to present a flow diagram physically delineating the CPA. Figure 7 presents a flow diagram showing all the equipment, systems and flows of mass. In particular the emissions sources and GHGs included in the project boundary and the data parameters to be monitored are indicated. Only CO₂ savings resulting from reduced consumption of non-renewable biomass will be considered under any CPA included in the PoA.

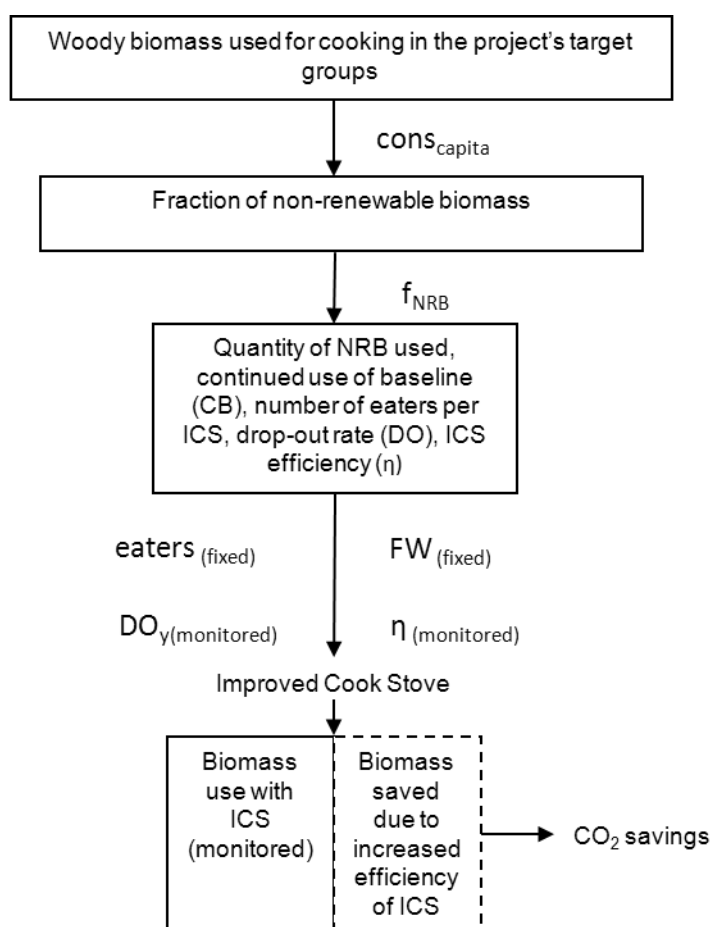


Figure 7: Flow diagram showing all the equipment, systems and flows of mass.

B.4. Description of baseline scenario

>> Following par.10 of ver. 5 of the methodology, it is assumed that in the absence of the PoA, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs. The baseline systems in this CPA are three stone fires, or conventional systems with no improved combustion air supply or flue gas ventilation system, i.e. without a grate or a chimney.

Emission reductions are calculated by multiplying the thermal energy from annual biomass savings stemming from non-renewable biomass ($B_{savings}$) with an emission factor for fossil fuels ($EF_{projected_fossilfuel}$). The baseline emission factor for fossil fuels is 81.6 tCO₂/TJ as per par. 11 of AMS-II.G version 5.

In par. 12 of AMS-II.G version 5, three options are given to determine $B_{savings}$. The second option is chosen for Tikikil stoves, based on a water boiling test.

For Mirt stoves, the third option is used, based on a controlled cooking test.

Par.13 of AMS-II.G version 5 gives two approaches to determine B_{old} . We choose to apply approach (a), where B_{old} is derived from the estimated average annual consumption of woody biomass per appliance (tonnes/year), derived from historical data or a survey of local usage. The average annual consumption of woody biomass per appliance is determined using the average annual firewood consumption per capita ($cons_{capita}$) and the number of eaters ($eaters_{HH}$).

In determining $cons_{capita}$ for household stoves, we opt for historical data as source since such data are available for Ethiopian households.

For determination of each parameter required for the emission reductions, please refer to Section B.6 of the PoA DD part II.

B.5. Demonstration of eligibility for a generic CPA

>>

Nr	Eligibility Criteria		Mean of proof / Evidence Document (to be checked at CPA inclusion)
	Category	Description	
1	CDM-EB 65-A03-STAN version 3.0 Par.16 (a): Geographical boundary and location of the CPA	The CPA is located within the project boundary. The geographical area within which all small-scale CDM programme activities (SSC-CPAs) included in the PoA, will be implemented is the Federal Democratic Republic of Ethiopia. Not all stoves may have been deployed at CPA inclusion stage. During verification, locations will be checked.	Location and boundary are specified in the specific CPA-DD stating that the location is limited to Ethiopia. Document: CPA-DD
2	CDM-EB 65-A03STAN version 3.0 Par.16 (b): Conditions to avoid double counting of stoves	A unique numbering or identification system for the ICSs disseminated is applied.	The specific numbering or identification regime is included in the specific CPA-DD. Document: CPA-DD
3	CDM-EB 65-A03STAN version 3.0 Par.16 (b): Conditions to avoid double-counting of CPAs	The CPA is exclusively bound to the PoA; there will be a confirmation that the programme activity has not been and will not be registered either as a single CDM project activity or as a CPA under another PoA.	A statement is included in the CPA-DD that the specific CPA will not be part of another single CDM project activity or CPA under another PoA. The numbering system will be unique to the PoA. Document: CPA-DD
4	CDM-EB 65-A03STAN version 3.0 Par.16 (c): Specification of technology	The CPA consists in the distribution of ICSs, e.g. fixed Mirt stoves and portable Tikikil stoves as described in section A6 of the PoA DD part I, with efficiency	Stove type, its specifications and compliance with the technological requirements of AMS-II G ver. 5 will be described in the specific CPA-

		improvements in thermal applications of non-renewable biomass as per AMS-II.G, ver. 5	DD. Document: CPA-DD
5	CDM-EB 65-A03STAN version 3.0 Par.16 (c): Performance specifications of technology including compliance with testing	The stove disseminated under the CPA has a specified efficiency of at least 20%	The water boiling test of the stove applied, or of any other stove testing protocol which is in compliance with the applied methodology will be described in the specific CPA-DD. Document: CPA-DD
6	CDM-EB 65-A03STAN version 3.0 Par.16 (d): Conditions to check start date of the CPA	CPA start date shall not be before the PoA webhosting date. . The stove sales dates will also be checked during verification, and in case any deployed stove will be found not in line with CPA start date requirement, those stoves will not be counted for emission reduction calculation.	Starting date as stated in the CPA-DD is after PoA webhosting date. Document provided at the time of first verification: Distribution contract of the first stove deployed under the CPA, including exact distribution date.
7	CDM-EB 65 A03STAN , STAN version 3.0 Par. 16 (d): CPA crediting period	The CPA starting date of the crediting period is the date of inclusion into the registered PoA or any date thereafter and the crediting period cannot exceed the PoA end date.	A statement is included in the CPA-DD that the crediting period starting date is the date of CPA inclusion into the registered PoA or any date thereafter and that the crediting period does not to exceed the PoA end date. Document: CPA-DD
8	CDM-EB 65-A03-STAN version 3.0 Par.16 (e): Compliance with applicability and other requirements of single or multiple methodologies applied by CPAs	CPAs shall comply with the applicability criteria and meet all requirements of the applied methodology AMS-II.G ver.5.	The CPA consists in the distribution of ICSs with efficiency improvements in thermal applications of non-renewable biomass as per AMS-II.G, ver. 5. The compliance with methodology AMS-II.G ver. 5 will be demonstrated in the specific CPA-DD. Document: CPA-DD
9	CDM-EB65-A03-STAN version 3.0 Para. 16 (f) and EB 68 Annex 27 Guidelines on the demonstration of additionality of small-scale project activities v.9.0)	Additionality of the PoA and the included CPAs is demonstrated as described in detail in Section B.1 of the PoA DD by applying paragraph 2. (c) of EB 68 Annex 27 (Guidelines on the demonstration of additionality of small-scale project activities v.9.0);.	Since the PoA and included CPA activities are composed of isolated units where the users of the Technology / measure are households or communities or Small and Medium Enterprises, the additionality of each CPA will be demonstrated, by demonstrating that:[...] the size of each unit is no larger than 5% of the small-scale CDM thresholds according to Section B1. of the PoA DD part I. This is in accordance with EB 68 Annex 27 2.c.

			Document: CPA-DD
10	CDM-EB 65-A03-STAN version 3.0 Par.16 (g): Conditions related to undertaking local stakeholder consultations and environmental impact analysis g	The local stakeholder consultation will be conducted at the PoA level. According to the analysis on environmental impacts done in section E of the PoA-DD part an environmental impact analysis is not required.	The results and measures of the stakeholder consultation are given in Section F of the PoA-DD part I. According to the analysis on environmental impacts done in section E of the PoA-DD part an environmental impact analysis is not required.
11	CDM-EB 65-A03 STAN version 3.0 Par.16 (h): Non-diversion of ODA in case of Public funding	The CME and the CPA operator (in case of being different from the CME) shall confirm that in case of public funding there shall not be diversion of Official Development Assistance.	In case of ODA involved in funding or pre-funding parts of a CPA, a confirmation of the party providing ODA that no diversion of ODA occurs. Document: Statement of the CME and the CPA operator (in case of being different from the CME)
12	CDM-EB 65-A03, STAN version 3.0 Par.16 (i): Target group and distribution mechanisms	Target groups are particularly rural households, e.g. for the Mirt and Tikikil stove. The distribution mechanism is the direct distribution of ICSs through the CME or regional partners such as the <i>Woreda</i> offices of the Ministry of Agriculture and Rural Development.	Target groups are particularly rural households. Document: CPA-DD
13	CDM-EB 65-A03 STAN version 3.0 Par.16 (j): Ability to carry out monitoring and sampling requirements	The monitoring plan should be in accordance with the latest approved version of the Standard for sampling and surveys for CDM project activities and programme of activities (EB 50, Annex 30, STAN version 4.1 including Amendment to version 4.1 EB 80 Annex 07).	The monitoring plan included in the specific CPA-DD should be in accordance with the latest approved version of the Standard for sampling and surveys for CDM project activities and programme of activities (EB 50, Annex 30, STAN version 4.1 including Amendment to version 4.1 EB 80 Annex 07) In case the CPA is not implemented by the CME itself, an agreement will be signed with the CME defining responsibilities and duties of the implementing agent and acceptance of the terms of the PoA. Document: CPA-DD
14	Approval of CPA by CME and awareness and agreement of those operating a CPA on PoA subscription	CME approved each CPA to be included into its registered PoA. Contractual provisions between the CPA operator and the CME will ensure that those operating the CPA are aware and have agreed that their activity is being	Statement of CME giving approval for the CPA to be included into its registered PoA. Document: Statement of approval for CPA inclusion

		subscribed to the PoA.	<p>from CME</p> <p>In case CPA operators are different from the CME: A declaration from CPA operators, stating that they are aware and have agreed that their activity is being subscribed to the PoA will be provided for each CPA.</p> <p>Document: A declaration from CPA operators.</p>
15	<p>CDM-EB 65-A03-STAN version 3.0 Par.16 (k):</p> <p>Conditions that ensure that CPAs meets SSC threshold criteria</p>	The CPA will remain under the thermal threshold of 180 GWh/a thermal energy savings (threshold as per clarification request SSC_233) throughout the crediting period of the CPA.	<p>The estimated maximum number of stoves will be defined in the CPA-DD according to a calculation of the total energy savings, where it will be shown that total energy savings of each CPA will not exceed 180GWh_{th}/a</p> <p>Document: CPA ex ante Emission reduction spreadsheet</p>
16	<p>CDM-EB 65-A03-STAN version 3.0 Par.16 (l):</p> <p>Requirements for the De-bundling check</p>	According to EB 54 Annex 13 (Guidelines on Assessment of Debundling for SSC project activities"/ Version 03): A CPA of PoA is exempted from performing de-bundling check, if each of the independent subsystems/measures included in the CPA of a PoA I no larger than 1% of the small-scale thresholds defined by the methodology applied.	<p>It will be shown in the CPA-DD that energy savings of each ICS type included are always below 1% of the SSC threshold.</p> <p>Document: Statement of the CME</p>
17	CER ownership	End users receiving ICSs under the specific CPA contractually cede their rights to claim and own emission reductions under the Clean Development Mechanism of the UNFCCC to the CME of the PoA.	<p>A default sales agreement for end users including the provision that emission reductions generated by the stove are owned by the CME will be provided for each CPA.</p> <p>Document: Sample sales agreement</p> <p>At the time of verification, the DOE will check that the default sales agreement has been used for stove distribution.</p>
18	Definition of CPA Baseline	<p>1. if the CPA is only including ICS for household level (as defined in Section B4 of this PoA-DD part II): The CPA applies the baseline fuel consumption as defined in this PoA-DD</p> <p>2. if the CPA is only including</p>	<p>1. CPA states that only household ICS or only Institutional ICS are to be implemented under the CPA</p> <p>2. Baseline fuel consumption is defined in the specific CPA-DD according to the regulations</p>

		institutional ICS (as defined in Section in Section B4 this PoA-DD part III): the baseline fuel consumption is to be defined in the specific CPA and validated by the DOE prior to CPA inclusion.	specified in AMS-II.G. and validated by a DOE before inclusion into the CPA. Document: CPA-DD
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B.6. Estimation of emission reductions of a generic CPA

B.6.1. Explanation of methodological choices

Emission reductions are calculated by multiplying the thermal energy from annual biomass savings stemming from non-renewable biomass with an emission factor for fossil fuels. The following formula is given in AMS-II.G, ver. 5:

Total emission reductions of the project will be calculated as:

$$ER_{total,y} = ER_{Mirt,y} + ER_{Tikil,y}$$

and:

Equation 3

$$ER_y = B_{savings,y} * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} * N_{y,i}$$

Where:

ER_y	Emission reductions during the monitoring period y in tCO ₂ e
$B_{savings,y}$	Quantity of woody biomass that is saved in tonnes per device
$f_{NRB,y}$	Fraction of woody biomass saved by the project activity in monitoring period y that can be established as non-renewable biomass
$NCV_{biomass}$	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel: 0.015 TJ/tonnes)
$EF_{projected_fossilfuel}$	Emission factor for substitution of non-renewable woody biomass by similar consumers. A default value of 81.6 tCO ₂ /TJ is given in AMS-II.G ver. 5.
$N_{i,y}$	Number of ICS distributed until the end of the monitoring period y adjusted by implementation dates

For $NCV_{biomass}$ and $EF_{projected_fossilfuel}$, the indicated default values are used. The methodological choices for the determination of $B_{savings,y}$ and f_{NRB} are described below.

Determination of quantity of woody biomass saved ($B_{savings,y}$)

In par. 12 of AMS-II.G, ver.5 three options are given to determine $B_{savings}$. Here, the second option is chosen for Tikikil stoves, with the corresponding formula:

Equation 4a

$$B_{\text{savings, Tikikil}, y} = B_{\text{old, Tikikil}} * (1 - \eta_{\text{old}} / \eta_{\text{Tikikil}, y})$$

Where:

$B_{\text{savings, Tikikil}, y}$ Quantity of woody biomass saved in tonne per Tikikil stove

$B_{\text{old, Tikikil}}$ Quantity of woody biomass used in the absence of the project activity in tonnes per Tikikil stove

η_{old} Efficiency of the baseline stove being replaced (0.1 default value)

$\eta_{\text{Tikikil}, y}$ Efficiency of the Tikikil stove; to be derived with a water boiling test (WBT) ^{18,19}

Both η_{old} and $\eta_{\text{Tikikil}, y}$ will be determined before the registration date of the PoA. $\eta_{\text{Tikikil}, y}$ will additionally be determined during monitoring. The baseline stove efficiency (η_{old}) is 0.10 as per par. 12 option 2 of AMS-II.G ver 5.

For Mirt stoves, the third option is used:

Equation 4b

$$B_{\text{savings, Mirt}, y} = B_{\text{old, Mirt}} * (1 - SC_{\text{Mirt}, y} / SC_{\text{old}})$$

Where:

$B_{\text{savings, Mirt}, y}$ Quantity of woody biomass saved in tonne per Mirt stove

$B_{\text{old, Mirt}}$ Quantity of woody biomass used in the absence of the project activity in tonnes per Mirt stove

SC_{old} Specific fuel consumption or fuel consumption rate of the baseline devices i.e. fuel consumption per quantity of item/s processed (e.g. food cooked) or fuel consumption per hour, respectively.

$SC_{\text{Mirt}, y}$ Specific fuel consumption or the fuel consumption rate in year y of the devices deployed as part of the project i.e. fuel consumption per quantity of item/s processed (e.g. food cooked) or fuel consumption per hour respectively. Use weighted average values if more than one type of system is being introduced by the project activity

SC_{old} and $SC_{\text{Mirt}, y}$ will be determined before the registration date of the PoA. $SC_{\text{Mirt}, y}$ will additionally be determined during monitoring.

Par.13 of AMS-II.G ver 5 gives two approaches to determine B_{old} . We choose to apply approach (a), where B_{old} is derived from the estimated average annual consumption of woody biomass per appliance (tonnes/year), derived from historical data or a survey of local usage. The average annual consumption of woody biomass per appliance is determined using the average annual firewood consumption per capita ($\text{cons}_{\text{capita}}$) and the number of eaters ($\text{eaters}_{\text{HH}}$).

¹⁸ The Water Boiling Test version 4.2.3, <http://www.cleancookstoves.org/our-work/standards-and-testing/learn-about-testing-protocols/>

¹⁹ <http://www.pciaonline.org/node/1048>

In determining $cons_{capita}$, for household stoves, we opt for historical data as source since such data are available for Ethiopian households.

Households: Average firewood consumption per capita

The most suitable source for estimating firewood consumption per household consists in data from the United Nations Statistics Division who published a number on overall fuelwood consumption figures for households in Ethiopia²⁰. The most recent data available for fuelwood consumption are from 2007: 76,311,000 m³. This can be expressed in tons by applying wood density²¹, resulting in 55,325,475 tonnes. To arrive at the per capita consumption, this figure can be divided by the total population in Ethiopia. As we need to refer to the same baseline year, we use 2007 fuelwood consumption and population data. In 2007, according to official census figures, Ethiopia had a population of 73,750,932²². The average fuelwood per capita consumption is hence 0.75 t per capita and year.

The conservativeness of this value can be shown by comparing with data from FAO (1.088 cum per capita and year for 1996, www.fao.org/docrep/x2740E/x2740e22.pdf). Considering a conversion factor for wood of 0.725 t/m³, annual per capita consumption in tonnes equals 0.78 t. Additionally, this last source reports increasing values for all years included (1980-1996) which is another indicator that the baseline data of 0.75 t is conservative.

Overview over per-capita household consumption from different sources

Source	Comments	per-capita consumption
UN (used in this PoA)	Based on 2007 data on total consumption and population	0.75 (t/a)
FAO	value for 1996, shows steadily increasing values	1.088 (cum/a)

Calculation of the quantity of woody biomass used in absence of the project activity

The average baseline firewood consumption (B_{old}) is derived from the average fuelwood per capita consumption ($cons_{capita,HH}$) number of eaters ($eaters_{HH,y}$) and an additional factor representing the continued use of baseline stoves ($FW_{i,y}$). FW accounts for the fact that the use of ICSs does not always cover the entire range of cooking tasks in households, e.g. Mirt stoves are only used for baking *injera* and preparing sauces, but not for other purposes such as preparation of coffee. If two ICS types are combined in a single household or institution, the sum of the corresponding FW values can never surpass 100%.

Equation 5

$$B_{old,i} = cons_{capita,HH} * eaters_{HH,y} * FW_{i,y}$$

Where:

²⁰<http://data.un.org/Data.aspx?d=EDATA&f=cmID%3aFW%3btrID%3a06>, last accessed on 02.07.2014

²¹http://www.fao.org/docrep/009/j8227e/j8227e11.htm#P1131_70563

²²

http://www.gcao.gov.et/index.php?option=com_jdownloads&Itemid=218&view=finish&cid=37&catid=12&m=0&lang=en

B_{old}	Quantity of woody biomass used in absence of the project activity in tonnes per year per device
$cons_{capita,HH}$	Baseline fuelwood consumption per capita
$eaters_{HH,y}$	average number of eaters (residents) per household
$FW_{ICS,,y}$	The proportion of household fuel wood consumed by the ICS, used as adjustment factor to account for the continued use of baseline stoves in the monitoring period y, according to par. 29 c) of AMS-II.G ver 5.

Total ER are then derived by multiplying with the length of the monitoring period and the number of implemented and operational ICS, adjusted by a drop out rate and leakage.

Combining equations 3), 4a or 4b, and 5), and considering drop out and leakage leads to:

Equation 6a

$$ER_{Mirt,y} = cons_{capita,HH} * eaters_{HH,y} * FW_{Mirt,y} * (1 - SC_{Mirt,y} / SC_{old}) * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} * N_{i,y} * mp_{length,y} / 365 * (1 - DO_{Mirt,y}) * L_y$$

Equation 7b

$$ER_{Tikikil,y} = cons_{capita,HH} * eaters_{HH,y} * FW_{Tikikil,y} * (1 - \eta_{old} / \eta_{Tikikil,y}) * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} * N_{i,y} * mp_{length,y} / 365 * (1 - DO_{Tikikil,y}) * L_y$$

Where:

$mp_{length,y}$	Length of monitoring period y in days
$DO_{i,y}$	Discount factor for drop-out, monitored
L_y	Leakage, default value of 0.95 according to AMS-II.G. par. 29 (c)

Determination of the share of Non-Renewable Biomass

A country specific default fraction of non-renewable woody biomass (f_{NRB}) is used, as available on the CDM website: 88%.

Qualitative assessment of non-renewable woody biomass in Ethiopia

AMS-II.G, par. 23, also mentions qualitative indicators for the determination of non-renewable woody biomass:

- A trend showing an increase in time spent or distance travelled for gathering fuel-wood by users (or fuel-wood suppliers) or alternatively, a trend showing an increase in the distance the fuel wood is transported to the project area.

Although the traveling distances for the collection of firewood vary among different parts of the country, due to place and time specific dependence of environmental degradation, a study carried out in the Nano Aseko *Kebele* in Arsi zone, Ethiopia, showed that the average distance travelled in search of fuelwood has increased. Over 50% of the interviewed persons of respondents replied that in the present time they travel an average of 9-15 km, while, in the past almost all (95%) of respondents travelled less than 2 km to collect fuelwood.

Average distance travelled in search of fuelwood²³

km	Past		Present	
	Frequency	Percentage	Frequency	Percentage
<2	184	95.8	-	-
2-8	8	4.10	31	16.10
9-15	-	-	98	51.00
16-22	-	-	47	24.40
23+	-	-	15	7.80
Total	192	100	192	100

- Survey results, national or local statistics, studies, maps or other sources of information such as remote sensing data that show that carbon stocks are depleting in the project area

Decline in Ethiopia's forest carbon stocks (FAO 2010)¹⁵

	Carbon stock in living forest biomass (million tonnes)				
	1990	2000	2005	2010	Per hectare 2010 (tonnes)
Ethiopia	289	254	236	219	18

- Increasing trends in fuel wood prices indicating a scarcity of fuel-wood;

No clear evidence could be found.

- Trends in the types of cooking fuel collected by users that indicate a scarcity of woody biomass.

In its "Short Term Technical Assistance Consultancy Report on Farming Systems and Natural Resource Management (2002)"²⁴, the Ministry of Agriculture of the Federal Democratic Republic of Ethiopia states that due to fuelwood scarcity, dung and crop residues are important substitute fuels in many parts of the country, e.g.:

"For the Central Rift Valley in East Shewa Zone the report states: "Fuel wood is becoming scarce in many parts of the area, and annual per capita consumption rates are between 400-600kg. Both dung and crop residues are important substitute fuels: with per capita consumption rates of about 300-400kg of dung, and similar rates for crop residues (almost all maize stalks)". Also "In West Harerge food fuel is being substituted by dung" (page 13). Another example for fuel wood scarcity is presented by the report for Oromiya region: "With reduced availability of woody biomass, dung is also being increasingly widely used as fuel (page 31)."

²³ Teshome Beyene (2010): Rural women and environmental degradation: The case of Nano Aseko kebele in Arsi Zone, in: Journal of Adama University, Vol. 1, No. 1, January, 2010, ISSN 1998-0531, p. 15-22

²⁴ Bourn, David. 2002. *Farming in Tsetse Controlled Areas of Eastern Africa Ethiopia National Component*. Project 7 ACP ET086- Short Term Technical Assistance Consultancy Report. Ministry of Agriculture-Federal Democratic Republic of Ethiopia.

AMS-II.G also presents Indicators for DRB. Woody biomass is “renewable” if one of the following two conditions is satisfied:

- I. *The woody biomass is originating from land areas that are forests where:*
 - (a) *The land area remains a forest; and*
 - (b) *Sustainable management practices are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and*
 - (c) *Any national or regional forestry and nature conservation regulations are complied with.*
- II. *The biomass is woody biomass and originates from non-forest areas (e.g., croplands, grasslands) where:*
 - (a) *The land area remains as non-forest or is reverted to forest; and*
 - (b) *Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and*
 - (c) *Any national or regional forestry, agriculture and nature conservation regulations are complied with.*

The following sources show that the conditions for renewable biomass are not in place:

Bourn (2002)²⁵ shows that in all different parts of Ethiopia, forests areas are decreasing, with annual rates of up to 2.4%. The report also demonstrates that sustainable managing practices are not in place, e.g. p.12 for the region around Addis Ababa: “Fuel wood stocks are relatively plentiful but are being harvested well above their sustainable yield. Annual per capita consumption rates are 900 to 1,100 kg. Total rates of harvesting are most certainly well above this figure because of the large market for fuel wood in Addis Ababa and the surrounding towns.”

There is also only low compliance with national regulations as shown by Abebe Damte (2010)²⁶: “Given that all major forests in Ethiopia are state-owned, while the government, like those in many other low-income countries, has neither the capacity nor the incentive to properly regulate these forests, such rates of forest degradation may not be that surprising. In terms of use, the wood supplied from open source forests is mainly used for fuel wood, fencing and construction”.

Leakage

According to AMS-II.G ver 5 the following potential sources of leakage have to be considered:

a) Use of NRB savings by non-project households or institutions

According to AMS-II.G par. 29 (c) the default factor of 0.95 is applied to account for leakage and therefore surveys are not required.

b) Transfer of Equipment

AMS-II.G par. 21 states: “If devices currently being utilised outside the project boundary are transferred to the project activity, leakage is to be considered.”

²⁵ Bourn, David. 2002. *Farming in Tsetse Controlled Areas of Eastern Africa Ethiopia National Component*. Project 7 ACP ET086- Short Term Technical Assistance Consultancy Report. Ministry of Agriculture-Federal Democratic Republic of Ethiopia.

²⁶ Damte Bayene, Abebe. 2010. “Property Rights and Choice of Fuel Wood Sources in Rural Ethiopia.” Contributed Paper Prepared for Presentation at the 3rd Conference of African Association of Agricultural Economists (AAAE) and the 48th Agricultural Economics Association of South Africa (AEASA), Cape Town,. <http://purl.umn.edu/96171>.

This leakage source can be ruled out since all ICSs being deployed under the PoA will be new stoves.

Methodological choices regarding monitoring

AMS-II.G, ver. 5, par. 22 and 23

“Monitoring shall consist of checking of all devices or a representative sample thereof, at least once every two years (biennial) to determine if they are still operating; those devices that have been replaced by an equivalent in-service device can be counted as operating.

Monitoring shall also consist of checking the efficiency of all devices or a representative sample thereof.

A representative sample of the appliances disseminated under a CPA will be monitored to determine the share of appliances that are still operating at the specified efficiency. Where appliances are found to be operational but with a changed efficiency the actual efficiency determined in monitoring will be applied to calculate emission reductions. Replacement of appliances is monitored and the replaced devices will have same efficiency. The procedures for monitoring the share of operational appliances and their respective efficiency(ies) are laid out in section B.7.

AMS-II.G, ver. 5 par. 25

“In order to assess the leakage described above, monitoring shall include data on the amount of woody biomass saved under the project activity that is used by non-project households/users (who previously used renewable energy sources). Other data on non-renewable woody biomass use required for leakage assessment shall also be collected.”

Par. 25 does not need to be considered for monitoring, as the net-to gross adjustment factor of 0.95 for leakage is used, according to par. 29 c) of AMS-II.G, ver. 5

According to par. 20 of AMS-II.G, ver. 5, monitoring shall ensure that either:

“The replaced low efficiency appliances are disposed of and not used within the boundary or within the region; or

If baseline stoves continue to be used, monitoring shall ensure that the fuel-wood consumption of those stoves is excluded from B_{old} .”

The continued use of baseline stoves is accounted for according to the explanations in B.6.2.

B.6.2. Data and parameters fixed ex-ante

Data / Parameter:	$cons_{capita,HH}$
Data unit:	Tonnes/year
Description:	Quantity of biomass per capita consumed in absence of the project activity per person and year

Source of data:	Official sources (all for 2007) are used for: the total fuelwood consumption in Ethiopia in m ³ , average wood density and the population of Ethiopia. (http://data.un.org/Data.aspx?d=EDATA&f=cmlID%3aFW%3btrID%3a06) and the wood density factor as given by the FAO (http://www.fao.org/docrep/009/j8227e/j8227e11.htm#P1131_70563) The following source represents the population of Ethiopia at the time of the last census in 2007. (http://www.csa.gov.et/surveys/Population%20and%20Housing%20census/ETH-pop-2007/survey0/data/Doc/Reports/National_Statistical.pdf)
Value(s) applied:	0.75
Choice of data or Measurement methods and procedures:	The value is derived by multiplying the total fuelwood consumption in m ³ with the density factor and then dividing the value by the total population:_ $cons_{capita,HH} = 76,311,000m^3 * 0.725t/m^3 / 73,750,932$
Purpose of data	Calculation of baseline emissions.
Additional comment:	Applicable when CPA includes households

Data / Parameter:	SC_{old}
Data unit:	g/kg
Description:	Specific fuelwood consumption of the baseline system (three stone fire) for injera baking
Source of data:	CCT Results: Open Fire (specific fuel consumption). Please refer to page 6 of GTZ-SUN Energy (2011): Energy Mirt stove test report.
Value(s) applied:	1031
Choice of data or Measurement methods and procedures:	The use of a pre-existing test report produced by GTZ-SUN: Energy for traditional open fires have been used to determine SC_{old} The same value is used in the registered PoA 9769 on Mirt stove distribution in Ethiopia.
Purpose of data	Calculation of baseline emissions
Additional comment:	Applicable for Mirt stoves

Data / Parameter:	η_{old}
Data unit:	%
Description:	Efficiency of the baseline system being replaced
Source of data:	AMS-II G, version 5 default value
Value(s) applied:	0.10
Choice of data or Measurement methods and procedures:	According to AMS-II.G, ver. 5, a default value of 0.10 can be used "if the replaced system is the three stone fire or a conventional system lacking improved combustion air supply mechanism and flue gas ventilation system i.e., without a grate as well as a chimney".
Purpose of data	Calculation of baseline emissions
Additional comment:	Applicable for all ICS

Data / Parameter:	$EF_{projected_fossilfuel}$
Data unit:	tCO ₂ /TJ
Description:	Emission factor for the substitution of non-renewable biomass by similar consumers
Source of data:	AMS II G., ver. 5 default value for fossil substitution fuels.
Value(s) applied:	81.6
Choice of data or Measurement methods and procedures:	According to AMS-II.G, ver. 5, par.11, the value of 81.6 t CO ₂ /TJ is to be taken as emission factor for the substitution fuel likely to be used instead of fuelwood
Purpose of data	Calculation of baseline emissions

Data / Parameter:	$f_{NRB,y}$
Data unit:	%
Description:	Fraction of woody biomass saved by the project activity in period y that can be established as non-renewable biomass
Source of data:	UNFCCC default value
Value(s) applied:	88
Choice of data or Measurement methods and procedures:	
Purpose of data	Calculation of baseline emissions
Additional comment:	

Data / Parameter:	L_y
Data unit:	Fraction
Description:	Leakage adjustment factor
Source of data:	Default value
Value(s) applied:	0.95
Choice of data or Measurement methods and procedures:	According to AMS-II G ver 5: Para 20, B _{old} can be multiplied by a net to gross adjustment factor 0.95 to account for leakage in which case surveys are not required.
Purpose of data	Calculation of baseline emissions
Additional comment:	

Data / Parameter:	$FW_{Mirt,y}$
Data unit:	%
Description:	The proportion of household fuel wood consumed by Mirt stove, used as a discount factor for continued use of baseline stoves or non-Mirt stoves in the monitoring period y.

Source of data:	Letter from the Alternative Energy Technology Promotion And Dissemination Directorate, Ministry of Water and Energy, The Federal Democratic Republic of Ethiopia, from 10.01.2013.
Value(s) applied:	49.91
Choice of data or Measurement methods and procedures:	Mirt stoves are fixed stoves exclusively used for a specific purpose: baking <i>injera</i> and preparing sauces. All over Ethiopia, injera is the staple food. Therefore an average percentage can be given for fuelwood use for injera baking.
Purpose of data	Calculation of baseline emissions
Additional comment:	

Data / Parameter:	$FW_{Tikikil,y}$
Data unit:	%
Description:	The proportion of household fuel wood consumed by Tikikil stove, used as a discount factor for continued use of baseline or non-Tikikil stoves in the monitoring period y.
Source of data:	Letter from the Alternative Energy Technology Promotion And Dissemination Directorate, Ministry of Water and Energy, The Federal Democratic Republic of Ethiopia, from 10.01.2013.
Value(s) applied:	41.5
Choice of data or Measurement methods and procedures:	Tikikil stoves are suitable for all cooking tasks except from <i>injera</i> baking, therefore, it is sensible to use an average value. The official letter from the Alternative Energy Technology Promotion And Dissemination Directorate, Ministry of Water and Energy, confirms the survey results from the Woody Biomass Inventory and Strategic Planning Project (WBISPP) for other types of cooking.
Purpose of data	Calculation of baseline emissions
Additional comment:	Applicable when CPA includes the distribution of Tikikil stoves to households.

Data / Parameter:	$eaters_{HH,y}$
Data unit:	
Description:	Average number of eaters (residents) per household
Source of data:	UN Data
Value(s) applied:	6

Choice of data or Measurement methods and procedures:	An average household size of 6 based on a fertility rate of 3.9 live births per woman in 2010-2015,, as per UN Data available at: http://data.un.org/CountryProfile.aspx?crName=Ethiopia . It is assumed that households are composed of two adults and four children on average. This is conservative, since no other adult household members are considered for the household size. The same value is used in the registered PoA 9769 on Mirt stove distribution in Ethiopia
Purpose of data	Calculation of baseline emissions
Additional comment:	-

B.6.3. Ex-ante calculations of emission reductions

Emission reductions are calculated according to **Fehler! Verweisquelle konnte nicht gefunden werden.** a and b (see B.6.1):

$$ER_{Mirt,y} = cons_{capita,HH} * eaters_{HH,y} * FW_{Mirt,y} * (1 - SC_{Mirt,y} / SC_{old})$$

$$* f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} * N_{Mirt,y} * mp_{length,y} / 365 * (1 - DO_{Mirt,y}) * L_y$$

$$ER_{Tikikil,y} = cons_{capita,HH} * eaters_{HH,y} * FW_{Tikikil,y} * (1 - \eta_{old} / \eta_{Tikikil})$$

$$* f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} * N_{Tikikil,y} * mp_{length,y} / 365 * (1 - DO_{Tikikil,y}) * L_y$$

Total emission reductions will be calculated as:

$$ER_y = ER_{Mirt,y} + ER_{Tikikil,y}$$

We summarize the calculation of expected emission reductions per ICS for the selected stove types assuming no drop-out (see also see Excel sheet in appendix 4):

Expected emission reductions per Mirt stove without accounting for drop-out:

Parameter ID	Description	Derived as	Unit	Value
A	$cons_{capita,HH}$ Ethiopian fuelwood consumption per capita	see B.6.1	tonnes/a	0.75
B	$eaters_{HH,y}$, average number of eaters per stove	see B.6.1	Persons	6
C	$FW_{Mirt,y}$: Proportion of household fuel wood consumed by Mirt stove, used as a discount for continued baseline stove use for non-Mirt purposes	See B.6.1	%	49.91
D	B_{old} : Baseline biomass consumption per stove	$A * B * C$	tonnes/a	2.25
E	Efficiency gain $(1 - SC_{Mirt,y} / SC_{old})$	monitored, value from preliminary CCT	%	51
F	$B_{savings,y}$ per stove	$D * E$	tonnes/a	1.14
G	$f_{NRB,y}$	see B.6.1	%	88

<i>H</i>	$EF_{\text{projected fossilfuel}}$	see B.6.1	tCO ₂ /TJ	81.6
<i>I</i>	NCV_{biomass}	see B.6.1	TJ/t	0.015
<i>J</i>	$(1-DO_y)$: Discount for drop-out	applied annually, not considered here	%	100
<i>K</i>	L_y : leakage adjustment	See B.6.1	%	95
Expected ER per Mirt stove		$F^*G^*H^*I^*J^*K$	tonnes/a	1.166

Expected emission reductions per Tikikil stove without accounting for drop-out:

Parameter ID	Description	Derived as	Unit	Value
<i>A</i>	$cons_{\text{capita, HH}}$ Ethiopian fuelwood consumption per capita	see B.6.1	tonnes/a	0.75
<i>B</i>	$eaters_{\text{HH, y}}$, average number of eaters per stove	see B.6.1	number	6
<i>C</i>	$FW_{\text{Tikikil, y}}$: Proportion of household fuel wood consumed by Mirt stove, used as a discount for continued baseline stove use for non-Tikikil purposes	See B.6.1	%	41.5
<i>D</i>	B_{old} : Baseline biomass consumption per stove	$A*B*C$	tonnes/a	1.87
<i>E</i>	Efficiency gain $(1-\eta_{\text{old}}/\eta_{\text{Tikikil, y}})$	monitored, value from preliminary WBT	%	64
<i>F</i>	$B_{\text{savings, y}}$ per stove	D^*E	tonnes/a	1.20
<i>G</i>	$f_{\text{NRB, y}}$	see B.6.1	%	88
<i>H</i>	$EF_{\text{projected fossilfuel}}$	see B.6.1	tCO ₂ /TJ	81.6
<i>I</i>	NCV_{biomass}	see B.6.1	TJ/t	0.015
<i>J</i>	$(1-DO_y)$: Discount for drop-out	applied annually, not considered here	%	100
<i>K</i>	L_y : leakage adjustment	See B.6.1	%	95
Expected ER per Tikikil stove	$F^*G^*H^*I^*J^*K$	tons/a		1.228

B.7. Application of the monitoring methodology and description of the monitoring plan**B.7.1. Data and parameters to be monitored by each generic CPA**

Data / Parameter:	SC _{Mirt,y}									
Data unit:	g/kg									
Description:	Specific fuel consumption in year y of the Mirt stove as part of the project that is fuel consumption per quantity of item/s processed (e.g. food cooked)									
Source of data:	Results of the Controlled Cooking Test (CCT)									
Value(s) applied	511									
Measurement methods and procedures:	<p>As per paragraph 12 and 23(c) of AMS-II.G Version 5.0.</p> <p>The CCT will be carried out in accordance with national standards (if available) or international standards or guidelines (e.g. the CCT procedures specified by the Partnership for Clean Indoor Air (PCIA) <http://www.pciaonline.org/node/1050>)</p> <p>The equipment used for the CCT will fulfill the accuracy and calibration requirements stated in CCT protocol version 2.0 and in the EB 79 Annex 3: Project standard vers.07 par 56 f:</p> <table><tr><td></td><td>Weighscale</td><td>Thermometer</td></tr><tr><td>Accuracy</td><td>± 1 gramm</td><td>Not specified</td></tr><tr><td>Calibration</td><td colspan="2">According to the EB 79 Annex 3: Project standard vers.07 par 56 f: equipment is calibrated either in accordance with the local/national standards, or as per the manufacturer's specifications. If local/national standards or the manufacturer's specifications are not available, international standards may be used.</td></tr></table> <p>All formulae applied to determine the statistical precision are standard formula. Furthermore, according to AMS-II.G., par.28 the sampling error has to be deducted ("<i>...the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen...</i>") in the event that 90/10 or 95/10 precision could not be achieved because of a small sample size. No deductions have to be made if 90/10 or 95/10 precision is achieved by sampling an appropriate number of appliances.</p> <p>Data will be collected using the standard procedures and will be stored for the CPA crediting period and an additional two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.</p> <p>A traceable "identity check" of the appliances visited during sampling will be performed and recorded (e.g. a picture of the appliance clearly showing its serial no., etc.).</p>		Weighscale	Thermometer	Accuracy	± 1 gramm	Not specified	Calibration	According to the EB 79 Annex 3: Project standard vers.07 par 56 f: equipment is calibrated either in accordance with the local/national standards, or as per the manufacturer's specifications. If local/national standards or the manufacturer's specifications are not available, international standards may be used.	
	Weighscale	Thermometer								
Accuracy	± 1 gramm	Not specified								
Calibration	According to the EB 79 Annex 3: Project standard vers.07 par 56 f: equipment is calibrated either in accordance with the local/national standards, or as per the manufacturer's specifications. If local/national standards or the manufacturer's specifications are not available, international standards may be used.									
Monitoring frequency:	The CME may decide to do annual or biennial monitoring of the parameter. Please refer to Section B.7.2.									

QA/QC procedures:	Cross-checks: The monitoring team will cross-check results with literature values, or specifications from manufacturer, if available. Results of the CCT will be stored in an electronic database and will be stored for a minimum of 2 years after the end of the crediting period of the CPA.
Purpose of data	Calculation of baseline emissions
Additional comment:	A value of 511 g/kg has been applied for the purposes of ex-ante calculations as per page 2 of GTZ SUN ENERGY (2011)_Memo, Result of stove testing..

Data / Parameter:	$\eta_{Tikil,y}$
Data unit:	Fraction
Description:	Thermal efficiency of the Tikil stoves deployed in monitoring period y. This parameter is monitored during the crediting period. This preliminary value is for reference.
Source of data:	Water boiling test of the Tikil stoves in use Source for preliminary value: GTZ SUN ENERGY Project. 2010. ²⁷
Value(s) applied	preliminary value 28%

²⁷ GTZ SUN ENERGY Project. 2010. Water Boiling Test Results- Institutional Rocket and Tikil Stove (Draft). Ethio Resource Group.

Measurement methods and procedures:	The data will be derived from applying the WBT ver. 4.2.3 ²⁸ as by AMS-II.G to a representative sample of Tikikil stoves distributed. The equipment used for the WBT will fulfill the accuracy and calibration requirements stated in WBT protocol version 4.2.3 and in the EB 79 Annex 3Project standard vers.07 par 56 f:										
		<table><tr><th></th><th>Weighscale</th><th>Thermometer</th></tr><tr><td>Accuracy</td><td>± 1 gramm</td><td>0.5 °C</td></tr><tr><td>Calibration</td><td colspan="2">According to the EB 79 Annex 3: Project standard vers.07 par 56 f f: equipment is calibrated either in accordance with the local/national standards, or as per the manufacturer’s specifications. If local/national standards or the manufacturer’s specifications are not available, international standards may be used.</td></tr></table>		Weighscale	Thermometer	Accuracy	± 1 gramm	0.5 °C	Calibration	According to the EB 79 Annex 3: Project standard vers.07 par 56 f f: equipment is calibrated either in accordance with the local/national standards, or as per the manufacturer’s specifications. If local/national standards or the manufacturer’s specifications are not available, international standards may be used.	
		Weighscale	Thermometer								
	Accuracy	± 1 gramm	0.5 °C								
	Calibration	According to the EB 79 Annex 3: Project standard vers.07 par 56 f f: equipment is calibrated either in accordance with the local/national standards, or as per the manufacturer’s specifications. If local/national standards or the manufacturer’s specifications are not available, international standards may be used.									
All formulae applied to determine the statistical precision are standard formula. Furthermore, according to AMS-II.G., par.28 the sampling error has to be deducted (“...the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen...”) in the event that 90/10 or 95/10 precision could not be achieved because of a small sample size. No deductions have to be made if 90/10 or 95/10 precision is achieved by sampling an appropriate number of appliances. Data will be collected using the standard procedures and will be stored for the CPA crediting period and an additional two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later. A traceable “identity check” of the appliances visited during sampling shall be performed and recorded (e.g. a picture of the appliance clearly showing its serial no., etc.).											
Monitoring frequency:	The CME may decide to do annual or biennial monitoring of the parameter. Please refer to Section B.7.2.										
QA/QC procedures:	The monitoring team will cross-check results with literature values, or specifications from manufacturer, if available. Results of the CCT will be stored in an electronic database and will be stored for a minimum of 2 years after the end of the crediting period of the CPA.										
Purpose of data	Calculation of baseline emissions										
Additional comment:	Applicable to CPAs including Tikikil stoves										

Data / Parameter:	$N_{Mirt,y}$
Data unit:	n/a
Description:	Number of efficient Mirt stoves distributed until the end of the monitoring period y adjusted by implementation dates. The adjustment accounts for the fact that stoves do not start to save CO ₂ simultaneously, but each stove starts saving CO ₂ as soon as it is sold and implemented.
Source of data:	Sales Record Database
Value(s) applied	Will be determined during monitoring. Assumption for ex-ante Emission Calculation: See B.6.3.

²⁸ <http://www.cleancookstoves.org/our-work/standards-and-testing/learn-about-testing-protocols/>

Measurement methods and procedures:	$N_y = \sum_{i=1}^{i=I_y} \frac{daystotal}{mp_{length}}$ <p>Where: I_y total number of Mirt stoves distributed till the end of the monitoring period y $daystotal_i$ sum of days since appliance i has been operational in the monitoring period y. Start of operation is assumed as one week after sales.</p>
Monitoring frequency:	Continuously updated in the distribution database. The CME may decide to do annual or biennial monitoring of the parameter. Please refer to Section B.7.2.
QA/QC procedures:	Data will be collected using the standard procedures and will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.
Purpose of data	Calculation of baseline emissions
Additional comment:	Applicable to CPAs including Mirt stoves

Data / Parameter:	$N_{Tikil,y}$
Data unit:	n/a
Description:	Number of efficient Tikikil stoves distributed until the end of the monitoring period y adjusted by implementation dates. The adjustment accounts for the fact that stoves do not start to save CO ₂ simultaneously, but each stove starts saving CO ₂ as soon as it is sold and implemented.
Source of data:	Sales Record Database
Value(s) applied	Will be determined during monitoring.
Measurement methods and procedures:	$N_y = \sum_{i=1}^{i=I_y} \frac{daystotal}{mp_{length}}$ <p>Where: I_y total number of Tikikil stoves distributed till the end of the monitoring period y $daystotal_i$ sum of days since appliance i has been operational in the monitoring period y. Start of operation is assumed as one week after sales.</p>
Monitoring frequency:	Continuously updated in the distribution database. The CME may decide to do annual or biennial monitoring of the parameter. Please refer to Section B.7.2.
QA/QC procedures:	Data will be collected using the standard procedures and will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.
Purpose of data	Calculation of baseline emissions
Additional comment:	Applicable to CPAs including Tikikil stoves

Data / Parameter:	$DO_{Mirt,y}$
Data unit:	%
Description:	Discount factor, statistically adjusted drop out from total population of a specific Mirt stoves in period y
Source of data:	Primary data collection: A representative sample of households will be visited by dedicated monitoring team
Value(s) applied	0% (For ex-ante calculations, no drop out is assumed, supposing a full replacement of non-operational or non-identifiable Mirt stoves.)
Measurement methods and procedures:	All formulae applied to determine the statistical precision are standard formula. Furthermore, according to AMS-II.G., par.28 the sampling error has to be deducted (<i>"...the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen..."</i>) in the event that 90/10 or 95/10 precision could not be achieved because of a small sample size. No deductions have to be made if 90/10 or 95/10 precision is achieved by sampling an appropriate number of appliances.
Monitoring frequency:	The CME may decide to do annual or biennial monitoring of the parameter. Please refer to Section B.7.2.
QA/QC procedures:	Data will be collected using the standard procedures and will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later. A traceable "identity check" of the appliances visited during sampling shall be performed and recorded (e.g. a picture of the appliance clearly showing its serial no., etc.).
Purpose of data	Calculation of baseline emissions
Additional comment:	Under this parameter, it will also be monitored that traditional stoves are not used for daily cooking purposes anymore. Please note that traditionally the householders may use the baseline stove for non-daily cooking purposes such as the production of alcohol, therefore the proportion of fuel wood consumed by cooking for each stove type is factored into the calculation of 49.91% (for Injera baking) and 41.50% (for other cooking) to ensure that the emissions arising from cooking activities only will be considered for emissions reduction calculations. Where continued use of baseline stoves for daily cooking is detected, the corresponding ICS will be counted as drop-out.

Data / Parameter:	$DO_{Tikikil,y}$
Data unit:	%
Description:	Discount factor, statistically adjusted drop out from total population of a specific Tikikil stoves in period y
Source of data:	Primary data collection: A representative sample of households will be visited by dedicated monitoring team
Value(s) applied	0% (For ex-ante calculations, no drop out is assumed, supposing a full replacement of non-operational or non-identifiable Tikikil stoves.)

Measurement methods and procedures:	All formulae applied to determine the statistical precision are standard formula. Furthermore, according to AMS-II.G., par.28 the sampling error has to be deducted (<i>“...the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen...”</i>) in the event that 90/10 or 95/10 precision could not be achieved because of a small sample size. No deductions have to be made if 90/10 or 95/10 precision is achieved by sampling an appropriate number of appliances.
Monitoring frequency:	The CME may decide to do annual or biennial monitoring of the parameter. Please refer to Section B.7.2.
QA/QC procedures:	Data will be collected using the standard procedures and will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later. A traceable “identity check” of the appliances visited during sampling shall be performed and recorded (e.g. a picture of the appliance clearly showing its serial no., etc.).
Purpose of data	Calculation of baseline emissions
Additional comment:	Under this parameter, it will also be monitored that traditional stoves are not used for daily cooking purposes anymore. Please note that traditionally the householders may use the baseline stove for non-daily cooking purposes such as the production of alcohol, therefore the proportion of fuel wood consumed by cooking for each stove type is factored into the calculation of 49.91% (for Injera baking) and 41.50% (for other cooking) to ensure that the emissions arising from cooking activities only will be considered for emissions reduction calculations. Where continued use of baseline stoves for daily cooking is detected, the corresponding ICS will be counted as drop-out.

B.7.2. Description of the monitoring plan for a generic CPA

There will be a continuous documentation of all ICS distributions in a centralized database. For the preparation of monitoring reports, samples will be drawn from the centralized database and the corresponding stoves will be examined regarding efficiency and usage.

The CME will hold the responsibility for all procedures related to monitoring, but it will cooperate with regional or local institutions involved in ICS distribution.

The flow chart below describes the general monitoring procedure (Figure).

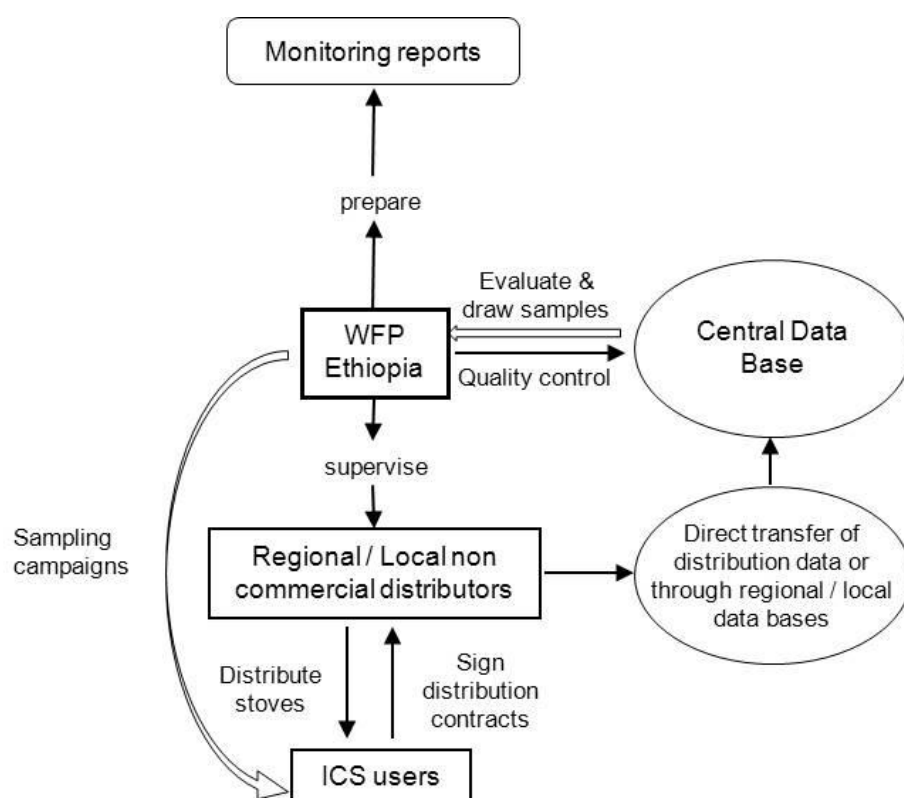


Figure7. Flow chart of monitoring procedure (may be slightly modified according to CPA circumstances)

Central databases

Central database will be operated and maintained by the CME to ensure completeness and accuracy of monitoring information

The basic information included will be²⁹:

- Stove type
- Unique number (Stove-ID) of system
- Sales date of appliance
- User details (Name, Address, etc.)
- Distributing Entity /Contact Person

²⁹ The record keeping system should collect as many information as necessary to facilitate the Verification of the CERs. At the current point of time the list of information seems ideal but may be extended or condensed. The collection of all the items is therefore not mandatory and additional information may be collected as well.

The information in these databases will be updated continuously, whenever new data (distribution contracts) are available. Original copies of the distribution contracts (or whatever format is used to collect the data required) will be kept and maintained for two years after the end of the crediting period.

Example of the fields of an electronic database for household distribution

Stove type	Stove ID	Date of distribution	Region	Woreda	Kebele	End user Name	End user address	End user Phone (if available)	GPS coordinates (if available)	Kebele Agent
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)	(t)	(u)	(v)

Stove IDs

Each ICS will obtain a unique number which facilitates its identification in the data base and avoid double counting. These unique numbers will be provided by the CME and shall be inserted in the distribution contract at the moment of distributing the stove.

It is planned to make the unique numbers visible on the ICSs, for example blowtorching numbers on the stove material for Tikikil stoves. For Mirt stoves that are built-in, IDs may also be attached somewhere at the house where it is installed in. Physical labels shall facilitate stove identification and shall be used where possible, but identification may also be achieved through other data indicated in the data base in the case of the built-in Mirt stoves.

Sampling campaigns

Sampling campaigns consist in generating extracts of the central database for checks in order to prepare the monitoring reports. A representative number of ICSs will be selected randomly for site visits in order to check the following monitoring parameters:

- operability (yes/no), in order to determine the drop out rates for a specific stove ($DO_{ICS,y}$). Under this parameter, it will also be monitored that traditional stoves are not used for cooking purposes anymore. Please note that traditionally the householders may use the baseline stove for non-cooking purposes such as the production of alcohol, therefore the proportion of fuel wood consumed by cooking for each stove type is factored into the calculation of 49.91% (for Injera baking) and 41.50% (for other cooking) to ensure that the emissions arising from cooking activities only will be considered for emissions reduction calculations. Where continued use of baseline stoves for cooking is detected, the corresponding ICS will be counted as drop-out.
- thermal efficiency ($\eta_{Tikikil,y}$) and specific fuelwood consumption ($SC_{Mirt,y}$) of a specific stove, tested according to the Water Boiling Test protocol, or the Controlled Cooking Test respectively.
- number of eaters per ICS distributed at the household level, ($eaters_{HH,y}$), if not fixed before CPA inclusion

Different sample sizes can be selected for each of these parameters.

Sampling Plan

The Sampling Plan outlined below is in accordance with Appendix 3 of the standard for sampling and surveys for CDM project activities and programme of activities (EB69 Annex 4).

1. Sampling Design

- a. Objective and Reliability Requirements
 - i. Objective of the sampling effort

Due to the high number of appliances to be deployed an annual check of all appliances is not feasible.

Sampling is utilized to indicate that all the appliances deployed are still operating or to record end of operation and/or replacement of the appliances which will allow determination of the statistically adjusted annual or biennial value for drop out ($DO_{i,y}$). In cases where non-functional ICSs are replaced, this replacement will be made with new appliances; thereby it is guaranteed that replaced stoves operate at high efficiency.

Sampling methods may also be applied to determine the annual or biennial values for the efficiencies of the ICSs in use ($\eta_{Tikikil,y}$ and $SC_{Mirt,y}$), the annual or biennial values for the average number of eaters for household ICSs ($eaters_{HH,y}$), if not fixed before CPA inclusion.

Therefore the sampling effort will provide data for the following parameters:

$DO_{i,y}$, $\eta_{Tikikil,y}$ and $SC_{Mirt,y}$, and potentially $eaters_{HH,y}$

- ii. Timeframe

The time frame for the parameters, i.e. annual or biennial, depends on selected inspection frequency which is at discretion of CME provided confidence/precision requirements are met, according to AMS-II.G ver. 5, par. 28.

- iii. Estimated parameter values

The estimated parameter values are as per the values used for ex-ante calculation of emission reductions (please refer to Section B.6.2. of the CPA-DD).

- iv. Sampling requirements as per sampling standard and applicable methodology

Precedence of methodology

Par. 3 of the Sampling Standard, EB 50, Annex 30 STAN version 4.1 including Amendment to version 4.1 EB 80 Annex 07. clarifies that “[...] any requirements specified in the applicable methodologies having precedence”.

Coverage of sampling requirements in the applicable methodology:

As per applicable methodology AMS-II.G ver. 5 par. 28, “when biennial inspection is chosen a 95% confidence interval and a 5% margin of error requirement shall be achieved for the sampling parameter. On the other hand when the project proponent chooses to inspect annually, a 90% confidence interval and a 10% margin of error requirement shall be achieved for the sampled parameters. In cases where survey results indicate that 90/10 precision or 95/10 precision is not achieved, the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve the 90/10 or 95/10 precision”.

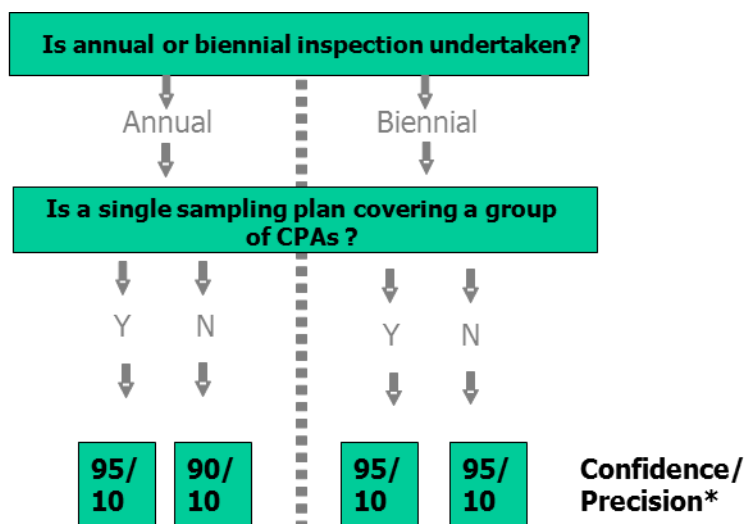
Additional requirement for PoAs as per sampling standard

In case a single sampling plan for more than one CPA is used, “parameter values shall be estimated by sampling in accordance with the requirements in the applied methodology separately and independently for each of the CPAs included in a PoA except when a single sampling plan covering a group of CPAs is undertaken applying 95/10 confidence/precision for the sample size calculation”, as per sampling standard, EB 50, Annex30 STAN, version 4.1 including Amendment to version 4.1 EB 80 Annex 07.

Furthermore, according to par. 37. EB 55 Annex 38 (PROCEDURES FOR REGISTRATION OF A PROGRAMME OF ACTIVITIES)³⁰ a request for issuance includes all CPAs which are included under the PoA. Sampling may therefore be across CPAs and hence a single sample plan may be applied, to reduce monitoring efforts.

v. Confidence/precision criteria to be met

As mentioned above, according to AMS-II.G ver. 5, par. 28, confidence/precision criteria to be met is determined as follows:



*due to methodology precedence

Note: As per par. 28 of AMS-II.G ver .5 the lower bound can also be used instead of repeating the survey efforts to achieve the required confidence/precision level

b. Target Population

i. Definition

For the monitoring parameters $DO_{i,y}$, $\eta_{Tikil,y}$ and $SC_{Mirt,y}$, the target population consists in all households end users, which received ICSs which are included until the end of the specific monitoring period.

ii. Description of particular features associated with it (if applicable)

There are no particular features associated with the target population.

c. Sampling method

i. Description and justification of selected sampling method

The sampling procedure is a simple random sampling process which samples households across all the CPAs deploying the same ICS type. Also multi-stage sampling may be applied if deemed suitable by the CME.

To reduce monitoring efforts a common sample is drawn from the central database based on which all of the parameters shall be monitored. As already stated above, the database may include stoves from several CPAs and a sample may be drawn across CPAs, as long as they deploy the

³⁰ UNFCCC (2010)_PROCEDURES FOR REGISTRATION OF A PROGRAMME OF ACTIVITIES_ EB 55, Annex 38, http://cdm.unfccc.int/Reference/Procedures/PoA_proc01.pdf

same stove type. The largest number for the sample size will be chosen for the sampling effort with one common survey for all parameters determined in Section B.7.1 of the PoA DD Part II except for $\eta_{Tikil,y}$ and $SC_{Mirt,y}$. For the monitoring of $\eta_{Tikil,y}$ and $SC_{Mirt,y}$ a random sub-sample from the common sample will be drawn according to the calculated sample size of the parameter.

However this does not imply that for each of the parameters the same number of users/appliances has to be monitored during sampling. The CME will determine the number of users/appliances monitored during sampling for each of the parameters separately. The reason is that the variation within the values obtained will be different for each parameter. Since the precision of a sampled parameter depends on the variation of its values, the necessary number of users/appliances to be monitored in order to achieve the confidence/precision as mentioned above will also depend on the variation of values. Therefore, although the monitoring team will undertake monitoring of various parameters simultaneously and on the same sample group, the CME may decide to stop monitoring of a particular parameter during the campaign once the required precision for this parameter is achieved. The monitoring team will continue to monitor appliances in the sample with respect to the remaining parameter(s) until the required precision for these parameters is achieved.

Random distribution

The method of selecting users to be included in the sample for deployed appliances will be random using simple random sampling or multistage sampling. All random selections will be stored for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later. In this way the traceability of the selection is assured.

ii. Identification of strata or clusters if applicable

Optionally, multistage sampling may be conducted. For each monitoring period y contact details from users are collected. In order to obtain a final representative selection, the study area may for example be divided into geographical units. A sample of *Woredas* or villages may be selected randomly for each monitoring period y from the sample database by “probability proportional to size”-sampling, i.e. units with a higher number of appliances deployed will have a higher chance to be selected than those with a smaller number of appliances. Within the selected units, ICS users will then be selected randomly.

d. Sample size: Estimated target number of units and justification

The following assumptions are applied to calculate the sample size for the different sampling options. Please note: The assumptions are valid at time of submitting the PoA-DD for registration and the specific CPA-DD for inclusion. If at the time of sampling, more up to date figures or information available (e.g. from previous monitoring campaigns or from other projects applying the same technology or updated guidance or best practice examples by the EB) can be applied to do a more accurate sampling, and these may be used to determine the sample size. Justification will be provided to the verifying DOE.

Parameter of interest	Expected value	Source efficiency	of	Estimated standard deviation	Source of estimated SD
$DO_{Mirt,y}$	10% (corresponding to 90%)	Estimate based on existing	on	Not applicable since the parameter is a proportion	Not applicable

	found in use) ³¹	projects (Nigeria PoA 5067 Monitoring Period 1)		
$DO_{Tikikil,y}$	10% (corresponding to 90% found in use) ³¹	Estimate based on existing projects (Nigeria PoA 5067 Monitoring Period)	Not applicable since the parameter is a proportion	Not applicable
$SC_{Mirt,y}$	511 g/kg (preliminary for slim Mirt)	See B.7.1	8 g/kg	GTZ SUN ENERGY (2011)_Memo, Result of stove testing.
$\eta_{Tikikil,y}$	28% for Tikikil	See B.7.1	0.5%	GTZ SUN ENERGY Project. 2010. <i>Water Boiling Test Results-Institutional Rocket and Tikikil Stove (Draft)</i> . Ethio Resource Group.

Equations used for calculation of sample size according to EB 75, Annex 8, version 3.0 (Best practice examples focusing on sample size and reliability calculations) for simple random sampling:

Parameter DO_{iy} (par. 16ff.)

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

³¹ Ethiopia and Nigeria are situated on the same tropical-subtropical latitudes in the African continent. Dry and hot climate conditions, with a vegetation consisting in open shrub land and savannah prevail in large parts Ethiopia and in the northern and central Nigeria (the main Project region of 5067) (<http://www.water-for-africa.org/en/vegetation-zones.html>). These vegetation types are slow in rehabilitation and prone to desertification if trees and shrubs are cut due to fuelwood extraction. This slow rehabilitation leads to fuelwood scarcity and thus to the urgent need of efficient cooking devices. In both countries, the ICS deployed are comparable since they are built to address the main cooking habits of the respective country. The fact that, in contrast to the Save80 stove in Nigeria, the Mirt stove deployed in Ethiopia is a fixed, built in stove, which cannot be stolen or lost, makes the preliminary application of the drop-out rate from the Nigeria Project (5067) a conservative assumption.

Where:

n	Sample size
z	Z value for confidence level (e.g. 1.645 for 90% confidence level)
N	Total number of households
p	Expected proportion
E	Relative precision (e.g. 0.1 for 10% precision)

Parameter $\eta_{Tikil,y}$ and $SC_{Mirt,y}$:

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

Where:

V	$\left(\frac{SD}{mean}\right)^2$
n	Sample size
N	Total number of households
mean	Our expected mean
SD	Our expected standard deviation
E	Relative precision (e.g. 0.1 for 10% precision)
z	Z value for confidence level (e.g. 1.645 for 90% confidence level)

Estimated sample size for different sampling options according to equations above:

Simple Random Sampling

Estimated sample size for random sampling

Parameter	Timeframe	Confidence/ Precision	Estimated value	Expected Variance/ Standard deviation*	Estimated Sample Size	Applied sample size
DO _{Mirt,y}	biennial	95/10	0.90	0.09	xx	xx
DO _{Tikil,y}	biennial	95/10	0.90	0.09	xx	xx
SC _{Mirt}	biennial	95/10	511	8	xx	xx
η_{Tikil}	biennial	95/10	0.28	0.005	xx	xx
DO _{Mirt,y}	one CPA annual	90/10	0.90	0.09	xx	xx
DO _{Tikil,y}	one CPA annual	90/10	0.90	0.09	xx	xx

SC_{Mirt}	one CPA annual	90/10	511	8	xx	xx
$\eta_{Tikikil}$	one CPA annual	90/10	0.28	0.005	xx	xx
$DO_{Mirt,y}$	across CPA annual	95/10	0.90	0.09	xx	xx
$DO_{Tikikil,y}$	across CPA annual	95/10	0.90	0.09	xx	xx
SC_{Mirt}	across CPA annual	95/10	511	8	xx	xx
$\eta_{Tikikil}$	across CPA annual	95/10	0.28	0.005	xx	xx

* Value for $DO_{i,y}$ is referring to the expected variance. The value has been calculated according to the following formula: $p_i(1-p_i)$ (reference: CDM-EB67-A06-GUID Par. 42). For all other values the standard deviation is applied, since it is used for sample size calculation.

The largest number for the sample size will be chosen for the sampling effort with one common survey for all parameters determined in Section B.7.2 of the PoA DD Part II except for $\eta_{Tikikil,y}$ and $SC_{Mirt,y}$. For the monitoring of $\eta_{Tikikil,y}$ and $SC_{Mirt,y}$ a random sub-sample from the common sample will be drawn according to the calculated sample size of the parameter.

Note: Response rate is assumed to be 80%. The factor for response rate will be added to the sample size after the sample size calculation. For subsequent monitoring periods, the values determined in former monitoring period(s) or internal spot checks will be used for calculation of sample sizes.

Multi-Stage Sampling

No sufficient data are available for an example sample size calculation. The following sampling framework provided for multistage sampling is according to EB 67 Annex 06 GUID vers.03, Guideline of sampling and surveys for CDM project activities and programme of activities.

The sampling approach of multistage sampling samples households of one CPA. Sampling across several CPAs is also possible when the same ICS type is deployed under these CPAs. In order to obtain a representative selection of stoves to be monitored, the total population of appliances is divided into sub-groups (clusters) e.g. geographical units like Woredas or villages. In a first step of multistage sampling a representative number of clusters is randomly selected. In a second step a pre-determined number of households will be randomly selected from within the selected clusters. These sampled households will be monitored.

The multistage sampling can be extended further to three or more stages.

Step 1.

The sample size on the cluster level will be calculated after the formula given in EB 67 Annex 06 GUID vers.03, Appendix 1, par. 41 Equation 16::

$$c \geq \frac{\frac{SD_B^2}{\bar{p}} \times \frac{M}{M-1} + \frac{1}{\bar{u}} \times \frac{SD_w^2}{\bar{p}} \times \frac{(\bar{N}-\bar{u})}{(\bar{N}-1)}}{\frac{E^2}{z^2} + \frac{1}{M-1} \times \frac{SD_B^2}{\bar{p}}}$$

Where:

c	Number of clusters to be sampled
M	Total number of clusters
\bar{u}	Number of units to be sampled per cluster (pre-specified as 10 HH)
\bar{N}	Average Number of units per cluster
SD_B^2	Unit variance (e.g. variance between woredas)
SD_w^2	Average of the cluster variances (average within woreda variation)
\bar{p}	Overall proportion
E	Relative precision (e.g. 0.1 for 10% precision)
z	Z value for confidence level (e.g. 1.645 for 90% confidence level, 1.96 for 95% confidence interval)

The framework for calculation of c for the parameter $DO_{ICS,y}$ will for example be the following:

Cluster	Stoves deployed	Proportion p_i of cook stoves in operation ($DO_{i,y}$)	Variance within State ($p_i(1-p_i)$)
A	N_A	p_A	a
B	N_B	p_B	b
C	N_C	p_C	c
D	N_D	p_D	d
E	N_E	p_E	e
F	N_F	p_F	f
G	N_G	p_G	g
\bar{N}^*	$(N_A + N_B + N_C + N_D + \dots) / M$		
\bar{p}^*		$(p_A + p_B + p_C + p_D + \dots) / M$	
SD_B^{2*}		See below	
SD_w^{2*}			See below
M (number of clusters)	M		
	AMS II G Annual	AMS II G Biennial	PoA Single S- Plan
	90/10	95/10	95/10
z	1.645	1.96	1.96
E	0.1	0.1	0.1

* Calculated values

$$SD_W^2 = \frac{a + b + c + d + \dots}{M}$$

$$SD_B^2 = \frac{\sum_{i=1}^n (p_i - \bar{p})^2}{n - 1}$$

For different pre-defined number of units to be sampled per cluster (\bar{u}), different sample sites for c will result:

Example results table with different input parameter u

u (number of HH per cluster)	Required number of clusters (c)	Total number of HH
10	27	270
20	24	480
25	24	600
30	23	690
40	23	920

Which of the clusters will be included in the sample is determined by “probability proportional to size”-sampling, i.e. clusters with a higher number of appliances deployed will have a higher chance to be selected than those with a smaller number of appliances.

Step 2.:

The households to be sampled within the selected clusters c, will be selected by simple random sampling by means of a computerized randomizer.

e. Sampling Frame

i. Identification or description of sampling frame

The sampling frame is the list containing all ICSs included until the end of the specific monitoring period.

ii. List of sampling frame (if known)

The full list of all ICSs included will only be available after the end of the specific monitoring period. At the time of submitting the PoA for registration and the first specific CPA for inclusion, there is no complete list available since full roll-out of stove deployment will only happen after PoA registration.

Example of the sampling frame:

Serial number (Stove-ID) of system	Delivery date of appliance (to user)	User details (Name, Address, etc.)	Administrative unit
1	xx/xx/2xxx	XXX	XXX
2	xx/xx/2xxx	XXX	XXX
3	xx/xx/2xxx	XXX	XXX
...

2. Data to be collected

a. Field Measurement

i. Identification of all variables to be measured

The following variables are measured for determining the parameter values of:

Parameter	Description
$DO_{i,y}$	Statistically adjusted drop out from total population of appliances in period y
$\eta_{Tikikil,y}$ or $SC_{Mirt,y}$	Adjusted average efficiency of the system being deployed as part of the CPA

ii. Determination of appropriate timing

In general (under normal circumstances), measurements will be conducted at the latest 6 months after the end of the specific monitoring period.

Therefore:

In general (under normal circumstances), the measurement will be conducted at the latest 12 + 6 months after the start of the specific monitoring period (annual monitoring) or at the latest 24 + 6 months after the start of the specific monitoring period if biennial inspection is chosen.

iii. Frequency of measurements

All measurements will be one time measurements, i.e. for the determined number of samples the measurement will only be conducted once per sample. However, this does not imply that every household can only be contacted once (see below).

iv. Demonstration that parameter of interest is not subject to seasonal fluctuations if measurements are conducted only during limited time periods or demonstrate that selected time period is conservative or corrections are applied

$DO_{i,y}$: Drop outs are recorded when users are found to not use the stove any longer. It is expected that the chance a stove is no longer in use is increasing over time for various reasons however seasonal effects will have no impact on the general stove usage. $DO_{i,y}$ is determined by asking the user a yes or no question.

$\eta_{Tikikil,y}$: The WBT protocol is applied to measure the efficiency of the ICS deployed. The WBT protocol takes seasonal effect such as variations of wood moisture in the different seasons into consideration by calculating the efficiency of the stove depending on the actual wood moisture.

$SC_{Mirt,y}$: The Controlled Cooking test (CCT) protocol is applied to measure the efficiency of the ICS deployed.

v. Description of measurement methods

$DO_{i,y}$: Drop outs will be either determined through monitoring recording sheets by the users themselves or through interviews where it will be checked if the appliances are still operational. Interviews will be reported in a questionnaire.

$\eta_{TikiKili,y}$: is determined applying the WBT protocol (see B.7.1). Tests will be reported in spreadsheet templates. The equipment used for the WBT will fulfill the accuracy and calibration requirements stated in WBT protocol version 4.2.3 and in the EB 79 Annex 3: Project standard vers.07 par 56 f.

$SC_{Mirt,y}$: is determined applying the CCT protocol (see B.7.1). Tests will be reported in spreadsheet templates. The equipment used for the CCT will fulfill the accuracy and calibration requirements stated in WBT protocol version 4.2.3 and in the EB 79 Annex 3: Project standard vers.07 par 56 f.

b. Quality Assurance/ Quality Control

i. Procedures for conducting the data collection and/or field measurements

Data collected and processed by the field staff will be checked regularly by the CME or a person dedicated by the CME.

Training of field personnel

All personnel involved in the monitoring will be trained to ensure that each of them undertakes an appropriate monitoring assignment according to the Monitoring Plan. Any personnel involved in the monitoring will be trained by the CME or by or a person dedicated by the CME before performing any monitoring activities. Only people who are trained are qualified to be involved in the monitoring.

Provisions for maximizing response rates

Documentation of out-of-population cases, refusals, other sources of non-responses

- Refusals and non-respondents

Refusals and non-respondents (i.e. households where the contact could not be established) will be recorded by the monitoring team as well as the reason for the refusal.

In case a household refuses to participate in the monitoring effort, the monitoring team will record the reason for the refusal and decide whether or not the refusal is due to a likely non-use of the ICS. If the CME decides that the refusal is due to a likely non-use of the stove, this stove will count as Drop-Out. If the reason is e.g. a time constraint that cannot be solved by repeating the survey effort at this end user at another date, the household or institution will be replaced by another.

ii. Procedure for defining outliers and under what circumstances outlier data/measurements may be excluded and/or replaced

CME will apply the “3 sigma rule”: All values outside 3 standard deviations from the mean will be excluded. See also: http://en.wikipedia.org/wiki/68-95-99.7_rule

Other appropriate measures to define and exclude outliers may also be used.

c. Analysis: Describe how the data will be used

Data will be used to calculate emission reductions achieved during the specific monitoring period according to the equations provided in Section B.6.1 of this CPA-DD. The CME is responsible for preparing the Monitoring Report.

3. Implementation Plan

a. Schedule for implementing the sampling effort

As mentioned above, the schedule for implementing the sampling effort shall be: within 6 months after the end of the specific monitoring period the sampling effort can be finalized.

b. Skills and resources required for data collection and the analyses, general description of qualifications and experience

The CME will assign the people, entities or qualified third parties responsible for the data collection and analysis. The CME will ensure that the qualification and experience of the person or entity involved is adequate for the specific tasks to be performed by the person or entity.

Other sampling methods which may be more practical and cost effective may alternatively be used, while considering the most recent standard and best practice examples for sampling and surveys for small-scale CDM project activities. If this is the case, the DOE will have to verify at verification stage that the sampling method was statistically sound and as robust as the approaches presented in this PoA-DD.

PART III. Generic component project activity (CPA) on ICS for institutions

SECTION A. General description of a generic CPA

A.1. Purpose and general description of generic CPAs

The CPA entitled “Fuel Efficient Stoves for Ethiopia Programme of Activity CPA xxx” consists in the distribution of improved cookstoves (ICS) suitable for use in institutions, e.g. Mirt stoves or institutional rocket stoves (IRS) for cooking in schools, prisons or other institutions. All ICS types have efficiency improvements in thermal applications of non-renewable biomass as compared to the baseline technology, as per AMS-II.G, ver. 5. Possibly, also pairs of stoves will be distributed to institutions, consisting e.g. in a Mirt stove (slim or classic type) for *injera* baking and a rocket stove for other cooking tasks.

The purpose of the CPA is to reduce GHG emissions and indoor air pollution by the dissemination of efficient cookstoves in institutions in Ethiopia.

The boundary of the CPA will correspond to the national borders of the Federal Democratic Republic of Ethiopia.

SECTION B. Application of a baseline and monitoring methodology and standardized baseline

B.1. Reference of methodology(ies) and standardized baseline(s)

The methodology AMS-II.G “Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass” (Version 5.0) will be used in this CPA.

The use of this methodology in a project activity under a programme of activities is permitted if leakages are estimated and accounted for. Here we will use option (c) of par. 29 for the accounting of leakages:

(c) As an alternative to subparagraphs (a) and (b), B_{old} can be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.

B.2. Applicability of methodology(ies) and standardized baseline(s)

Part I: Demonstration of the small scale limit for each CPA included in the PoA

The CPA will distribute xxx (NUMBER of TECHNOLOGY) types of ICS. The CPA qualifies as Type II – energy efficiency improvement project and will remain under the limit of small-scale project activity type (annual energy savings below 180 GWh_{th}/a, threshold as per clarification request SSC_233) during each year of the crediting period. The number of disseminated ICSs is recorded in the database. Only the ICSs recorded in the database will be part of the CPA.

The calculation of the maximum number of ICSs to be disseminated under this CPA in order to remain under the limit was calculated according to the following formula:

$$180 \frac{GWh}{year} > B_{savings} \cdot N_y \cdot NCV_{biomass}$$

Where:

$B_{savings}$	Quantity of woody biomass saved by the use of the ICS in tonnes
$N_{y,i}$	Adjusted total number of appliances deployed in period y
$NCV_{biomass}$	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne, which is 4.17 kWh/kg)

The formula above can be transformed into:

Equation 9

$$N_y < \frac{180 GWh / year}{B_{savings} * NCV_{biomass}}$$

Since N_y and $B_{savings}$, are monitoring parameters whose values will be obtained during verification, an ex-ante estimated limit of stove numbers will be defined according to the equation above at CPA inclusion stage in order to qualify for small scale threshold. If during verification it is found that the SSC limit has been surpassed, the most recently deployed stoves will not be counted for ER in order not to surpass the SSC limit.

The maximum number of ICS that can possibly be included without violating the SSC limit depends on the performance found in monitoring. Therefore this number may vary in different CPAs. At the time of verification compliance with the SSC limit will be shown.

Part II: Applicability criteria of AMS-II.G (Technology/measure)

1. AMS-II.G, ver. 5 applies to “*appliances involving the efficiency improvements in the thermal applications of non-renewable biomass. Examples of these technologies and measures include the introduction of high efficiency biomass fired cook stoves or ovens or dryers and/or improvement of energy efficiency of existing biomass fired cook stoves or ovens or dryers.*”

The improved cookstoves disseminated under the PoA and therefore under each SSC-CPA are high efficiency biomass fired cook stoves and hence the category is applicable.

2. “*Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods*”.

Non-renewable biomass has been used since 31 December 1989. Justification:

Several studies and reports give evidence that NRB has been used on a large scale since that date and even before. This evidence concerns:

- “A number of documents indicate that around the late 1950s, 16 percent of Ethiopia's land area was covered by natural forest. The Ethiopian Forestry Action Programme has estimated that 150,000- 200,000 ha of forest is destroyed annually. This is calculated to be 6 percent of the total existing natural forest. This action program, which was prepared in 1993, cautions that if the trend continues, all the natural forests in the country will be fully

depleted within 15 to 20 years. At present, forest resources are estimated to be not more than 3 percent because of the pressure on them to date^{32,33}.

- “Overall it is estimated that the gap between the demand for wood products and the sustainable supply in the 20 years between 1992 and 2013 is expected to grow from 33 to 81 million m³. An extensive programme of study is currently in process as regards the current status of supply and demand for forest products³⁴.”

Supply and demand for forest products in Ethiopia

Year	Demand in 1000 m ³			Projected incremental yield/supply in 1000 m ³	Difference demand-supply in 1000 m ³
	For industrial use and construction	For fuel	Total		
1	2	3	4=3+2	5	6=4-5
1992	2.500	44.953	47.453	14.339	33.114
1993	2.586	46.450	49.036	14.193	34.843
1994	2.683	47.958	50.641	14.045	36.596
1995	2.785	49.518	52.303	13.857	38.446
1996	2.895	51.192	54.087	13.717	40.370
1997	3.015	52.917	55.932	13.550	42.382
1998	3.135	54.693	57.828	13.503	44.325
1999	3.263	56.521	59.784	13.314	46.470
2000	3.396	58.403	61.799	13.136	48.663
2001	3.535	60.310	63.845	12.932	50.913
2002	3.677	62.269	65.946	12.798	53.148
2003	3.827	64.283	68.110	12.681	55.429
2004	3.984	66.350	70.334	12.738	57.596
2005	4.150	68.473	72.623	12.617	60.006
2006	4.319	70.583	74.902	12.452	62.450
2007	4.495	72.745	77.240	12.108	65.132
2008	4.681	74.967	79.648	12.093	67.555
2009	4.875	77.222	82.097	11.852	70.245
2010	5.079	79.539	84.618	12.059	72.559
2011	5.286	81.812	87.098	11.559	75.539
2012	5.503	84.130	89.633	11.260	78.373
2013	5.731	86.439	92.170	11.054	81.116

- On the basis of the Wood Biomass Inventory and Strategic Planning Project (WBISPP) of the Ethiopian Ministry of Agriculture and Rural Development (2004), the Forestry

³² Environmental Protection Authority. 2003. *State of the Environment Ethiopia*. Addis Ababa: Environmental Protection Authority. <http://www.epa.gov.et/Download/Publications/State%20of%20Environment%20Report%20of%20Ethiopia-%202003.pdf>.

³³ Berry, Leonhard 2003. *Land Degradation in Ethiopia: Its Extent and Impact*. GM with WB support. http://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CFwQFjAA&url=ftp%3A%2F%2Fftp.fao.org%2Fagl%2Fagl%2Fadadocs%2FETHIOPIA_LD_CASE_STUDIES.doc&ei=NPogUIm6F4_JsgbKuoDoBg&usg=AFQjCNGBaZMf-AOYlgsO52-g79dpJQCcvA.

³⁴ Environmental Protection Authority (2003): *State of the Environment Ethiopia*. Addis Ababa: Environmental Protection Authority., Annex 4

Resources Assessment (FRA) 2010 Ethiopia Country Report estimates the decline of forest area to 2,817,656 ha³⁵.

Using a linear extrapolation, the areas of forest (from 1990 to 2010) have been estimated and forecasted¹⁸.

Year	1990	2000	2005	2010
Forest area (1000 ha)	15114	13705	13000	12296

- The Environmental Protection Authority Ethiopia states in their 2003 State of the environment Ethiopia report: report "Increases in population and consequent expansion of settlement resulting in demand for farm lands near forest areas, increases in demand for fuel, construction and industrial wood, forest fires, low public awareness, pervasive poverty and failure to demarcate and protect the boundaries of forests are major, among the factors that impact the forest resources of the country"³⁶

B.3. Sources and GHGs

According to the applied methodology AMS-II.G ver. 5, par. 9: "The project boundary is the physical, geographical site of the efficient systems using biomass." The geographical area within which all small-scale CDM programme activities (SSC-CPAs) included in the PoA, including this CPA, will be implemented is the Federal Democratic Republic of Ethiopia. The assessment of sources and gases included in the SSC-CPA boundary is given below.

	Source	Gas	Included ?	Justification/ Explanation
Baseline	Combustion of non renewable biomass for cooking, Emission Factor for combustion of fossil fuels for cooking	CO ₂	Yes	Major source of emissions
		CH ₄	No	Not required by methodology, only CO ₂ Emission Factor for fossil fuels is considered.
		N ₂ O	No	Not required by methodology, only CO ₂ Emission Factor for fossil fuels is considered.
Project activity	Combustion of non renewable biomass for cooking, Emission Factor for combustion of fossil fuels for cooking	CO ₂	Yes	Major source of emissions
		CH ₄	No	Not required by methodology, only CO ₂ Emission Factor for fossil fuels is considered.
		N ₂ O	No	Not required by methodology, only CO ₂ Emission Factor for fossil fuels is considered.

CPAs may overlap geographically, but the ICSs will be clearly attributable to CPAs for their unique stove IDs. Hence is it not possible to present a flow diagram physically delineating the CPA. Figure 7 presents a flow diagram showing all the equipment, systems and flows of mass. In particular the emissions sources and GHGs included in the project boundary and the data parameters to be monitored are indicated. Only CO₂ savings resulting from reduced consumption of non-renewable biomass will be considered under any CPA included in the PoA.

³⁵ FAO (2010):Global Forest Resources Assessment 2010, Country Report Ethiopia, <http://www.fao.org/docrep/013/al501E/al501e.pdf>, last accessed on 27.03.2012

³⁶ Environmental Protection Authority. 2003. State of the Environment Ethiopia. Addis Ababa: Environmental Protection Authority. [http://www.epa.gov.et/Download/Publications/State of Environment Report of Ethiopia 2003.pdf](http://www.epa.gov.et/Download/Publications/State%20of%20Environment%20Report%20of%20Ethiopia%202003.pdf).

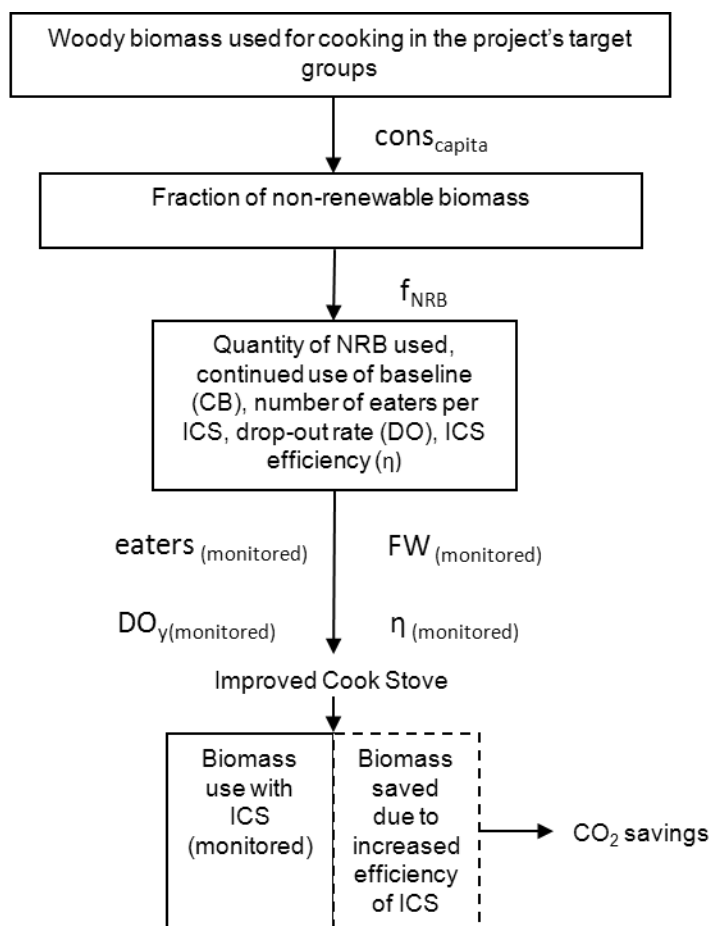


Figure 8: Flow diagram showing all the equipment, systems and flows of mass.

B.4. Description of baseline scenario

Following par.10 of ver. 5 of the methodology, it is assumed that in the absence of the PoA, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs. The baseline systems in this CPA are three stone fires, or conventional systems with no improved combustion air supply or flue gas ventilation system, i.e. without a grate or a chimney.

Emission reductions are calculated by multiplying the thermal energy from annual biomass savings stemming from non-renewable biomass ($B_{savings}$) with an emission factor for fossil fuels ($EF_{projected_fossilfuel}$). The baseline emission factor for fossil fuels is 81.6 tCO₂/TJ as per par. 5 of AMS-II.G.

In par. 12 of AMS-II.G ver 5, three options are given to determine $B_{savings}$. The second option is chosen for the institutional rocket stove and the third option is used for Mirt stoves, with the corresponding formula.

Par.13 of AMS-II.G gives two approaches to determine B_{old} . We choose to apply approach (a), where B_{old} is derived from the estimated average annual consumption of woody biomass per appliance (tonnes/year), derived from historical data or a survey of local usage. The average

annual consumption of woody biomass per appliance is determined using the average annual firewood consumption per capita ($cons_{capita,inst}$) and the number of eaters ($eaters_{inst}$).

In determining $cons_{capita,inst}$ for institutional stoves, the per-capita consumption will be derived from surveys.

For determination of each parameter required for the emission reductions, please refer to Section B.6.

B.5. Demonstration of eligibility for a generic CPA

Nr	Eligibility Criteria		Mean of proof / Evidence Document (to be checked at CPA inclusion)
	Category	Description	
1	CDM-EB 65-A03 STAN version 3.0 Par.16 (a): Geographical boundary and location of the CPA	The CPA is located within the project boundary. The geographical area within which all small-scale CDM programme activities (SSC-CPAs) included in the PoA, will be implemented is the Federal Democratic Republic of Ethiopia. Not all stoves may have been deployed at CPA inclusion stage. During verification, locations will be checked.	Location and boundary are specified in the specific CPA-DD stating that the location is limited to the Federal Democratic Republic of Ethiopia. Document: Statement of CME that the location and boundary is within the Federal Democratic Republic of Ethiopia.
2	CDM-EB 65-A03 STAN version 3.0 Par.16 (b): Conditions to avoid double counting of stoves	A unique numbering or identification system for the ICSs disseminated is applied.	The specific numbering or identification regime is included in the specific CPA DD. Document: CPA-DD
3	CDM-EB 65-A03 STAN version 3.0 Par.16 (b): Conditions to avoid double-counting of CPAs	The CPA is exclusively bound to the PoA; there will be a confirmation that the programme activity has not been and will not be registered either as a single CDM project activity or as a CPA under another PoA.	A statement is included in the CPA-DD that the specific CPA will not be part of another single CDM project activity or CPA under another PoA. The numbering system will be unique to the PoA. Document: CPA-DD
4	CDM-EB 65-A03 STAN version 3.0 Par.16 (c): Specification of technology	The CPA consists in the distribution of ICSs, e.g. portable institutional rocket stoves or institutional Mirt stoves as described in section A6 of the PoA DD part I, with efficiency improvements in thermal applications of non-renewable biomass as per AMS-II.G, ver. 5	Stove type, its specification and compliance with the technological requirements of AMS-II G will be described in the specific CPA-DD. Document: CPA-DD
5	CDM-EB 65-A03 STAN version 3.0 Par.16 (c): Performance specifications of technology including compliance with testing	The stove disseminated under the CPA has a specified efficiency of at least 20%	The water boiling test of the stove applied, or any other stove testing protocol which is in compliance with the applied methodology will be described in the specific CPA-DD.

			Document: CPA-DD
6	CDM-EB 65-A03 STAN version 3.0 Par.16 (d): Conditions to check start date of the CPA	CPA start date shall not be before the PoA webhosting date. The ICS sales dates will also be checked during verification, and in case any deployed stove will be found not in line with CPA start date requirement, those stoves will not be counted for emission reduction calculation.	Starting date as stated in the CPA-DD is after PoA webhosting date. Document provided at the time of first verification: Distribution contract of the first stove deployed under the CPA, including exact distribution date.
7	CDM-EB 65-A03 STAN version 3.0 Par.16 (d): CPA crediting period	The CPA starting date of the crediting period is the date of inclusion into the registered PoA or any date thereafter and the crediting period cannot exceed the PoA end date.	A statement is included in the CPA-DD that the crediting period starting date is the date of CPA inclusion into the registered PoA or any date thereafter, the end of the crediting period in a CPA-DD will not exceed the PoA end date. Document: CPA-DD
8	CDM-EB 65-A03 STAN version 3.0 Par.16 (e): Compliance with applicability and other requirements of single or multiple methodologies applied by CPAs	CPAs shall comply with the applicability criteria and meet all requirements of the applied methodology AMS-II.G.	The CPA consists in the distribution of ICSs with efficiency improvements in thermal applications of non-renewable biomass as per AMS-II.G, ver. 5. The compliance with methodology AMS-II.G ver. 5 will be demonstrated in the specific CPA-DD. Document: CPA-DD
9	CDM-EB 65-A03 STAN version 3.0 Par 16 (f) and and EB 68 Annex 27 (Guidelines on the demonstration of additionality of small-scale project activities v.9.0)	Additionality of the PoA and the included CPAs is demonstrated as described in detail in Section B.1 of the PoA DD by applying paragraph 2. (c) of and EB 68 Annex 27 (Guidelines on the demonstration of additionality of small-scale project activities v.9.0)	Since the PoA and included CPA activities are composed of isolated units where the users of the Technology / measure are households or communities or Small and Medium Enterprises, the additionality of each CPA will be demonstrated, by demonstrating that:[...] the size of each unit is no larger than 5% of the small-scale CDM thresholds according to Section B1. of the PoA DD part I This is in accordance with EB 68 Annex 27 2.c. Document: CPA-DD
10	CDM-EB 65-A03 STAN version 3.0 Par.16 (g): Conditions related to undertaking local stakeholder consultations and environmental impact	The local stakeholder consultation will be conducted at the PoA level. According to the analysis on environmental impacts done in section E of the PoA DD part I an environmental impact analysis is not required.	The results and measures of the stakeholder consultation are given in Section F of the PoA-DD part I. According to the analysis on environmental impacts done in section E of the PoA DD part I

	analysis g		an environmental impact analysis is not required..
11	CDM-EB 65-A03 STAN version 3.0 Par.16 (h): Non-diversion of ODA in case of Public funding	The CME and the CPA operator (in case of being different from the CME) shall confirm that in case of public funding there shall not be diversion of Official Development Assistance.	In case of ODA involved in funding or pre-funding parts of a CPA, a confirmation of the party providing ODA that no diversion of ODA occurs. Document: Statement of CME and the CPA operator (in case of being different from the CME).
12	CDM-EB 65-A03 STAN version 3.0 Par.16 (i): Target group and distribution mechanisms	Target groups are Institutions (e.g. prisons, schools) for the institutional rocket stove. Target groups of one CPA may only be institutions. The distribution mechanism is the direct distribution of ICSs through the CME or regional partners such as the <i>Woreda</i> offices of the Ministry of Agriculture and Rural Development.	Target groups are institutions. Document: CPA-DD
13	CDM-EB 65-A03 STAN version 3.0 Par.16 (j): Ability to carry out monitoring and sampling requirements	The monitoring plan included in the PoA-DD part III should be in accordance with the latest version of the Standard for sampling and surveys for CDM project activities and programme of activities (EB 50 Annex 30, STAN version 4.1 including Amendment to version 4.1 EB 80 Annex 07).	The monitoring plan included in the specific CPA-DD should be in accordance with the latest approved version of the Standard for sampling and surveys for CDM project activities and programme of activities (EB 50 Annex 30, STAN version 4.1 including Amendment to version 4.1 EB 80 Annex 07). In case the CPA is not implemented by the CME itself, an agreement will be signed with the CME defining responsibilities and duties of the implementing agent and acceptance of the terms of the PoA. Document: CPA-DD
14	Approval of CPA by CME and awareness and agreement of those operating a CPA on PoA subscription.	CME approved each CPA to be included into its registered PoA. Contractual provisions between the CPA operator and the CME will ensure that those operating the CPA are aware and have agreed that their activity is being subscribed to the PoA.	Statement of CME giving approval for the CPA to be included into its registered PoA. Document: Statement of approval for CPA inclusion from CME In case CPA operators are different from the CME:

			A declaration from CPA operators, stating that they are aware and have agreed that their activity is being subscribed to the PoA will be provided for each CPA. Document: A declaration from CPA operators.
15	CDM-EB 65-A03 STAN version 3.0 Par.16 (k): Conditions that ensure that CPAs meets SSC threshold criteria	The CPA will remain under the thermal threshold of 180 GWh/a thermal energy savings (threshold as per clarification request SSC_233) throughout the crediting period of the CPA.	The estimated maximum number of stoves will be defined in the CPA-DD according to a calculation of the total energy savings, where it will be shown that total energy savings of each CPA will not exceed $180\text{GWh}_{\text{th}}$. Document: CPA ex ante Emission reduction spreadsheet
16	CDM-EB 65-A03 STAN version 3.0 Par.16 (l): Requirements for the De-bundling check	According to EB 54 Annex 13 (Guidelines on Assessment of Debundling for SSC project Activities"/ Version 3) A CPA of a PoA is exempted from performing the de-bundling check, if each of the independent subsystems/ measures included in the CPA of a PoA is no larger than 1% of the small-scale threshold defined by the applied methodology.	It will be shown in the CPA-DD that energy savings of each ICS type included are always below 1% of the SSC threshold. Document: Statement of the CME.
17	CER ownership	End users receiving ICSs under the specific CPA contractually cede their rights to claim and own emission reductions under the Clean Development Mechanism of the UNFCCC to the CME of the PoA.	A default sales agreement for end users including the provision that emission reductions generated by the stove are owned by the CME will be provided for each CPA. Document: Sample sales agreement At the time of verification, the DOE will check that the default sales agreement has been used for stove distribution.
18	Definition of CPA baseline	1. if the CPA is only including ICS for household level (as defined in Section B4 of this PoA-DD part II): The CPA applies the baseline fuel consumption as defined in this PoA-DD 2. If the CPA is only including institutional ICS (as defined in Section B4 in PoA-DD part III): the baseline fuel consumption is to be defined in the specific CPA and validated by the DOE prior to CPA inclusion	1. CPA states that only Institutional ICS are to be implemented under the CPA 2. Baseline fuel consumption is defined in the specific CPA-DD according to the regulations specified in AMS-II.G. and validated by a DOE before inclusion into the CPA.

B.6. Estimation of emission reductions of a generic CPA**B.6.1. Explanation of methodological choices**

Emission reductions are calculated by multiplying the thermal energy from annual biomass savings stemming from non-renewable biomass with an emission factor for fossil fuels. The following formula is given in AMS-II.G, ver. 5:

Equation 10

$$ER_y = B_{savings,y} * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} * N_{y,i}$$

Where:

ER_y	Emission reductions during the monitoring period y in tCO ₂ e
$B_{savings,y}$	Quantity of woody biomass that is saved in in tonnes per device (or pair of deceives)
$f_{NRB,y}$	Fraction of woody biomass saved by the project activity in monitoring period y that can be established as non-renewable biomass
$NCV_{biomass}$	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel: 0.015 TJ/tonne)
$EF_{projected_fossilfuel}$	Emission factor for substitution of non-renewable woody biomass by similar consumers. A default value of 81.6 tCO ₂ /TJ is given in AMS-II.G.
$N_{y,i}$	Number of ICS distributed until the end of the monitoring period y adjusted by implementation dates

For $NCV_{biomass}$ and $EF_{projected_fossilfuel}$, the indicated default values are used. The methodological choices for the determination of $B_{savings,y}$ and $f_{NRB,y}$ are described below.

Determination of quantity of woody biomass saved ($B_{savings,y}$)

In par. 12 of AMS-II.G, three options are given to determine $B_{savings,y}$. Here, the second option with the corresponding formula is chosen for the institutional rocket stove

Equation 11 a

$$B_{savings,y} = B_{old} * (1 - \eta_{old} / \eta_{inst,i})$$

Where:

B_{old}	Quantity of woody biomass used in the absence of the project activity in tonnes
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η_{old} Efficiency of the baseline stove being replaced (0.1 default value)

$\eta_{inst,y}$ Efficiency of the institutional rocket stove; to be derived with a water boiling test (WBT)

In case a Mirt stove is applied the third option will be applied for Mirt stoves:

Equation 12 b

$$B_{savings,Mirt,y} = B_{old,Mirt} * (1 - SC_{Mirt,y}/SC_{old})$$

Where:

$B_{savings,Mirt,y}$ Quantity of woody biomass saved in tonne per Mirt stove

$B_{old,Mirt}$ Quantity of woody biomass used in the absence of the project activity in tonnes per Mirt stove

SC_{old} Specific fuel consumption or fuel consumption rate of the baseline devices i.e. fuel consumption per quantity of item/s processed (e.g. food cooked) or fuel consumption per hour, respectively. Use weighted average values if more than one type of device is being replaced

$SC_{Mirt,y}$ Specific fuel consumption or the fuel consumption rate in year y of the devices deployed as part of the project i.e. fuel consumption per quantity of item/s processed (e.g. food cooked) or fuel consumption per hour respectively. Use weighted average values if more than one type of system is being introduced by the project activity

In case a pair of stoves (Mirt stove and Institutional rocket stove) is deployed, total ER reductions will be calculated as follows:

$$ER_{total,y} = ER_{Mirt,y} + ER_{Inst,y}$$

The parameters η_{old} , $\eta_{inst,i}$, SC_{old} and $SC_{Mirt,y}$ will be determined before the inclusion date of the CPA into the PoA. $\eta_{inst,y}$ and $SC_{Mirt,y}$ will additionally be determined during monitoring.

Par.13 of AMS-II.G gives two approaches to determine B_{old} . We choose to apply approach (a), where B_{old} is derived from the estimated average annual consumption of woody biomass per appliance (tonnes/year), derived from a survey. The average annual consumption of woody biomass per appliance is determined using the average annual firewood consumption per capita ($cons_{capita,inst}$) and the number of eaters ($eaters_{inst,y}$).

In determining $cons_{capita,inst}$ for institutional stoves, the per-capita consumption is derived from a survey.

Calculation of the quantity of woody biomass used in absence of the project activity

The average baseline firewood consumption (B_{old}) is derived from the average fuelwood per capita consumption for institutions ($cons_{capita,inst}$), number of eaters ($eaters_{inst,i,y}$ monitored) and an additional factor representing the continued use of baseline stoves ($FW_{inst,i,y}$). FW accounts for the fact that an ICS may not be large enough to provide cooking for all eaters, and additionally for the fact that the use of ICSs does not always cover the entire range of cooking tasks institutions, e.g. Mirt stoves are only used for baking *injera* and preparing sauces, but not for other purposes such

as preparation of coffee. If two ICS types are combined in an institution, the sum of the corresponding FW values can never surpass 100%.

Equation 12

$$B_{old,appliance} = cons_{capita,inst,} * eaters_{inst,i,y} * FW_{inst,y}$$

Where:

$B_{old,appliance}$	Quantity of woody biomass used in absence of the project activity in tonnes per year per appliance
$cons_{capita,inst,}$	Baseline fuelwood consumption per capita
$eaters_{inst,i,y}$	average number of eaters per stove (monitored)
$FW_{inst,i,y}$	proportion of fuel wood consumed by the ISC, used as an adjustment factor to account for the continued use of baseline stoves in the monitoring period y, according to par. 20 b) of AMS-II.G ver. 5

Total ER per stove type are then derived by multiplying with the length of the monitoring period and the number of implemented and operational ICS, adjusted by a drop out rate and leakage.

Total emission reductions of the project will be calculated as:

$$ER_{total,y} = ER_{Mirt,y} + ER_{Inst,y}$$

Combining equations 11), 12a or b, and 13), and considering drop out and leakage leads to:

Equation 13 a

$$ER_{Inst,y} = cons_{capita,inst,} * eaters_{inst,y} * FW_{inst,y} * (1 - \eta_{old}/\eta_{inst,y}) * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} * N_{inst,y} * mp_{length,y} / 365 * (1 - DO_{inst,y}) * L_y$$

Equation 14 b

$$ER_{Mirt,y} = cons_{capita,inst,} * eaters_{inst,y} * FW_{Mirt,y} * (1 - SC_{Mirt,y}/SC_{old}) * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} * N_{Mirt,y} * mp_{length,y} / 365 * (1 - DO_{Mirt,y}) * L_y$$

Where:

$ER_{i,y}$	Emission reductions during the monitoring period y in tCO ₂ e
$B_{savings,y}$	Quantity of woody biomass that is saved in tonnes per device
$f_{NRB,y}$	Fraction of woody biomass saved by the project activity in monitoring period y that can be established as non-renewable biomass

$NCV_{biomass}$	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel: 0.015 TJ/tonne)
$EF_{projected_fossilfuel}$	Emission factor for substitution of non-renewable woody biomass by similar consumers. A default value of 81.6 tCO ₂ /TJ is given in AMS-II.G.
$N_{i,y}$	Number of ICS distributed until the end of the monitoring period y adjusted by implementation dates

For $NCV_{biomass}$ and $EF_{projected_fossilfuel}$, the indicated default values are used. The methodological choices for the determination of $B_{savings,y}$ and $f_{NRB,y}$ are described below.

Determination of the Share of Non-Renewable Biomass

A country specific default fraction of non-renewable woody biomass ($f_{NRB,y}$) is used, as available on the CDM website: 88%

Qualitative assessment of non-renewable woody biomass in the Federal Democratic Republic of Ethiopia

AMS-II.G, par. 10, also mentions qualitative indicators for the determination of non-renewable woody biomass:

- A trend showing an increase in time spent or distance travelled for gathering fuel-wood by users (or fuel-wood suppliers) or alternatively, a trend showing an increase in the distance the fuel wood is transported to the project area.

Although the traveling distances for the collection of firewood vary among different parts of the country, due to place and time specific dependence of environmental degradation, a study carried out in the Nano Aseko Kebele in Arsi zone, Federal Democratic Republic of Ethiopia, showed that the average distance travelled in search of fuelwood has increased. Over 50% of the interviewed persons of respondents replied that in the present time they travel an average of 9-15 km, while, in the past almost all (95%) of respondents travelled less than 2 km to collect fuelwood.

Average distance travelled in search of fuelwood³⁷

km	Past		Present	
	Frequency	Percentage	Frequency	Percentage
<2	184	95.8	-	-
2-8	8	4.10	31	16.10
9-15	-	-	98	51.00
16-22	-	-	47	24.40
23+	-	-	15	7.80
Total	192	100	192	100

³⁷ Teshome Beyene (2010): Rural women and environmental degradation: The case of Nano Aseko kebele in Arsi Zone, in: Journal of Adama University, Vol. 1, No. 1, January, 2010, ISSN 1998-0531, p. 15-22

- *Survey results, national or local statistics, studies, maps or other sources of information such as remote sensing data that show that carbon stocks are depleting in the project area*

Decline in Ethiopia's forest carbon stocks (FAO 2010)¹⁵

Country/area	Carbon stock in living forest biomass (million tonnes)				Per hectare 2010 (tonnes)
	1990	2000	2005	2010	
Ethiopia	289	254	236	219	18

- *Increasing trends in fuel wood prices indicating a scarcity of fuel-wood;*

No clear evidence could be found.

- *Trends in the types of cooking fuel collected by users that indicate a scarcity of woody biomass.*

In its "Short Term Technical Assistance Consultancy Report on Farming Systems and Natural Resource Management (2002)"³⁸, the Ministry of Agriculture of the Federal Democratic Republic of Ethiopia states that due to fuelwood scarcity, dung and crop residues are important substitute fuels in many parts of the country, e.g.:

"For the Central Rift Valley in East Shewa Zone the report states: "Fuel wood is becoming scarce in many parts of the area, and annual per capita consumption rates are between 400-600kg. Both dung and crop residues are important substitute fuels: with per capita consumption rates of about 300-400kg of dung, and similar rates for crop residues (almost all maize stalks)". Also "In West Harerge food fuel is being substituted by dung" (page 13). Another example for fuel wood scarcity is presented by the report for Oromiya region: "With reduced availability of woody biomass, dung is also being increasingly widely used as fuel (page 31)."

AMS-II.G also presents Indicators for DRB. Woody biomass is "renewable" if one of the following two conditions is satisfied:

III. *The woody biomass is originating from land areas that are forests where:*

- (d) *The land area remains a forest; and*
- (e) *Sustainable management practices are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and*
- (f) *Any national or regional forestry and nature conservation regulations are complied with.*

IV. *The biomass is woody biomass and originates from non-forest areas (e.g., croplands, grasslands) where:*

- (d) *The land area remains as non-forest or is reverted to forest; and*
- (e) *Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and*
- (f) *Any national or regional forestry, agriculture and nature conservation regulations are complied with.*

³⁸ Bourn, David. 2002. *Farming in Tsetse Controlled Areas of Eastern Africa Ethiopia National Component*. Project 7 ACP ET086- Short Term Technical Assistance Consultancy Report. Ministry of Agriculture-Federal Democratic Republic of Ethiopia.

The following sources show that the conditions for renewable biomass are not in place:

Bourn (2002)³⁹ shows that in all different parts of Ethiopia, forests areas are decreasing, with annual rates of up to 2.4%. The report also demonstrates that sustainable managing practices are not in place, e.g. p.12 for the region around Addis Ababa: "Fuel wood stocks are relatively plentiful but are being harvested well above their sustainable yield. Annual per capita consumption rates are 900 to 1,100 kg. Total rates of harvesting are most certainly well above this figure because of the large market for fuel wood in Addis Ababa and the surrounding towns."

There is also only low compliance with national regulations as shown by Abebe Damte (2010)⁴⁰: "Given that all major forests in Ethiopia are state-owned, while the government, like those in many other low-income countries, has neither the capacity nor the incentive to properly regulate these forests, such rates of forest degradation may not be that surprising...In terms of use, the wood supplied from open source forests is mainly used for fuel wood, fencing and construction".

Leakage

According to AMS-II.G the following potential sources of leakage have to be considered:

a) Use of NRB savings by non-project households or institutions

According to AMS-II.G par. 13 (a) the default net to gross adjustment factor of 0.95 is applied to account for leakage and therefore surveys are not required.

b) Transfer of Equipment

AMS-II.G par. 14 states: *"If equipment currently being utilised is transferred from outside the boundary to the project activity, leakage is to be considered."*

This leakage source can be ruled out since all ICSs being deployed under the PoA will be new stoves.

Methodological choices regarding monitoring

AMS-II.G, ver. 5, par. 22 and 23

"Monitoring shall consist of checking of all devices or a representative sample thereof, at least once every two years (biennial) to determine if they are still operating; those devices that have been replaced by an equivalent in-service device can be counted as operating."

Monitoring shall also consist of checking the efficiency of all devices or a representative sample thereof...

A representative sample of the appliances disseminated under a CPA will be monitored to determine the share of appliances that are still operating at the specified efficiency. Where appliances are found to be operational but with a changed efficiency the actual efficiency determined in monitoring will be applied to calculate emission reductions. Replacement of appliances is monitored and the replaced devices will have same efficiency. The procedures for monitoring the share of operational appliances and their respective efficiency(ies) are laid out in section B.7.

³⁹ Bourn, David. 2002. *Farming in Tsetse Controlled Areas of Eastern Africa Ethiopia National Component*. Project 7 ACP ET086- Short Term Technical Assistance Consultancy Report. Ministry of Agriculture-Federal Democratic Republic of Ethiopia.

⁴⁰ Damte Bayene, Abebe. 2010. "Property Rights and Choice of Fuel Wood Sources in Rural Ethiopia." Contributed Paper Prepared for Presentation at the 3rd Conference of African Association of Agricultural Economists (AAAE) and the 48th Agricultural Economics Association of South Africa (AEASA), Cape Town., <http://purl.umn.edu/96171>.

AMS-II.G, ver. 5 par. 25

"In order to assess the leakage described above, monitoring shall include data on the amount of woody biomass saved under the project activity that is used by non-project households/users (who previously used renewable energy sources). Other data on non-renewable woody biomass use required for leakage assessment shall also be collected."

Par. 25 does not need to be considered for monitoring, as the net-to gross adjustment factor of 0.95 for leakage is used, according to par. 29a) of AMS-II.G, ver. 5

According to par. 20 of AMS-II.G, ver. 5, monitoring shall ensure that either:

"The replaced low efficiency appliances are disposed of and not used within the boundary or within the region; or

If baseline stoves continue to be used, monitoring shall ensure that the fuel-wood consumption of those stoves is excluded from B_{old} ."

The continued use of baseline stoves is accounted for according to the explanations in B.6.2.

B.6.2. Data and parameters fixed ex-ante

Data / Parameter:	$cons_{capita,inst}$
Data unit:	Tonnes/year
Description:	Quantity of biomass per capita consumed in specific institutions in absence of the project activity per person and year
Source of data:	Surveys conducted before CPA inclusion
Value(s) applied:	To be defined, depending on the type of institution
Choice of data or Measurement methods and procedures:	Surveys based on simple random sampling. The CDM sampling standard EB 50 Annex 30 STAN, version 4.1 including Amendment to version 4.1 EB 80 Annex 07 will be applied.
Purpose of data	Calculation of baseline emissions
Additional comment:	Applicable when CPA includes public institutions

Data / Parameter:	η_{old}
Data unit:	%
Description:	Efficiency of the baseline system being replaced
Source of data:	AMS-II G, version 5 default value
Value(s) applied:	0.10
Choice of data or Measurement methods and procedures:	According to AMS-II.G., ver. 5, a default value of 0.10 can be used "if the replaced system is the three stone fire or a conventional system lacking improved combustion air supply mechanism and flue gas ventilation system i.e., without a grate as well as a chimney".
Purpose of data	Calculation of baseline emissions
Additional comment:	Applicable for all ICS

Data / Parameter:	SC_{old}
Data unit:	g/kg
Description:	Specific fuelwood consumption of the baseline system (three stone fire) for injera baking
Source of data:	CCT Results: Open Fire (specific fuel consumption). Please refer to page 6 of GTZ-SUN Energy (2011): Energy Mirt stove test report.
Value(s) applied:	1031
Choice of data or Measurement methods and procedures:	The use of a pre-existing test report produced by GTZ-SUN: Energy for traditional open fires have been used to determine SC_{old} . The same value is used in the registered PoA 9769 on Mirt stove distribution in the Federal Democratic Republic of Ethiopia
Purpose of data	Calculation of baseline emissions
Additional comment:	Applicable for Mirt stoves

Data / Parameter:	$EF_{projected_fossilfuel}$
Data unit:	tCO ₂ /TJ
Description:	Emission factor for the substitution of non-renewable biomass by similar consumers
Source of data:	AMS II G., ver. 5 default value for fossil substitution fuels.
Value(s) applied:	81.6
Choice of data or Measurement methods and procedures:	According to AMS-II.G, ver. 5, par.11, the value of 81.6 t CO ₂ /TJ is to be taken as emission factor for the substitution fuel likely to be used instead of fuelwood
Purpose of data	Calculation of baseline emissions
Additional comment:	

Data / Parameter:	$f_{NRB,y}$
Data unit:	%
Description:	Fraction of woody biomass saved by the project activity in period y that can be established as non-renewable biomass
Source of data:	UNFCCC default value
Value(s) applied:	88
Choice of data or Measurement methods and procedures:	
Purpose of data	Calculation of baseline emissions
Additional comment:	

Data / Parameter:	L_y
Data unit:	Fraction

Description:	Leakage adjustment factor
Source of data:	Default value
Value(s) applied:	0.95
Choice of data or Measurement methods and procedures:	According to AMS-II G ver 5: Para 20, B_{old} can be multiplied by a net to gross adjustment factor 0.95 to account for leakage in which case surveys are not required.
Purpose of data	Calculation of baseline emissions
Additional comment:	

B.6.3. Ex-ante calculations of emission reductions

Here the expected emission reductions for a CPA distributing Institutional rocket stoves to schools are presented as an example for a typical CPA. Values will be adapted in the specific CPA at time of CPA inclusion.

Emission reductions are calculated according to Equation 12a and b (see B.6.1):

$$ER_{Inst,y} = cons_{capita,inst} * eaters_{inst,y} * FW_{inst,y} * (1 - \eta_{old}/\eta_{inst,y}) * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} * N_{inst,y} * mp_{length,y} / 365 * (1 - DO_{inst,y}) * L_y$$

$$ER_{Mirt,y} = cons_{capita,inst} * eaters_{inst,y} * FW_{Mirt,y} * (1 - SC_{Mirt,y}/SC_{old}) * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} * N_{Mirt,y} * mp_{length,y} / 365 * (1 - DO_{Mirt,y}) * L_y$$

Example for the calculation of expected emission reductions per Institutional rocket stove in a school:

Parameter ID	Description	Derived as	Unit	Value
A	$cons_{capita,school}$ fuelwood consumption per child and year	Woody Biomass Inventory of Ethiopia 2004	tonnes/a	0.018
B	$eaters_{school,i,y}$, average number of eaters per stove	based on school survey	Persons	600
C	$FW_{school,i,y}$: proportion of fuel wood consumed by the ICS, used as discount for continued use of baseline stove	preliminary estimate, to be monitored	%	90
D	B_{old} per stove	$A * B * C$	tonnes/a	9.79
E	Efficiency gain	preliminary WBT ($\eta_{inst,ICS} = 42\%$) ⁴¹	%	76

⁴¹ GTZ SUN ENERGY Project (2010)_WBT Results Institutional Rocket and Tikikil stoves

<i>F</i>	<i>B_{savings per stove}</i>	<i>F*G</i>	tonnes/a	7.46
<i>G</i>	<i>f_{NRB,y}</i>	see generic CPA-DD D.6.1	%	88
<i>H</i>	<i>EF_{projected_fossilfuel}</i>	default AMS-II.G	tCO ₂ /TJ	81.6
<i>I</i>	<i>NCV_{biomass}</i>	default AMS-II.G	TJ/t	0.015
<i>J</i>	<i>DO_{i,y}</i> : Discount for drop-out	not considered here	%	100%
<i>K</i>	<i>L_y</i> : leakage adjustment	default AMS-II.G		0.95
Expected ER per institutional ICS		<i>H*I*J*K</i>	tonnes/a	8.326

Note: Data are only used to give an example of how ER can be calculated. Data are based on a preliminary survey that has not been validated by the DOE. For any specific CPA on institutions, however, baseline data will be determined newly and validated.

B.7. Application of the monitoring methodology and description of the monitoring plan

B.7.1. Data and parameters to be monitored by each generic CPA

Data / Parameter:	<i>eaters_{inst,i,y}</i>
Data unit:	Number
Description:	Number of eaters served by a specific ICS at a specific institution
Source of data:	Official sources for each single institution participating in the CPA (e.g. registration data of school children in the individual institutions)
Value(s) applied	Determined in monitoring
Measurement methods and procedures:	<p>The number of members of the institution will be monitored from official sources for each single institution participating in the CPA.</p> <p>A maximum value of eaters per ICS will be determined.</p> <p>For each institution, the specific number of eaters will be derived by multiplying the number of ICSs used in the institution with the maximum number of eaters per ICS, and then comparing the result with the average number of eaters in the institution.</p> <p>If the number of eaters in an institution exceeds the total capacity of all ICS in this institution, the number of eaters per ICS is set to a defined maximum number, since all ICSs will be used at maximum. Otherwise, the number of eaters for the ICSs in the institution will be determined by multiplying the maximum number of eaters per ICS with the ratio of the total number of eaters in the institution and the combined capacity of ICSs in the institution.</p>
Monitoring frequency:	The CME may decide to do annual or biennial monitoring of the parameter
QA/QC procedures:	Data will be collected using the standard procedures and will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.
Purpose of data	Calculation of baseline emissions

Additional comment:	
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Data / Parameter:	$\eta_{inst,i,y}$											
Data unit:	Fraction											
Description:	Thermal efficiency of a specific ICS deployed in monitoring period y.											
Source of data:	Water boiling test											
Value(s) applied	Determined during monitoring											
Measurement methods and procedures:	<p>The data will be derived from applying the WBT ver. 4.2.3⁴² as by AMS-II.G to a representative sample of ICSs distributed.</p> <p>The equipment used for the WBT will fulfill the accuracy and calibration requirements stated in WBT protocol version 4.2.3 and in the EB 79 Annex 3: Project standard vers.07 par 56 f:</p> <table><tr><td></td><td>Weighscale</td><td>Thermometer</td></tr><tr><td>Accuracy</td><td>± 1 gramm</td><td>0.5 °C</td></tr><tr><td>Calibration</td><td colspan="2">According to the EB 79 Annex 3: Project standard vers.07 par 56 f: equipment is calibrated either in accordance with the local/national standards, or as per the manufacturer’s specifications. If local/national standards or the manufacturer’s specifications are not available, international standards may be used.</td></tr></table> <p>All formulae applied to determine the statistical precision are standard formula. Furthermore, according to AMS-II.G., par.22 the sampling error has to be deducted (“...the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen...”) in the event that 90/10 or 95/10 precision could not be achieved because of a small sample size. No deductions have to be made if 90/10 or 95/10 precision is achieved by sampling an appropriate number of appliances. A traceable “identity check” of the appliances visited during sampling will be performed and recorded (e.g. a picture of the appliance clearly showing its serial no., etc.).</p>				Weighscale	Thermometer	Accuracy	± 1 gramm	0.5 °C	Calibration	According to the EB 79 Annex 3: Project standard vers.07 par 56 f: equipment is calibrated either in accordance with the local/national standards, or as per the manufacturer’s specifications. If local/national standards or the manufacturer’s specifications are not available, international standards may be used.	
	Weighscale	Thermometer										
Accuracy	± 1 gramm	0.5 °C										
Calibration	According to the EB 79 Annex 3: Project standard vers.07 par 56 f: equipment is calibrated either in accordance with the local/national standards, or as per the manufacturer’s specifications. If local/national standards or the manufacturer’s specifications are not available, international standards may be used.											
Monitoring frequency:	The CME may decide to do annual or biennial monitoring of the parameter											
QA/QC procedures:	<p>Data will be collected using the standard procedures and will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.</p> <p>Cross-checks: The monitoring team will cross-check results with literature values, or specifications from manufacturer, if available.</p>											
Purpose of data	Calculation of baseline emissions											
Additional comment:												

⁴² <http://www.cleancookstoves.org/our-work/standards-and-testing/learn-about-testing-protocols/>

Data / Parameter:	SC _{Mirt,y}									
Data unit:	g/kg									
Description:	Specific fuel consumption in year y of the Mirt stove as part of the project that is fuel consumption per quantity of item/s processed (e.g. food cooked)									
Source of data:	Results of the Controlled Cooking Test (CCT)									
Value(s) applied	511									
Measurement methods and procedures:	<p>As per paragraph 12 and 23(c) of AMS-II.G Version 5.0.</p> <p>The CCT will be carried out in accordance with national standards (if available) or international standards or guidelines (e.g. the CCT procedures specified by the Partnership for Clean Indoor Air (PCIA) <http://www.pciaonline.org/node/1050>)</p> <p>The equipment used for the CCT will fulfill the accuracy and calibration requirements stated in CCT protocol version 2.0 and in the EB 79 Annex 3: Project standard vers.07 par 56 f:</p> <table><tr><td></td><td>Weighscale</td><td>Thermometer</td></tr><tr><td>Accuracy</td><td>± 1 gramm</td><td>Not specified</td></tr><tr><td>Calibration</td><td colspan="2">According to the EB 79 Annex 3: Project standard vers.07 par 56 f: equipment is calibrated either in accordance with the local/national standards, or as per the manufacturer's specifications. If local/national standards or the manufacturer's specifications are not available, international standards may be used.</td></tr></table> <p>All formulae applied to determine the statistical precision are standard formula. Furthermore, according to AMS-II.G., par.28 the sampling error has to be deducted ("<i>...the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen...</i>") in the event that 90/10 or 95/10 precision could not be achieved because of a small sample size. No deductions have to be made if 90/10 or 95/10 precision is achieved by sampling an appropriate number of appliances.</p> <p>Data will be collected using the standard procedures and will be stored for the CPA crediting period and an additional two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.</p> <p>A traceable "identity check" of the appliances visited during sampling will be performed and recorded (e.g. a picture of the appliance clearly showing its serial no., etc.).</p>		Weighscale	Thermometer	Accuracy	± 1 gramm	Not specified	Calibration	According to the EB 79 Annex 3: Project standard vers.07 par 56 f: equipment is calibrated either in accordance with the local/national standards, or as per the manufacturer's specifications. If local/national standards or the manufacturer's specifications are not available, international standards may be used.	
	Weighscale	Thermometer								
Accuracy	± 1 gramm	Not specified								
Calibration	According to the EB 79 Annex 3: Project standard vers.07 par 56 f: equipment is calibrated either in accordance with the local/national standards, or as per the manufacturer's specifications. If local/national standards or the manufacturer's specifications are not available, international standards may be used.									
Monitoring frequency:	The CME may decide to do annual or biennial monitoring of the parameter									
QA/QC procedures:	Results of the CCT will be stored in an electronic database and will be stored for a minimum of 2 years after the end of the crediting period of the CPA. Cross-checks: The monitoring team will cross-check results with literature values, or specifications from manufacturer, if available.									
Purpose of data	Calculation of baseline emissions									

Additional comment:	A value of 511 g/kg has been applied for the purposes of ex-ante calculations as per page 2 of GTZ SUN ENERGY (2011)_Memo, Result of stove testing.
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Data / Parameter:	$N_{inst,i,y}$
Data unit:	n/a
Description:	Number of specific ICSs distributed to specific institutions until the end of the monitoring period y adjusted by implementation dates. The adjustment accounts for the fact that stoves do not start to save CO ₂ simultaneously, but each stove starts saving CO ₂ as soon as it is sold and implemented.
Source of data:	Sales Record Database
Value(s) applied	Will be determined during monitoring.
Measurement methods and procedures:	$N_y = \sum_{i=1}^{i=I_y} \frac{daystotal}{mp_{length}}$ <p>Where: I_y total number of ICSs distributed till the end of the monitoring period y $daystotal_i$ sum of days since appliance i has been operational in the monitoring period y. Start of operation is assumed as one week after sales.</p>
Monitoring frequency:	Continuously in the distribution database
QA/QC procedures:	Data will be collected using the standard procedures and will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.
Purpose of data	Calculation of baseline emissions
Additional comment:	

Data / Parameter:	$FW_{inst,i,y}$
Data unit:	%
Description:	Proportion of fuel wood consumed for cooking by a specific ICS, used as discount factor for continued use of baseline stoves in the monitoring period y, where ICSs are applied to institutions in general.
Source of data:	To be defined in a survey at the time of CPA.
Value(s) applied	The discount factor for the institutional stoves is to be determined at the time of CPA inclusion, since the relevant data for the institutional rocket stoves are not available.
Measurement methods and procedures:	Determined in a survey at the time of CPA inclusion or monitored continuously.
Monitoring frequency:	The CME may decide to do annual or biennial monitoring of the parameter

QA/QC procedures:	Data will be collected using the standard procedures and will be stored for the CPA crediting period and an additional two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.
Purpose of data	Calculation of baseline emissions
Additional comment:	

Data / Parameter:	$DO_{i,y}$
Data unit:	%
Description:	Discount factor, statistically adjusted drop out from total population of a specific ICSs in period y
Source of data:	Primary data collection: A representative sample of institutions will be visited by dedicated monitoring team
Value(s) applied	0% (For ex-ante calculations, no drop out is assumed, supposing a full replacement of non-operational or non-identifiable ICSs.)
Measurement methods and procedures:	All formulae applied to determine the statistical precision are standard formula. Furthermore, according to AMS-II.G., par.22 the sampling error has to be deducted (" <i>...the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen...</i> ") in the event that 90/10 or 95/10 precision could not be achieved because of a small sample size. No deductions have to be made if 90/10 or 95/10 precision is achieved by sampling an appropriate number of appliances.
Monitoring frequency:	The CME may decide to do annual or biennial monitoring of the parameter
QA/QC procedures:	Data will be collected using the standard procedures and will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later. A traceable "identity check" of the appliances visited during sampling shall be performed and recorded (e.g. a picture of the appliance clearly showing its serial no., etc.).
Purpose of data	Calculation of baseline emissions
Additional comment:	

B.7.2. Description of the monitoring plan for a generic CPA

There will be a continuous documentation of all ICS distributions in a centralized database. For the preparation of monitoring reports, samples will be drawn from the centralized database and the corresponding stoves will be examined regarding efficiency and usage.

The CME will hold the responsibility for all procedures related to monitoring, but it will cooperate with regional or local institutions involved in ICS distribution.

The flow chart below describes the general monitoring procedure (Figure).

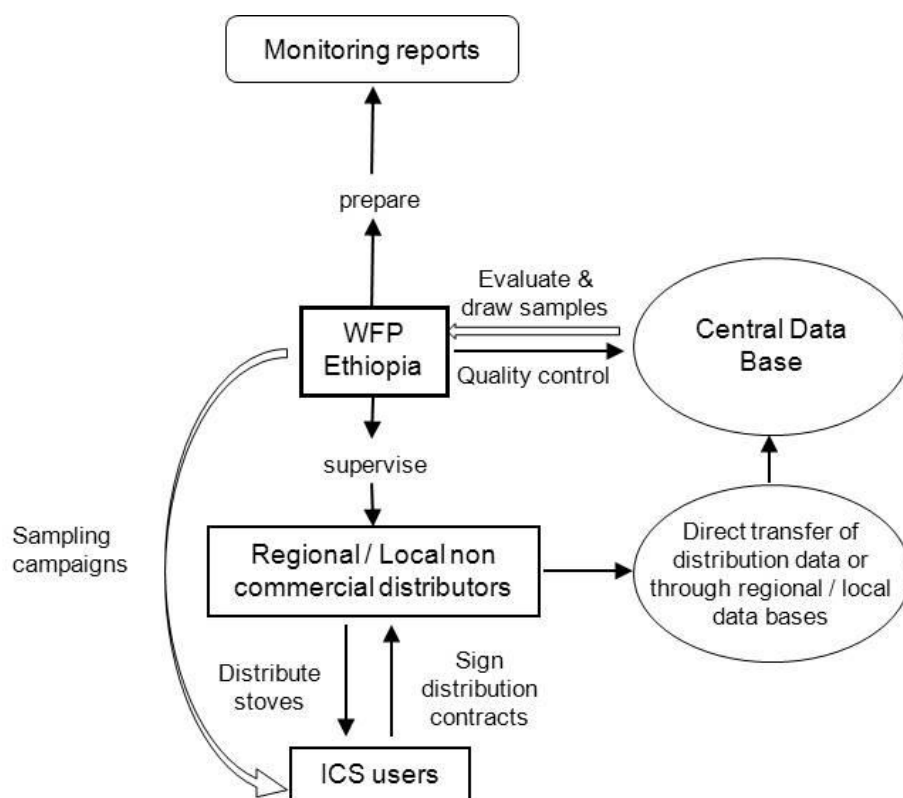


Figure 8. Flow chart of monitoring procedure (may be slightly modified according to CPA circumstances)

Central database

A central database will be operated and maintained by the CME to ensure completeness and accuracy of monitoring information. The basic information for ICSs distributed to institutions will be⁴³:

- Unique number (Stove-ID) of system
- Sales date of appliance
- Contact details of the institution (type of institution, address, responsible person, etc.)
- Distributing Entity or Contact Person within distributing entity
- Number of eaters at each institution (e.g. derived from number of pupils per school), annually updated

The information in these databases will be updated continuously, whenever new data (distribution contracts) are available. Original copies of the distribution contracts (or whatever format is used to collect the data required) will be kept and maintained for two years after the end of the crediting period.

Stove IDs

⁴³ The record keeping system should collect as many information as necessary to facilitate the Verification of the CERs. At the current point of time the list of information seems ideal but may be extended or condensed. The collection of all the items is therefore not mandatory and additional information may be collected as well.

Each ICS will obtain a unique number which facilitates its identification in the data base and avoid double counting. These unique numbers will be provided by the CME and shall be inserted in the distribution contract at the moment of distributing the stove.

It is planned to make the unique numbers visible on the ICSs, for example by blowtorching numbers on the stove material. The physical attachment of labels to ICSs shall facilitate stove identification, but identification can also be achieved through other data indicated in the data base in cases where physical labels have not been attached to ICSs, especially in the case of the built-in Mirt stoves.

Sampling campaigns

Sampling campaigns consist in generating extracts of the central database for checks in order to prepare the monitoring reports. A representative number of ICSs will be selected randomly for site visits in order to check the following monitoring parameters:

- operability (yes/no), in order to determine the drop out rates for a specific stove ($DO_{i,y}$).
- thermal efficiency ($\eta_{ICS,y}$) and specific fuelwood consumption ($SC_{Mirt,y}$) (if applied) of a specific stove, tested according to the Water Boiling Test protocol, or the Controlled Cooking Test respectively.
- number of eaters per ICS. The variable $eaters_{inst,i,y}$ will be updated annually for each institution where an ICS has been distributed under the PoA; therefore, no sampling is done in this case.
- continued use of baseline stoves or other stoves than the ICS monitored ($FW_{inst,i,y}$)

Different sample sizes can be selected for each of these parameters.

Sampling Plan

The Sampling Plan outlined below is in accordance with the standard for sampling and surveys for CDM project activities and programme of activities (EB 50 Annex 30 STAN, version 4.1 including Amendment to version 4.1 EB 80 Annex 07).

4. Sampling Design

a. Objective and Reliability Requirements

i. Objective of the sampling effort

Due to the high number of appliances to be deployed an annual check of all appliances is not feasible.

- Sampling is utilized to indicate that all the appliances deployed are still operating or to record end of operation and/or replacement of the appliances which will allow determination of the statistically adjusted annual or biennial value for drop out ($DO_{i,y}$). In cases where non-functional ICSs are replaced, this replacement will be made with new appliances; thereby it is guaranteed that replaced stoves operate at high efficiency.
- Sampling methods may also be applied to determine the annual or biennial values for the thermal efficiencies of the ICSs in use ($\eta_{inst,i}$ and $SC_{Mirt,y}$ (if applied)), the annual or biennial values for the average number of eaters for household ICSs ($eaters_{inst,y}$) and the annual or biennial values for continued use of baseline stoves or other stoves than the ICS monitored ($FW_{inst,i,y}$).

Therefore the sampling effort will provide data for the following parameters:

$DO_{i,y}$, $\eta_{inst,i,y}$, $eaters_{inst,i,y}$, SC_{Mirt} (if applied) and $FW_{inst,i,y}$.

ii. Timeframe

The time frame for the parameters, i.e. annual or biennial, depends on selected inspection frequency which is at discretion of CME provided confidence/precision requirements are met, according to AMS-II.G., par. 28.

iii. Estimated parameter values

The estimated parameter values are as per the values used for ex-ante calculation of emission reductions (please refer to Section B.6.2. of the this generic CPA-DD in PoA DD Part III).

iv. Sampling requirements as per sampling standard and applicable methodology

Precedence of methodology

Par. 3 of the Sampling Standard, EB 50 Annex 30 STAN, version 4.1 clarifies that “[...] *any requirements specified in the applicable methodologies having precedence*”.

Coverage of sampling requirements in the applicable methodology:

As per applicable methodology AMS-II.G ver 5. par. 28, *“when biennial inspection is chosen a 95% confidence interval and a 5% margin of error requirement shall be achieved for the sampling parameter. On the other hand when the project proponent chooses to inspect annually, a 90% confidence interval and a 10% margin of error requirement shall be achieved for the sampled parameters. In cases where survey results indicate that 90/10 precision or 95/10 precision is not achieved, the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve the 90/10 or 95/10 precision”*.

Additional requirement for PoAs as per sampling standard

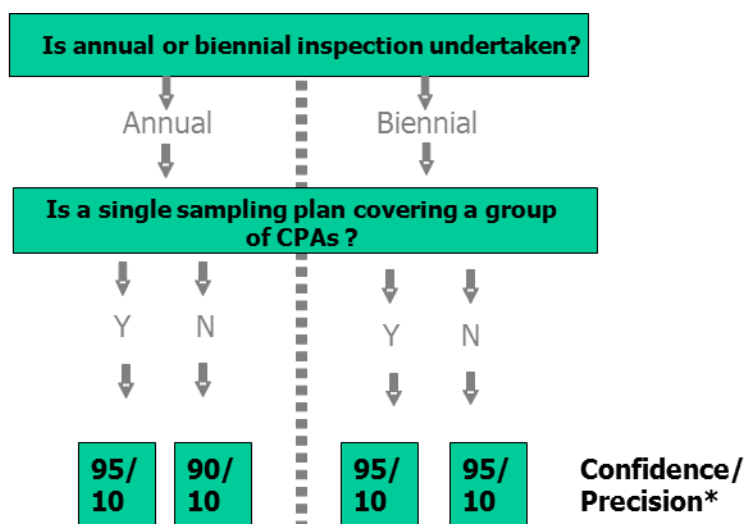
In case a single sampling plan for more than one CPA is used, *“parameter values shall be estimated by sampling in accordance with the requirements in the applied methodology separately and independently for each of the CPAs included in a PoA except when a single sampling plan covering a group of CPAs is undertaken applying 95/10 confidence/precision for the sample size calculation”*, as per EB 50 Annex 30 STAN, version 4.1 including Amendment to version 4.1 EB 80 Annex 07.

Furthermore, according to par. 37. EB 55 Annex 38 (PROCEDURES FOR REGISTRATION OF A PROGRAMME OF ACTIVITIES)⁴⁴ a request for issuance includes all CPAs which are included under the PoA. Sampling may therefore be across CPAs and hence a single sample plan may be applied, to reduce monitoring efforts.

v. Confidence/precision criteria to be met

As mentioned above, according to AMS-II.G ver 5, par. 28, confidence/precision criteria to be met is determined as follows:

⁴⁴ UNFCCC (2010)_PROCEDURES FOR REGISTRATION OF A PROGRAMME OF ACTIVITIES_ EB 55, Annex 38, http://cdm.unfccc.int/Reference/Procedures/PoA_proc01.pdf



*due to methodology precedence

Note: As per par. 28 of AMS-II.G ver. 5 the lower bound can also be used instead of repeating the survey efforts to achieve the required confidence/precision level

b. Target Population

i. Definition

For the monitoring parameters $DO_{i,y}$, $SC_{Mirt,y}$ (if applied) and $\eta_{inst,y}$, the target population consists in all ICSs which are included until the end of the specific monitoring period.

For the monitoring parameter $eaters_{inst,i,y}$, and $FW_{inst,i,y}$ if not determined ex-ante, the target population consists in all ICSs of a specific type which are included up to the specific monitoring period; however households where stoves are found to be not operational will not be considered to determine $eaters_{inst,i,y}$ and $FW_{inst,i,y}$.

ii. Description of particular features associated with it (if applicable)

There are no particular features associated with the target population.

c. Sampling method

i. Description and justification of selected sampling method

The sampling procedure is a simple random sampling process which samples households across all the CPAs deploying the same ICS type. Also multi-stage sampling may be applied if deemed suitable by the CME.

To reduce monitoring efforts a common sample is drawn from the central database based on which all of the parameters shall be monitored. As already stated above, the database may include stoves from several CPAs and a sample may be drawn across CPAs. The largest number for the sample size will be chosen for the sampling effort with one common survey for all parameters determined in Section B.7.1 of the PoA DD PartIII except for $\eta_{inst,y}$ and $SC_{Mirt,y}$ (if applied). For the monitoring of $\eta_{inst,i,y}$ and $SC_{Mirt,y}$ (if applied) a random sub-sample from the common sample will be drawn according to the calculated sample size of the parameter.

However this does not imply that for each of the parameters the same number of users/appliances has to be monitored during sampling. The CME will determine the number of users/appliances monitored during sampling for each of the parameters separately. The reason is that the variation

within the values obtained will be different for each parameter. Since the precision of a sampled parameter depends on the variation of its values, the necessary number of users/appliances to be monitored in order to achieve the confidence/precision as mentioned above will also depend on the variation of values. Therefore, although the monitoring team will undertake monitoring of various parameters simultaneously and on the same sample group, the CME may decide to stop monitoring of a particular parameter during the campaign once the required precision for this parameter is achieved. The monitoring team will continue to monitor appliances in the sample with respect to the remaining parameter(s) until the required precision for these parameters is achieved.

Random distribution

The method of selecting users to be included in the sample for deployed appliances will be random using simple random sampling or multistage sampling. All random selections will be stored for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later. In this way the traceability of the selection is assured.

ii. Identification of strata or clusters if applicable

Optionally, multistage sampling may be conducted. For each monitoring period y contact details from users are collected. In order to obtain a final representative selection, the study area may for example be divided into geographical units. A sample of *Woredas* or villages may be selected randomly for each monitoring period y from the sample database by “probability proportional to size”-sampling, i.e. units with a higher number of appliances deployed will have a higher chance to be selected than those with a smaller number of appliances. Within the selected units, ICS users will then be selected randomly.

d. Sample size: Estimated target number of units and justification

The following assumptions are applied to calculate the sample size for the different sampling options. Please note: The assumptions are valid at time of submitting the PoA-DD for registration and the specific CPA-DD for inclusion. If at the time of sampling, more up to date figures or information available (e.g. from previous monitoring campaigns or from other projects applying the same technology or updated guidance or best practice examples by the EB) can be applied to do a more accurate sampling, and these may be used to determine the sample size. Justification will be provided to the verifying DOE.

Expected parameter values on the illustrated on the example of a school institutional rocket stove

Parameter of interest	Expected value	Source efficiency of	Estimated standard deviation	Source of estimated SD
$DO_{i,y}$	10% (corresponding to 90% found in use)	Estimate based on existing projects	Not applicable since the parameter is a proportion	Not applicable
$\eta_{inst,i,y}$	42%	See B.6.3	1%	GTZ SUN ENERGY Project (2010)_WBT Results Institutional Rocket and Tikikil stoves
$eaters_{inst,i,y}$ (rough estimate)	600	See B.6.3	30%	Estimate based on school survey

$FW_{inst,i,y}$	90%	See B.6.3	20%	Estimate
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Equations used for calculation of sample size according to EB 69, Annex 5 (Best practice examples focusing on sample size and reliability calculations) for simple random sampling:

Parameter $DO_{i,y}$ (par. 16ff.)

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

Where:

n	Sample size
z	Z value for confidence level (e.g. 1.645 for 90% confidence level)
N	Total number of households
p	Expected proportion
E	Relative precision (e.g. 0.1 for 10% precision)

Parameter $\eta_{i,y}$, $eaters_{inst,i,y}$ and $FW_{inst,i,y}$:

$$n \geq \frac{z^2 NV}{(N-1) \times E^2 + z^2 V}$$

Where:

V	$\left(\frac{SD}{mean}\right)^2$
n	Sample size
N	Total number of households
mean	Our expected mean
SD	Our expected standard deviation
E	Relative precision (e.g. 0.1 for 10% precision)
z	Z value for confidence level (e.g. 1.645 for 90% confidence level)

Estimated sample size for different sampling options according to equations above:

Estimated sample size for random sampling illustrated on the example of a school institutional rocket stove

Parameter	Timeframe	Confidence/ Precision	Estimated value	Expected Variance/ Standard deviation	Estimated Sample Size	Applied sample size
$DO_{i,y}$	biennial	95/10		0.09	xx	xx
$\eta_{inst,i,y}$	biennial	95/10	0.42	0.01	xx	xx
$eaters_{inst,i,y}$			600	0.30	xx	xx
$FW_{inst,i,y}$	biennial	90/10	0.90	0.20	xx	xx

DO _{i,y}	one annual	CPA	90/10		0.09	xx	xx
$\eta_{inst,i,y}$	one annual	CPA	90/10	0.42	0.01	xx	xx
$eaters_{inst,i,y}$				600	0.30	xx	xx
$FW_{inst,i,y}$	one annual	CPA	90/10	0.90	0.20	xx	xx
DO _{i,y}	across annual	CPA	95/10		0.09	xx	xx
$\eta_{inst,i,y}$	across annual	CPA	95/10	0.42	0.01	xx	xx
$eaters_{inst,i,y}$				600	0.30	xx	xx
$FW_{inst,i,y}$	across annual	CPA	95/10	0.90	0.20	xx	xx

* Value for DO_{i,y} is referring to the expected variance. The value has been calculated according to the following formula: $p_i(1-p_i)$ (reference: CDM-EB67-A06-GUID Par. 42). For all other values the standard deviation is applied, since it is used for the calculation of sample sizes.

The largest number for the sample size will be chosen for the sampling effort with one common survey for all parameters determined in Section B.7.2 of the PoA DD Part III except for $\eta_{inst,i,y}$. For the monitoring of $\eta_{inst,i,y}$ a random sub-sample from the common sample will be drawn according to the calculated sample size of the parameter.

Multi-Stage Sampling

No sufficient data are available for an example sample size calculation. The following sampling framework provided for multistage sampling is according to EB 67 Annex 06 GUID vers.03, Guideline of sampling and surveys for CDM project activities and programme of activities.

The sampling approach of multistage sampling samples households of one CPA. Sampling across several CPAs is also possible when the same ICS type is deployed under these CPAs. In order to obtain a representative selection of stoves to be monitored, the total population of appliances is divided into sub-groups (clusters) e.g. geographical units like Woredas or villages. In a first step of multistage sampling a representative number of clusters is randomly selected. In a second step a pre-determined number of households will be randomly selected from within the selected clusters. These sampled households will be monitored.

The multistage sampling can be extended further to three or more stages.

Step 1.

The sample size on the cluster level will be calculated after the formula given in EB 67 Annex 06 GUID vers.03 par. 41 Equation 16:

$$c \geq \frac{\frac{SD_B^2}{\bar{p}} \times \frac{M}{M-1} + \frac{1}{\bar{u}} \times \frac{SD_w^2}{\bar{p}} \times \frac{(\bar{N}-\bar{u})}{(\bar{N}-1)}}{\frac{E^2}{z^2} + \frac{1}{M-1} \times \frac{SD_B^2}{\bar{p}}}$$

Where:

- c Number of clusters to be sampled
 M Total number of clusters
 \bar{u} Number of units to be sampled per cluster (pre-specified as 10 HH)
 \bar{N} Average Number of units per cluster
 SD_B^2 Unit variance (e.g. variance between woredas)
 SD_W^2 Average of the cluster variances (average within woreda variation)
 \bar{p} Overall proportion

 E Relative precision (e.g. 0.1 for 10% precision)
 z Z value for confidence level (e.g. 1.645 for 90% confidence level, 1.96 for 95% confidence interval)

The framework for calculation of c for the parameter $DO_{ICS,y}$ will for example be the following:

Cluster	Stoves deployed	Proportion p of cook stoves in operation (DOy)	Variance within State ($\pi(1-\pi)$)
A	N_A	p_A	a
B	N_B	p_B	b
C	N_C	p_C	c
D	N_D	p_D	d
E	N_E	p_E	e
F	N_F	p_F	f
G	N_G	p_G	g
\bar{N}^*	$(N_A + N_B + N_C + N_D + \dots)/M$		
\bar{p}^*		$(p_A + p_B + p_C + p_D + \dots)/M$	
SD_B^{2*}		See below	
SD_W^{2*}			See below
M (number of clusters)	M		
	AMS II G Annual	AMS II G Biennial	PoA Single S- Plan
	90/10	95/10	95/10
z	1.645	1.96	1.96
E	0.1	0.1	0.1

* Calculated values

$$SD_W^2 = \frac{a + b + c + d + \dots}{M}$$

$$SD_B^2 = \frac{\sum_{i=1}^n (p_i - \bar{p})^2}{n-1}$$

For different pre-defined number of units to be sampled per cluster (\bar{u}), different sample sites for c will result:

Example results table with input parameter u

u (number of HH per cluster)	Required number of clusters (c)	Total number of HH
10	27	270
20	24	480
25	24	600
30	23	690
40	23	920

Which of the clusters will be included in the sample is determined by “probability proportional to size”-sampling, i.e. clusters with a higher number of appliances deployed will have a higher chance to be selected than those with a smaller number of appliances.

Step 2.:

The households to be sampled within the selected clusters c , will be selected by simple random sampling by means of a computerized randomizer.

e. Sampling Frame

i. Identification or description of sampling frame

The sampling frame is the list containing all ICSs included until the end of the specific monitoring period.

ii. List of sampling frame (if known)

The full list of all ICSs included will only be available after the end of the specific monitoring period. At the time of submitting the PoA for registration and the first specific CPA for inclusion, there is no complete list available since full roll-out of stove deployment will only happen after PoA registration.

Example of the sampling frame:

Serial number (Stove-ID) of system	Delivery date of appliance (to user)	User details (Name, Address, etc.)	Administrative unit
1	xx/xx/2xxx	XXX	XXX
2	xx/xx/2xxx	XXX	XXX
3	xx/xx/2xxx	XXX	XXX

...
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5. Data to be collected

a. Field Measurement

i. Identification of all variables to be measured

The following variables are measured for determining the parameter values of:

Parameter	Description
$DO_{i,y}$	Statistically adjusted drop out from total population of appliances in period y
$\eta_{inst,i,y}$	Adjusted average efficiency of the system being deployed as part of the CPA
$eaters_{inst,i,y}$	Average number of eaters for whom meals are prepared on the ICS
$FW_{inst,i,y}$	Proportion of household fuel wood consumed by the ISC, used as discount factor to account for continued use of baseline stove or other stove than monitored ICS

ii. Determination of appropriate timing

In general (under normal circumstances), measurements will be conducted at the latest 6 months after the end of the specific monitoring period.

Therefore:

In general (under normal circumstances), the measurement will be conducted at the latest 12 + 6 months after the start of the specific monitoring period (annual monitoring) or at the latest 24 + 6 months after the start of the specific monitoring period if biennial inspection is chosen.

iii. Frequency of measurements

All measurements will be one time measurements, i.e. for the determined number of samples the measurement will only be conducted once per sample. However, this does not imply that every household can only be contacted once (see below).

iv. Demonstration that parameter of interest is not subject to seasonal fluctuations if measurements are conducted only during limited time periods or demonstrate that selected time period is conservative or corrections are applied

$DO_{i,y}$: Drop outs are recorded when users are found to not use the stove any longer. It is expected that the chance a stove is no longer in use is increasing over time for various reasons however seasonal effects will have no impact on the general stove usage. $DO_{i,y}$ is determined by asking the user a yes or no question.

$\eta_{inst,i,y}$: The WBT protocol is applied to measure the efficiency of the ICS deployed. The WBT protocol takes seasonal effect such as variations of wood moisture in the different seasons into consideration by calculating the efficiency of the stove depending on the actual wood moisture.

$eaters_{inst,i,y}$ is determined by asking the user about average number of eaters during the specific monitoring period. This question does not depend on the season when the survey is conducted. The average number of eaters will change over time due to changes in family size; however, this is not affected by seasonal fluctuations.

$FW_{inst,i}$ is not influenced by seasonal changes since eating habits do not change over the year.

v. Description of measurement methods

$DO_{i,y}$: Drop outs will be either determined through monitoring recording sheets by the users themselves or through interviews where it will be checked if the appliances are still operational. Interviews will be reported in a questionnaire.

$\eta_{inst,i,y}$ is determined applying the WBT protocol (see B.4, and B.7.1). Tests will be reported in spreadsheet templates. All equipment used will fulfill the requirements of EB 61 Annex 21 par. 17. (c).

$eaters_{inst,i,y}$: The average number of eaters will be either determined through monitoring recording sheets by the users themselves, or through interviews. Interviews will be conducted using a questionnaire.

$FW_{inst,i,y}$: This parameter will be determined through monitoring recording sheets by the users themselves, or through interviews. Interviews will be conducted using a questionnaire. A question will be added in the questionnaire asking the user what percentage of the total wood used for cooking is used in the ISC.

b. Quality Assurance/ Quality Control

i. Procedures for conducting the data collection and/or field measurements

Data collected and processed by the field staff will be checked regularly by the CME or a person dedicated by the CME.

Training of field personnel

All personnel involved in the monitoring will be trained to ensure that each of them undertakes an appropriate monitoring assignment according to the Monitoring Plan. Any personnel involved in the monitoring will be trained by the CME or by or a person dedicated by the CME before performing any monitoring activities. Only people who are trained are qualified to be involved in the monitoring.

Provisions for maximizing response rates

Documentation of out-of-population cases, refusals, other sources of non-responses

- Refusals and non-respondents

Refusals and non-respondents (i.e. households where the contact could not be established) will be recorded by the monitoring team as well as the reason for the refusal.

In case a household or institution refuses to participate in the monitoring effort, the monitoring team will record the reason for the refusal and decide whether or not the refusal is due to a likely non-use of the ICS. If the CME decides that the refusal is due to a likely non-use of the stove, this stove will count as Drop-Out. If the reason is e.g. a time constraint that cannot be solved by repeating the survey effort at this end user at another date, the household or institution will be replaced by another.

ii. Procedure for defining outliers and under what circumstances outlier data/measurements may be excluded and/or replaced

CME will apply the “3 sigma rule”: All values outside 3 standard deviations from the mean will be excluded. See also: http://en.wikipedia.org/wiki/68-95-99.7_rule

Other appropriate measures to define and exclude outliers may also be used.

c. Analysis: Describe how the data will be used

Data will be used to calculate emission reductions achieved during the specific monitoring period according to the equations provided in Section B.6.1 of the PoA-DD. The CME is responsible for preparing the Monitoring Report.

6. Implementation Plan

a. Schedule for implementing the sampling effort

As mentioned above, the schedule for implementing the sampling effort shall be: within 6 months after the end of the specific monitoring period the sampling effort can be finalized.

b. Skills and resources required for data collection and the analyses, general description of qualifications and experience

The CME will assign the people, entities or qualified third parties responsible for the data collection and analysis. The CME will ensure that the qualification and experience of the person or entity involved is adequate for the specific tasks to be performed by the person or entity.

Other sampling methods which may be more practical and cost effective may alternatively be used, while considering the most recent standard and best practice examples for sampling and surveys for small-scale CDM project activities. If this is the case, the DOE will have to verify at verification stage that the sampling method was statistically sound and as robust as the approaches presented in this PoA-DD.

Appendix 1. Contact information of coordinating/managing entity and responsible person(s)/ entity(ies)

CME and/or responsible person/ entity	<input checked="" type="checkbox"/> CME <input checked="" type="checkbox"/> Responsible person/ entity for application of the selected methodology(ies) and, where applicable, the selected standardized baseline(s) to the PoA
Organization	World Food Programme Ethiopia
Street/P.O. Box	Off Olompya/ Haile Gebreselassie Road, P.O.Box 25584
Building	Kebele 17/18 River Side Hotel PLC
City	Addis Ababa, Kirkos Sub City
State/Region	Oromia
Postcode	1000
Country	the Federal Democratic Republic of Ethiopia
Telephone	00251 115515188
Fax	00251 115514433
E-mail	
Website	www.wfp.org/ www.wfp.org/countries/ethiopia
Contact person	Keton Sankei
Title	Programme Officer
Salutation	Mr
Last name	Sankei
Middle name	

Appendix 2. Affirmation regarding public funding



United Nations
World Food Programme

Programa
Mundial
de Alimentos

Programme
Alimentaire
Mondial

برنامج
الأغذية العالمي

The Food Aid Organisation of the United Nations System

REF: CC53/13

08 November 2013

To Whom it May concern

World Food Program in collaboration with the government of Ethiopia is developing a Program of Activities under the modality of Clean Development Mechanism under a theme: Ethiopia Improved Cook Stove Initiative. This process has reached a validation stage which has already started after which the distribution starts.

We confirm that there has been no Official Development Assistance received and used for this program in view of the Certified Emission Reduction.

Sincerely yours,

Hakan Tongul
Head of Programmes



✉ 25584 code 1000
Addis Ababa
Ethiopia

☎ 011-5515188

FAX: 011-5514433

Appendix 3. Applicability of methodology(ies) and standardized baseline(s)

- Format of distribution contract to be signed by stove users

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

- Excel sheet "preliminary ER calculation WFP Ethiopia"
- Mirt WBT testing report

Appendix 5. Further background information on the monitoring plan

Appendix 6. Summary of post registration changes

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	25 June 2014	<p>Revisions to:</p> <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the programme design document form for small-scale CDM programme of activities (these instructions supersede the "Guideline: Completing the programme design document form for small-scale CDM programme of activities" (Version 03.0)); • 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 Fehler! Verweisquelle konnte nicht gefunden werden.; • Change the reference number from <i>F-CDM-SSC-PoA-DD</i> to <i>CDM-SSC-PoA-DD-FORM</i>; • Editorial improvement.

<i>Version</i>	<i>Date</i>	<i>Description</i>
02.0	13 March 2012	EB 66, Annex 13 Revision required to ensure consistency with the "Guidelines for completing the programme design document form for small-scale CDM programmes of activities".
01.0	27 July 2007	EB33, Annex43 Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Registration Keywords: programme of activities, project design document, SSC project activities		