Component project activity design document form for small-scale CDM component project activities

(Version 04.0)

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

COMPONENT PROJECT DESIGN DOCUMENT (CPA-DD)	
Title of the CPA	Improved Cook Stoves programme for Rwanda #CPA2 Cameroon
Version number of the CPA-DD	2
Completion date of the CPA-DD	28/01/2016
Title of the PoA to which the CPA is included	Improved Cook Stoves programme for Rwanda
Host Party	Republic of Cameroon
Estimated amount of annual average GHG emission reductions	20,952

SECTION A. General description of CPA

A.1. Title of the proposed or registered PoA

>>
Improved Cook Stoves programme for Rwanda
http://cdm.unfccc.int/ProgrammeOfActivities/poa_db/J8SI1GZNVU6FQ7KC24OA3LE50WDTRH/view

A.2. Title of the CPA

>>
Title: Improved Cook Stoves programme for Rwanda #CPA2 Cameroon
Version: 2
Date of completion: 28/01/2016

A.3. Description of the CPA

>>
The project activity aims at reducing the fuel wood consumption of households by disseminating energy efficient stoves at subsidized prices in Cameroon.

The project activity is being implemented by Pro Climate International Cameroon (distributor) and/or other IEs. Users of the Improved Cookstoves (ICS) will be households that used inefficient three-stones-fireplaces or charcoal stoves prior to implementation of the project activity.

Cameroon has recorded significant damage to its ecosystems in the last several decades following the unsustainable use and exploitation of natural resources. An estimated 73.5% of the Cameroonian households use wood for cooking[1] which translates to a fuel wood consumption of 17,359,000 cubic meters for the year 2010[2].

The project activity proposes to replace traditional stoves with improved cook stoves of the type Save80, which can save up to 80% of fuel wood. This reduction in fuel wood and charcoal consumption will lead to reduction of greenhouse gas emissions from the use of non-renewable biomass and reduction in the household's average expenditure for fuel wood.

The project activity's contribution to sustainable development is as follows:

Environment

The project activity will help to preserve the existing forests due to current consumption activities of biomass, particularly woods. Furthermore, it will help preventing adverse changes in the ecosystem as a result of deforestation leading to erosion which could harm the local community.

The use of ICS will reduce the pressure placed on local forests (as firewood resources and for the production of charcoal) through less amount of woody biomass being consumed. Also, it will help preventing woody biomass from being harvested faster than it is being grown.

Social

The implementation of the project activity will create temporary and permanent employment opportunities through dissemination, assembly, and customer support activities. Other opportunities will come from monitoring activities which may also involve people from the local community.

[1] Improved cookstove as an appropriate technology for the Logone Valley (Chad – Cameroon): Analysis of fuel and cost savings by Vaccari et al (http://www.sciencedirect.com/science/article/pii/S0960148112002492)

[2] http://data.un.org/Data.aspx?q=fuelwood&d=EDATA&f=cmID%3aFW [Accessed 10.07.2015]

Economic

The project activity will result in substantial fuel cost savings by reducing the wood consumption for cooking. Thus, local people will have opportunity to enjoy a higher standard of living and they will acquire knowledge about energy and environmental conservation.
For households currently cooking with collected wood, the application of more efficient stoves will reduce time spent by the community collecting firewood resulting in more time available for performing income-generating activities.

A.4. Entity/individual responsible for the operation of CPA

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The project activity is being implemented by the Implementing Entity (IE) Pro Climate International Cameroon (distributor) and/or other IEs. atmosfair gGmbH is the CME of the PoA.

A.5. Technical description of the CPA

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The proposed project activity falls under Sectoral Scope 3: “Energy demand”.

The SSC-CPA will apply SAVE80 cookstove, a state of the art of technology for efficient stove. It is a portable stove made of stainless steel, developed and prefabricated by a German manufacturer and constructed locally to create employment and income. As per specification of the manufacturer, the SAVE80 needs only about 250 g of small brittle sticks of wood to bring 6 litres of water to the boil, 80% less than traditional fire places and has a specified thermal efficiency of 52%[3]. The design ensures preheating of the air and a complete combustion with no visible smoke and only small amounts of ash.

Design of the SAVE80 may develop over time. There is no technology transferred, however there will be know-how transfer of stoves construction. The parts of the SAVE80 stoves to be distributed to the users will be imported from Germany and constructed at the project site by the CPA implementing entities under guidance of the CME. The stoves used in the CPA will be newly produced stoves (no equipment transfer from existing project site).

SAVE80 type stove is a simple technology based on scientific concepts and easy to operate. It has been used in several countries[4] and is proven to be satisfying[5,6.] The technology and know-how used in the project activity is environmentally safe and sound. As long as users follow the procedure for operation and regular maintenance, problems or damage can be minimized.

[3] See manufactures specifications

[4]Report covering the mission “stove Save 80” in refugee camps in eastern Chad: bigee_residential_cooking_stoves_good_practice_save80

[5] http://www.rwe.com/web/cms/en/113648/rwe/press-news/press-release/?pmid=4004208

[6] http://www.bioenergylists.org/files/Save80_0.pdf

Figure A.2.1: Indicative design of the SAVE80 system

A.6. Party(ies)

Name of Party involved (host) indicates host Party	Private and/or public entity(ies) CPA implementer(s) (as applicable)	Indicate if the Party involved wishes to be considered as CPA implementer (Yes/No)
Republic of Cameroon (host)	atmosfair gGmbH (Private entity)	No

A.7. Geographic reference or other means of identification

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The geographical area within which the CPA will be implemented, is the Republic of Cameroon

Geographic coordinates: 6.0000°N 12.000°E[7]

Figure: Map of Cameroon

[7] https://www.cia.gov/library/publications/the-world-factbook/geos/cm.html

All appliances disseminated under this CPA shall have a unique serial number, allowing to doubtlessly identifying the appliance and its corresponding CPA.

A.8. Duration of the CPA

A.8.1. Start date of the CPA

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The expected starting date of the CPA is 01/08/2016.

According to Paragraph 67 of the Report on 41st meeting of the Executive Board of the Clean Development Mechanism, "the start date shall be considered to be the date on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity. This, for example, can be the date on which contracts have been signed for equipment or construction/operation services required for the project activity. Minor pre-project expenses, e.g. the contracting of services /payment of fees for feasibility studies or preliminary surveys, should not be considered in the determination of the start date as they do not necessarily indicate the commencement of implementation of the project."

The start date is the date the CME expects to place the first order to the stove manufacturer for all components and equipment to be used for the distribution of stoves within the project.

A.8.2. Expected operational lifetime of the CPA

>>
10 years and 0 months

A.9. Choice of the crediting period and related information

>>
Fixed crediting period

A.9.1. Start date of the crediting period

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01/01/2017

A.9.2. Length of the crediting period

>>
10 years 0 months

A.10. Estimated amount of GHG emission reductions

Emission reductions during the crediting period	
Years	Annual GHG emission reductions (in tonnes of CO_2e) for each year
Year 1	20,952
Year 2	20,952

Year 3	20,952
Year 4	20,952
Year 5	20,952
Year 6	20,952
Year 7	20,952
Year 8	20,952
Year 9	20,952
Year 10	20,952
Total number of crediting years	10 years
Annual average GHG emission reductions over the crediting period	20,952
Total estimated reductions (tonnes of CO_2e)	209,521

A.11. Public funding of the CPA

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There is no public funding from Annex I countries involved in the implementation of the CPA. An ODA declaration has been provided to the DOE.

A.12. Debundling of small-scale component project activities

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As per section C of the PoA-DD, each CPA applying household ICS is exempted from the de-bundling check as a household subsystem cannot exceed the limit for the 1% of the small scale threshold in accordance with paragraph 10 of the "Guidelines on assessment of debundling for SSC project activities" Version 03 (EB 54, Annex 13).

A.13. Confirmation for CPA

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The small-scale CPA is neither registered as an individual CDM project activity nor is it part of another registered PoA. The proposed CPA is also not a CPA that has been excluded from a registered CDM PoA as a result of erroneous inclusion of CPAs.

A.14. Contact information of responsible persons/ entities for completing the CDM-SSC-CPA-DD-FORM

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Contact information of responsible person for completing the CDM-SSC-CPA-DD-FORM:

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Germany
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SECTION B. Environmental analysis

B.1. Analysis of the environmental impacts

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The PoA-DD states that the environmental analysis has been undertaken at the PoA level. Hence, an analysis of the environmental impacts for the CPA is not required.

SECTION C. Local stakeholder consultation

C.1. Solicitation of comments from local stakeholders

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The PoA-DD states that the Local Stakeholder Consultation has been undertaken at the PoA level. Hence, a Local Stakeholder Consultation for the CPA is not required.

C.2. Summary of comments received

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Refer section C.1 above.

C.3. Report on consideration of comments received

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Refer section C.1 above.

SECTION D. Eligibility of CPA and estimation of emissions reductions

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

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Title: Type II - Energy Efficiency Improvement Project
Reference: II.G. Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass
Version: 03, EB 60, (15 April 2011), valid since: 29/4/2011

The project activity falls under category II.G. Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass

https://cdm.unfccc.int/methodologies/DB/UFM2QB70KFMWLVO7LJN8XD1O2RKHEK

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

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The small-scale methodology AMS-II.G is applicable to the SSC-CPA as shown through the following criteria:

- ➢ *"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[8] biomass fired cook stoves[9] or ovens or dryers and/or improvement of energy efficiency of existing biomass fired cook stoves or ovens or dryers."*
- ✓ The project activity consists of dissemination of high efficiency biomass fired cook stoves, which are improving the efficiency compared to the existing stoves in use and improving the efficiency by avoiding the inefficient conversion of wood into charcoal. Therefore each CPA will save non-

[8] The efficiency of the project systems as certified by a national standards body or an appropriate certifying agent recognized by that body. Alternatively manufacturers' specifications may be used.

[9] Single pot or multi pot portable or in-situ cook stoves with specified efficiency of at least 20%.

renewable biomass which would otherwise be consumed by less efficient cooking appliances. The cookstoves disseminated under the project activity have a thermal efficiency of 40%.

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

✓ According to FAO data the total forest cover in Cameroon has decreased since 1990. The Forest Resource Assessment Country Report for Cameroon (2010) revealed that the total forest area declined by 18.1% between 1990 and 2010, as indicated in the table below. The annual deforestation rate of Cameroon accounts, according to the FAO, for 220.000 ha/an.[10]

Table: Cameroon's forest area

Hectares	1990	2000	2005	2010
Forest	24,316,475	22,116,475	21,016,475	19,916,475

Source: FAO country report 2010

The deforestation of mangrove forests is a big threat in Cameroon. In the FAO paper *'The world's mangroves 1980-2005'* a special focus is based on the situation in Cameroon. According to this publication, Cameroon's total mangrove area was 272,000 ha in 1980, but decreased to 250,000 ha in 2005. Moreover it is stated that especially in Cameroon *'the rapid growth of the human population and the resulting pressure on coastal environments lead to uncontrolled exploitation of mangrove trees'.* Another threat for mangrove forest in Cameroon is the *'absence of adequate legislation for mangrove protection"* as well as the pollution.[11] Based on the findings above, one can reasonably assume that non-renewable biomass has been used since 31 December 1989.

The estimated numbers of ICS proposed to be disseminated under the project activity are 10,000. The actual number of ICS deployed may differ. Once the limit of the SSC-CPA is reached, the CPA will be closed and only those ICS included in the CPA up to the limit of the SSC-CPA limit shall be considered for the specific CPA.

The corresponding saving in thermal fuel input energy per year is calculated as below:

$$\sum_i B_{old,appliance,i} \cdot N_{i,y} \cdot \left(1 - \frac{\eta_{old,i}}{\eta_{new}}\right) \cdot NCV_{biomass}$$

Parameter	Unit	Description
$B_{old,,appliance,\ i}$	T	Quantity of woody biomass used in the absence of the project activity in tonnes, per appliance
$N_{i,y}$	-	Total number of appliances operational in period y
$\eta_{old,i}$	%	Efficiency of the baseline device/s being replaced (fraction)
η_{new}	%	Efficiency of the device being deployed as part of the project activity (fraction)
$NCV_{biomass}$	TJ/t	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for fuel wood, 0.015 TJ/tonne)

Thermal energy in fuel input is calculated as: (Refer Section D.6.3 for sources of parameter values)

$$= \left[0.6305 \cdot 5.73 \cdot 10{,}000 \cdot \left(1 - \frac{10\%}{40\%}\right)\right] \cdot 0.015 \cdot \frac{1000}{3600} GWh_{th} = 112.90\ GWh_{th}$$

[10] FRA (2010) : Evaluation des ressources forestières mondiales 2010. Rapport national Cameroun. Page .9 ;25

[11] FAO (2007): The world's mangroves 1980-2005. Page 28; 30.

Therefore, it can be concluded that the annual energy savings resulting from efficiency improvements in the project activity will not exceed 180 GWh_{th} in any year of the crediting period.

D.3. Sources and GHGs

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As per the applied methodology AMS-II.G paragraph 9 "The project boundary is the physical, geographical site of the efficient devices that burn biomass." The geographical area within which the project activity will be implemented is the Republic of Cameroon. The assessment of sources and gases included in the project boundary are 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_2O	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_2O	No	Not required by methodology, only CO_2 Emission Factor for fossil fuels is considered.

D.4. Description of the baseline scenario

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As per AMS-II.G., it is assumed that in the absence of the PoA, the baseline scenario is the use of fossil fuels for meeting similar thermal energy needs. Therefore, emission reductions are calculated by multiplying the thermal energy from annual biomass savings stemming from non-renewable biomass with an emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis.

Part II – Section B.4 of the PoA DD defines 4 different scenarios for the calculation of baseline woody biomass consumption:

1) Household users currently predominantly cooking with efficient charcoal stoves
2) Household users currently predominantly cooking with inefficient charcoal stoves
3) Household users currently predominately cooking with wood
4) Institutional users (such as schools and prisons) currently cooking with wood

Since the project activity involved distribution of improved cookstoves in households, scenarios 1 to 3 have been considered for the project activity.

D.5. Demonstration of eligibility for a CPA

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Nr	Eligibility Criteria		Mean of proof	Monitoring Criteria	CPA situation
	Description	Conditions to be met			

1	Technological requirement	The CPA consists of distribution of one type of new ICS only as defined in the CPA-DD, and hence small appliances involving the efficiency improvements in the thermal applications of non-renewable biomass as per AMS-II.G.	Specification of stove type and compliance with the requirements of AMS-II.G. in the specific CPA-DD to be added	Number of stoves monitored	Only Save80 stoves will be included in the CPA.
2	Boundary and location of the CPA	The CPA is located within Rwanda or Cameroon.	Location and boundary is specified in the specific CPA-DD stating that the location is limited either to Rwanda or Cameroon.	Locations of stoves monitored	All eligible ICS included in the CPA will be located in Cameroon
3	Definition of CPA Baseline	1. if the CPA is only including ICS for household level (scenario 1) to 3) as defined in section B.4 of this PoA-DD): 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 scenario 4) in section B.4 of this PoA-DD): the baseline 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 2. Baseline 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.	1. na 2. defined at CPA level	Only household ICS (the Save 80 household size stoves) will disseminated under the CPA 2. Not applicable
4	Efficiency of the ICS	The stove type disseminated under the CPA has a specified efficiency of at least 20%	Manufactures specifications will be the first option of choice. If not possible other options allowable by AMS-II.G. will be used	Efficiency of the ICS is also monitored	According to the manufacturer of the Save80 stove the specified efficiency is >20%
5	SSC Limit for CPAs	The CPA will remain under the thermal threshold of 180 GWh thermal energy savings.	ICSs will be determined in each CPA-DD. During verifications the DOE needs to assess, that the small scale limit (180 GWh_{th}) was not exceeded at any time for any CPA.	---	The number of Save80 and share of Scenario 1) to 3) stoves will be monitored. Based on ex-ante estimate, the saving in thermal fuel input energy per year is 112.90GWh_{th} which is below the threshold of 180GWh_{th}.
6	Monitoring	A unique numbering or identification system for the	The specific numbering or	Monitored	All ICS are equipped with a

		stoves disseminated is applied	identification regime is included in the specific CPA-DD		serial number, for details see section D.7.2.
7	De-bundling	The CPA is exclusively bound to the PoA. 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.	For CPAs applying ICS under scenario 1)-3): A statement is included in the CPA-DD that no ICS distributed under the specific CPA will be part of another single CDM project activity or CPA under another PoA For CPAs applying ICS under scenario 4) (institutional stoves) as defined under section B.4. the necessity for a debundling check per system needs to be assessed before proposing the CPA for inclusion. In any case it needs to be shown if any ICS under scenario 4) may be larger than 5% of the SSC threshold	---	Only household ICS are implemented. No ICS distributed under the specific CPA will be part of another single CDM project activity or CPA under another PoA.
8	CER ownership	End users receiving ICS 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	The default ICS purchase contract for end users is including the provision that emission reductions generated by the stove are owned by the CME	---	The default ICS purchase contract for end users includes the provision that emission reductions generated by the stove are owned by the CME
9	Additionality for ICS under scenario 4) only	The additionality of the CPAs including stoves as described under scenario 4) in Section B.4 can be demonstrated in the CPA	Proof of additionality to be demonstrated in the specific CPA-DD and to be validated by a DOE before inclusion into the PoA-DD	Defined at CPA level	Not applicable as only household ICS are to be included under the CPA
10	Type of ICS	Each CPA is only including baseline stoves of either scenario 1) to 3) or scenario 4) as defined in Section B.4	The specific CPA-DD is specifying the type and model of the ICS which belongs to either scenario 1) to 3) or 4)	Type of stove monitored	The Save80 stove can replace charcoal stoves and none efficient wood stoves. Therefore only scenario 1) to 3) are

					applicable for the CPA
11	Additionality of CPAs	Additionality is demonstrated as described in detail in Part I – Section B.1 of the PoA DD. Applying paragraph 2. I of EB 68 Annex 27 (Guidelines on the demonstration of additionality of small-scale project activities v.9.0)	For CPAs applying ICS under scenario 1)-3): Eligibility criteria 7) (debundling) needs to be fulfilled. For CPAs applying ICS under scenario 4) (institutional stoves) as defined under section B.4. proof needs to be provided, that the energy savings of each institutional stove does not achieve 3,000 MWh of energy savings per year or 3,000 tonnes of emission reductions per year.	---	Eligibility criteria 7) is fulfilled
12	Start date of the CPA	Confirmation that the start date of any CPA is not, or will not be, prior to the commencement of validation of the programme of activities, i.e. the date on which the CDM-POA-DD is first published for global stakeholder consultation (15/05/2011)	Documentary evidence is provided to support the start date of the CPA	---	01/08/2016 (date of expected sales order for the Save80 stove equipment and material as stated in the CPA-DD)
13	Compliance with applicability conditions of AMS-II.G.	The CPA is in compliance with all applicability conditions as stated in AMS-II.G.	The compliance of the CPA with the applicability conditions is demonstrated in the specific CPA-DD	---	Refer to section D.2
14	Sampling requirements	The sampling requirements as stipulated in the monitoring plan of the PoA-DD (which is in line with the guidelines/standard from the EB pertaining sampling and surveys) are implemented.	The requirements for sampling as stipulated in the PoA-DD are reflected in the specific CPA-DD.	---	Refer to section D.7.2
15	None diversion of ODA	Funding from Annex I parties for the implementation of the PoA, if any, does not result in a diversion of official development assistance (ODA)	A statement is provided that either no ODA is included in the financing of the CPA or a statement that the funding does not result in a diversion of ODA.	---	Refer ODA declaration submitted to the DOE

D.6. Estimation of emission reductions

D.6.1. Explanation of methodological choices

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The methodological choices considered in the application of AMS-II.G are as follows:

Para 6:

Option 2 of paragraph 6 of AMS-II.G. is chosen to calculate the quantity of woody biomass that is saved: biomass savings are calculated by multiplying the quantity of woody biomass used in the absence of the project activity ($B_{old,i}$) with the efficiency gains ($1-n_{old}/n_{new}$) of the system being deployed as part of the project activity. The efficiencies of the new systems are measured by applying the Water-Boiling-Test (WBT) protocol.

Para 7:

We choose to apply approach (a) to determine B_{old}:

"Calculated as the product of the number of systems multiplied by the estimated average annual consumption of woody biomass per appliance (tonnes/year). This can be derived from historical data or a survey of local usage,"

Para 15:

*Monitoring shall consist of checking the efficiency of all appliances **or** a representative sample thereof, at least once every two years (biennial) to ensure that they are still operating at the specified efficiency (η_{new}) or replaced by an equivalent in service appliance. Where replacements are made, monitoring shall also ensure that the efficiency of the new appliances is similar to the appliances being replaced.*

And

Para 16:

*Monitoring shall also consist of checking of all appliances **or** a representative sample thereof, at least once every two years (biennial) to determine if they are still operating or are replaced by an equivalent in service appliance.*

A representative sample of the appliances disseminated under a CPA will be monitored to determine the share of appliances that are still operating or are replaced by an equivalent in service appliance. A representative sample will also be monitored to ensure that they 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 are considered with their related efficiency as applicable.

If an ICS gets replaced the efficiency of the new ICS can be compared to the average efficiency of ICS which are of the same vintage as the replaced ICS to determine if the efficiency of the replaced ICS and the new ICS is *similar*. It is not possible to replace an ICS with a different ICS type which has a lower efficiency.

The procedures for monitoring the share of operational appliances and their respective efficiency(ies) are laid out in section D.7.

Para 20:

Monitoring shall ensure that:

*(a) Either the replaced low efficiency appliances are disposed off and not used within the boundary or within the region; **or***

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

As monitoring of the proper disposal of old appliances is complicated (especially if the old appliances is just 3 random stones) and will potentially result in conflicts, we choose option (b). The continuous use of baseline appliances will be excluded from B_{old} by determining the average number of eaters for whom meals are prepared on the ICS during monitoring (parameter $N_{eaters\_project}$) (see Section D.7.1) and by introducing a cap for the maximum number of eaters possible per ICS type utilized (parameter *HH_CAP)* (see section D.6.2)

For explanation:

By determining the average number of eaters per new appliance (i.e. the specific ICS of the CPA), the continuous use of the baseline appliance is considered because the parameter $B_{old,\ appliance,\ i}$ is determined by multiplication of the per-capita consumption with the number of eaters for whom meals are prepared on the ICS only. (Please refer to the parameter $N_{eaters\_project}$ in the monitoring tables in Section D.7.1.):

Furthermore to increase the robustness of the concept, the maximum number of eaters per ICS is defined (see parameter ***HH_CAP*** see section D.6.2). The value for the number of eaters will therefore always be equal or lower than the household cap of the ICS.

Therefore only the baseline consumption which is reduced by the project appliance is considered and if users are cooking with other (i.e. old) appliances in occasions such as, for example, a big family gathering, this will not be considered for the emission reduction calculations since the number of eaters per ICS is determined during monitoring.

D.6.2. Data and parameters fixed ex-ante

(Copy this table for each data and parameter.)

Data / Parameter	$B_{old,\ capita,,\ 1,2}$
Unit	t/year/head
Description	Average charcoal consumption per head per day for Scenario 1)-2)
Source of data	Derived from historical data (Refer Step 1 of Part II - Section B.6.3 of PoA-DD)
Value(s) applied	Scenario 1: 0.03731 t/y/head Scenario 2: 0 t/y/head
Choice of data or Measurement methods and procedures	Derived from data published by CIFOR on charcoal consumption in Cameroonian urban households as well as demographic data from the Cameroonian government. (Refer Step 1 of Part II - Section B.6.3 of PoA-DD)
Purpose of data	Calculation of baseline emissions
Additional comment	Parameter value has been fixed ex-ante in the PoA-DD

Data / Parameter	$f_{biomass/charcoal}$
Unit	Number
Description	Conversion factor wood to charcoal
Source of data	Default conversion factor defined by the IPCC (Refer Step 1 of Part II - Section B.6.3 of PoA-DD)
Value(s) applied	6
Choice of data or Measurement methods and procedures	Default conversion factor defined by the IPCC (Refer Step 1 of Part II - Section B.6.3 of PoA-DD)
Purpose of data	Calculation of baseline emissions
Additional comment	Parameter value has been fixed ex-ante in the PoA-DD

Data / Parameter	$B_{old, capita,3}$
Unit	t/year/head
Description	Average woody biomass consumption per head per year for Scenario 3)
Source of data	Derived from historical data (Refer Step 1 of Part II - Section B.6.3 of PoA-DD)
Value(s) applied	0.6305
Choice of data or Measurement methods and procedures	Derived from data published by United Nations Statistics Division for fuel wood consumption in Cameroonian households (Refer Step 1 of Part II - Section B.6.3 of PoA-DD)
Purpose of data	Calculation of baseline emissions
Additional comment	Parameter value has been fixed ex-ante in the PoA-DD

Data / Parameter	$\eta_{charcoal\_stove,1,2,}$
Unit	%
Description	Efficiency of the baseline system being replaced
Source of data	Default value from AMS-II.G
Value(s) applied	Scenario 1= 30% (efficient charcoal stove with clay) Scenario 2= 20% (inefficient charcoal stove without clay)
Choice of data or Measurement methods and procedures	In Cameroon, there is hardly any literature on charcoal stove efficiencies. A value of 0.3 or 30% has been conservatively chosen for scenario 1 (based on available data). A value of 0.2 or 20% as per para 12 of AMS-II.G has been considered for scenario 2. (Refer to Step 1 of Part II – Section B.6.3. of PoA-DD)
Purpose of data	Calculation of baseline emissions
Additional comment	Parameter value has been fixed ex-ante in the PoA-DD

Data / Parameter	$\eta_{old,3}$
Unit	%
Description	Efficiency of the baseline system being replaced
Source of data	Default value from AMS-II.G
Value(s) applied	10%
Choice of data or Measurement methods and procedures	According to para 12 of AMS-II.G, a default value of 0.10 can be used “if the replaced device is a three stone fire, or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney”
Purpose of data	Calculation of baseline emissions
Additional comment	Parameter value has been fixed ex-ante in the PoA-DD

Data / Parameter	$NCV_{biomass}$
Unit	TJ/t
Description	Net calorific value of the non-renewable woody biomass that is substituted
Source of data	IPCC default value
Value(s) applied	0.015
Choice of data or Measurement methods and procedures	This is the IPCC default value for fuel wood as provided by paragraph 11 of AMS-II.G
Purpose of data	Calculation of baseline emissions

Additional comment	Parameter value has been fixed ex-ante in the PoA-DD

Data / Parameter	$NCV_{charcoal}$
Unit	TJ/t
Description	Net calorific value of the non-renewable woody biomass that is substituted
Source of data	IPCC default value
Value(s) applied	0.0295
Choice of data or Measurement methods and procedures	IPCC default value in Table 1.2, Chapter 1: Introduction, Volume 2: Energy of 2006 IPCC Guidelines for National Greenhouse Gas Inventories
Purpose of data	Calculation of baseline emissions
Additional comment	Parameter value has been fixed ex-ante in the PoA-DD

Data / Parameter	$EF_{projected\_fossilfuel}$
Unit	tCO_2/TJ
Description	Emission factor for the substitution of non-renewable woody biomass by similar consumers
Source of data	IPCC default value
Value(s) applied	81.6
Choice of data or Measurement methods and procedures	According to AMS-II.G., the emission factor for the substitution fuel likely to be used instead of non-renewable woody biomass of 81.6 t CO_2/TJ is to be taken.
Purpose of data	Calculation of baseline emissions
Additional comment	Parameter value has been fixed ex-ante in the PoA-DD

Data / Parameter	L_y
Unit	Fraction
Description	Leakage adjustment factor period y
Source of data	Default value from AMS-II.G
Value(s) applied	0.95
Choice of data or Measurement methods and procedures	According to paragraph 20 of AMS-II.G, B_{old} can be multiplied by a net to gross adjustment factor of 0.95 to account for leakage in which case surveys are not required.
Purpose of data	Calculation of baseline emissions
Additional comment	Parameter value has been fixed ex-ante in the PoA-DD

Data / Parameter	$f_{NRB,y}$
Unit	Fraction
Description	Fraction of woody biomass saved by the project activity in period y that can be established as non-renewable biomass
Source of data	Default national value approved by the Executive Board
Value(s) applied	0.70 or 70%
Choice of data or Measurement methods and procedures	Default value approved by the Executive Board (http://cdm.unfccc.int/DNA/fNRB/index.html)
Purpose of data	Calculation of baseline emissions

Additional comment	Parameter value has been fixed ex-ante in the PoA-DD

Parameters to be reported in SSC-CPA-DD form

Data / Parameter	***HH_CAP***
Unit	Number
Description	Maximum number of eaters possible per specific ICS as applied in the specific CPA
Source of data	Manufactures specifications
Value(s) applied	8
Choice of data or Measurement methods and procedures	According to manufactures specifications
Purpose of data	Calculation of baseline emissions
Additional comment	Parameter value has been fixed ex-ante for the entire crediting period

D.6.3. Ex-ante calculation of emission reductions

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Average number of eaters for whom meals are prepared on the ICS ($N_{eaters\_project}$) = 5.73 [12]

Type of stove predominately used before purchasing the ICS[13]:

Cooking with efficient charcoal stoves	Scenario 1:	0%
Cooking with inefficient charcoal stoves	Scenario 2:	0%
Cooking with wood	Scenario 3:	100%

Efficiency value of ICS using biomass (η_{new}) = 40%[14]

Total number of appliances deployed ($\Sigma N_{i,y}$) = 10,000

Statistically adjusted drop out from total population of appliances (DO_y) = 5% [15]

Emission reductions are calculated as:

$$ER_y = B_{y,savings} \cdot f_{NRB,y} \cdot NCV_{biomass} \cdot EF_{projected\_fossilfuel}$$

Parameter	Unit	Type	Description
ER_y	tCO_2	Calculated	Emission reductions of the project activity in period *y*
$B_{y,savings}$	t	Calculated	Quantity of woody biomass that is saved by the CPA in period y. $B_{y,savings}$ comprises three options

[12] See monitoring results for CPA#1 and Monitoring Period 1 under: https://cdm.unfccc.int/PoAIssuance/iss_db/poaiss267785262/view

[13] Only 1.7% of the households use charcoal – Refer Improved cookstove as an appropriate technology for the Logone Valley (Chad – Cameroon): Analysis of fuel and cost savings by Vaccari et al, Table 1 (http://www.sciencedirect.com/science/article/pii/S0960148112002492) and since charcoal users are not the target households for the CPA it is assumed that 0% of the ICS users will be former charcoal users.

[14] Improved cook stoves programme for Rwanda #CPA2 Cameroon is applying the same model of the Save80 stove as CPA 1 in Rwanda. During the first monitoring period of CPA#1 an efficiency of 45% was achieved (see monitoring report here: https://cdm.unfccc.int/PoAIssuance/iss_db/poaiss267785262/view). The assumed efficiency of 40% for the ex-ante estimates of ER is reasonable and conservative.

[15] Results for monitoring period one of the first CPA in Rwanda showed that 100% of the deployed cook stoves could be found during spot checks. See monitoring report here: https://cdm.unfccc.int/PoAIssuance/iss_db/poaiss267785262/view However, we do not expect this result to remain constant for the whole crediting period. Therefore a value of 5% for DOy is estimated, which is realistic and conservative.

			according to the scenario 1) to 4) illustrated in section B.4.
$f_{NRB,y}$	%	Fixed	Fraction of woody biomass saved by the project activity in period y that can be established as non-renewable biomass
$NCV_{biomass}$	TJ/t	Fixed	Net calorific value of the non-renewable woody biomass that is substituted (IPCC: 0.015TJ/t)
$EF_{projected\_fossilfuel}$	tCO_2/TJ	Fixed	Emission factor for the substitution of non-renewable woody biomass by similar consumers: $81.6tCO_2/TJ$

$B_{y,savings}$ shall be calculated according to Option 2 of para 12 of AMS-II.G.

$$B_{y,savings} = \sum_{i=1}^{4} B_{old,i} \cdot \left(1 - \frac{\eta_{old,i}}{\eta_{new}} \right)$$

Index i comprises four options according to the scenario 1)-4) illustrated in section D.4.

Parameter	Unit	Type	Description
$B_{y,savings}$	t	Calculated	Quantity of woody biomass that is saved
$B_{old,i}$	t	Calculated	Quantity of woody biomass used in the absence of the project activity
$\eta_{old,i}$	%	Fixed	Efficiency of the baseline system being replaced
η_{new}	%	Monitored	Efficiency of the system being deployed as part of the project activity

Applying the procedures outlined in Part II - Section B.6.3 of the PoA-DD the value $B_{old,appliance,i}$ is derived from per capita woody biomass consumption ($B_{old,capita,i}$), (Step 1), multiplied with the average number of eaters per ICS as determined during monitoring ($N_{eaters\_project}$) (Step1), times an adjustment factor for drop out (DO_y) as found during sampling (Step 2).

Since $B_{i,y,appliance}$ is an annual value the term is also adjusted according to the length of the monitoring period, in case it doesn't equal one calendar year. Finally, the term is adjusted for leakage (L_y) using the default leakage factor (Step 3).

Furthermore in order to determine quantity of woody biomass that is saved ($B_{y,savings}$) the efficiency of the replaced and deployed appliances needs to be determined (Step 4). At last the share of Non-Renewable biomass ($f_{NRB,y}$) needs to be determined (Step 5) along with total number of appliances deployed ($N_{i,y}$) in order to calculate the emission reductions.

$B_{old,i}$ shall be calculated according to the following formula:

$$B_{old,i} = B_{old,appliance,i} \cdot N_{i,y} \cdot (1 - DO_y) \cdot \frac{mp_{length}}{365} \cdot L_y$$

Index i comprises four options according to the scenario 1)-4)

Parameter	Unit	Type	Description
$B_{old,i}$	t/year	Calculated	Quantity of woody biomass used in the absence of the project activity
$B_{old,appliance,i}$	t/year	Calculated using monitored parameters	Average annual consumption of woody biomass per appliance $B_{old,appliance,i}$ comprises four options according to the scenario 1) to 4) illustrated in section D.4
$N_{i,y}$	-	Monitored	Total number of appliances deployed in period y
DO_y	%	Monitored	Statistically adjusted drop out from total population of appliances in period y

mp_{length}	days	Monitored (implicitly, no extra parameter)	Length of monitoring period y
L_y	-	Fixed	0.95 default value

The efficiency of the charcoal stove would be transformed to the efficiency of a fuel wood stove as follows

$$\eta_{old,1,2} = \frac{\eta_{charcoal\_stove,1,2} \cdot NCV_{charcoal}}{f_{biomass/charcoal} \cdot NCV_{biomass}}$$

Where

Parameter	Unit	Type	Description
$\eta_{charcoal\_stove,1,2}$	fraction	fixed	Efficiency of the charcoal device/s being replaced
$NCV_{charcoal}$	TJ/t	fixed	Net calorific value of charcoal
$f_{biomass/chacoal}$	number	fixed	Conversion factor for wood to charcoal
$NVC_{biomass}$	TJ/t	fixed	Net calorific value of the non-renewable woody biomass that is substituted

For scenario 1:

Average annual consumption of woody biomass per appliance

$B_{old,appliance,1} = 0.22386\ t/y \cdot N_{eaters\_project}$ (Refer Step 1 in Part II – Section B.6.3 of PoA-DD)

Quantity of woody biomass used in the absence of the project activity

$$B_{old,1} = B_{old,appliance,i} \cdot N_{i,y} \cdot (1 - DO_y) \cdot \frac{mp_{length}}{365} \cdot L_y$$

$$B_{old,1} = 0.22386 \cdot 5.73 \cdot 0 \cdot (1 - 5.0\%) \cdot \frac{365 \cdot}{365} \cdot 0.95$$

$$B_{old,1} = 0\ t/year$$

Since it is assumed that all households used predominantly fuel wood for cooking before purchasing the ICS (see above, scenario 1 = 0% and scenario 3 = 100%), the value for $B_{old,1}$ is nil.

For scenario 2:

Average annual consumption of woody biomass per appliance

$B_{old,appliance,2} = 0\ t/year \cdot N_{eaters\_project}$ (Refer Step 1 in Part II – Section B.6.3 of PoA-DD)

Quantity of woody biomass used in the absence of the project activity

$$B_{old,i} = B_{old,appliance,i} \cdot N_{i,y} \cdot (1 - DO_y) \cdot \frac{mp_{length}}{365} \cdot L_y$$

$$B_{old,2} = 0\ t/year$$

For scenario 3:

Average annual consumption of woody biomass per appliance

$B_{old,appliance,3} = 0.6305\ t/year \cdot N_{eaters\_project}$ (Refer Step 1 in Part II – Section B.6.3 of PoA-DD)

Quantity of woody biomass used in the absence of the project activity

$$B_{old,i} = B_{old,appliance,i} \cdot N_{i,y} \cdot (1 - DO_y) \cdot \frac{mp_{length}}{365} \cdot L_y$$

$$B_{old,3} = 0.6305 \cdot 5.73 \cdot 10{,}000 \cdot (1 - 5.0\%) \cdot \frac{365}{365} \cdot 0.95 = 32.605{,}20 t / year$$

Efficiency of the baseline system being replaced

$$\eta_{old,3} = 10\%$$

$B_{y,savings}$ shall be calculated according to Option 2 of Para 6:

$$B_{y,savings} = \sum_{i=1}^{4} B_{old,i} \cdot \left(1 - \frac{\eta_{old,i}}{\eta_{new}} \right)$$

$$B_{y,savings,1} = 0\, t / year$$

$$B_{y,savings,2} = 0\, t / year$$

$$B_{y,savings,3} = 32{,}605.20 \cdot \left(1 - \frac{10\%}{40\%} \right) = 24{,}453.90\, t / year$$

Emission reductions will be calculated as:

$$ER_y = B_{y,savings} \cdot f_{NRB,y} \cdot NCV_{biomass} \cdot EF_{projected\_fossilfuel}$$

$$ER_y = 24{,}453.90 \times 0.70 \cdot 0.015 \cdot 81.6$$

$$ER_y = 20{,}952\, tCO_2 / annum$$

D.6.4. Summary of the ex-ante estimates of emission reductions

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
Year 1	20,952	0	N/A	20,952
Year 2	20,952	0	N/A	20,952
Year 3	20,952	0	N/A	20,952
Year 4	20,952	0	N/A	20,952
Year 5	20,952	0	N/A	20,952
Year 6	20,952	0	N/A	20,952
Year 7	20,952	0	N/A	20,952
Year 8	20,952	0	N/A	20,952
Year 9	20,952	0	N/A	20,952
Year 10	20,952	0	N/A	20,952
Total	209,521	0	N/A	209,521
Total number of crediting years	10 years			
Annual average over the crediting period	209,521	0	N/A	209,521

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

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D.7.1. Data and parameters to be monitored

(Copy this table for each data and parameter.)

Data / Parameter	$N_{eaters\_project}$
Unit	Number
Description	Average number of eaters for whom meals are prepared on the ICS
Source of data	Primary data collection: dedicated monitoring team; database maintenance: CME
Value(s) applied	5.73
Measurement methods and procedures	Monitoring of the statistically adjusted average number of eaters for whom meals are prepared on the ICS will be performed by either monitoring all appliances or a sample thereof, and will in the latter involve two steps: Step 1: Sample survey amongst ICS deployed under the CPA as specified in section D.7.2 Step 2: Calculation of the average number of eaters at 90% confidence level and 10% precision (annual inspections) or 95% confidence level and 5% precision (biennial inspections) following the statistical standard approach for a homograde test of independent units that have a standard normal distribution. The average number of eaters will be either determined through monitoring recording sheets by the users themselves, or through interviews performed by a dedicated monitoring team according to the sampling procedure described in section B.7.2. Interviews will be conducted using a questionnaire. Interviews are conducted with the aim to achieve the required precision of 10% (annual inspections) or 5% (biennial inspections) for this parameter. All questionnaires and information gathered during the sampling by the monitoring team are handed over to the CME that takes care of entering the information to an electronic database and updating sample databases where appropriate. By determining the average number of eaters for whom meals are prepared on the ICS, the continuous use of the baseline appliance is considered as only the baseline consumption which is reduced by the ICS is considered.
Monitoring frequency	The CME may decide to do annual or biennial inspections
QA/QC procedures	All formulae applied to determine the statistical precision used are standard formulae. 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 95/5 precision could not be achieved because of a small sample size. No deductions have to be made if 90/10 or 95/5 precision is achieved by sampling an appropriate number of appliances. 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

Purpose of data	Calculation of baseline emissions
Additional comment	See: Results for first monitoring period one of CPA#1 of PoA6207. See monitoring report here: https://cdm.unfccc.int/PoAIssuance/iss_db/poaiss267785262/view

Data / Parameter	**Type of stove predominantly used before purchasing the ICS**
Unit	1) to3)
Description	The type of stove used before the purchase of the ICS needs to be determined in order to allocate the user to a specific scenario (1)-3))
Source of data	Primary data collection: to be recorded on the ICS purchase contract
Value(s) applied	Scenario 1): 0% Scenario 2): 0% Scenario 3): 100%
Measurement methods and procedures	The kind of stoves which was used before the ICS was purchased will be recorded on the purchase contracts. In order to separate between scenario 1) and 2) the general rule will be used, that all stoves including clay will be determined as scenario 1) and traditional metal stoves will be allocated to scenario 2). If there is doubt and to be conservative users will be allocated to scenario 1) if it cannot be clearly determined which type of charcoal stove was predominantly used before purchasing the ICS. In order to determine which stove was used predominantly, users will be asked to determine which stove they are cooking most of the meals on.
Monitoring frequency	Once at the time of purchase of ICS
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. The validity of the purchase contract showing the baseline stove will be checked during sampling.
Purpose of data	Calculation of baseline emissions
Additional comment	Type of stove predominantly used before purchasing the ICS is recorded permanently as part of the on-going sales documentation.

Data / Parameter	η_{new}
Unit	% (efficiency value of ICS using biomass)
Description	Adjusted average efficiency of the device being deployed as part of the CPA
Source of data	Primary data collection: dedicated monitoring team; database maintenance: CME
Value(s) applied	40%

Measurement methods and procedures	Monitoring of the statistically adjusted average efficiency involves two steps: Step 1: Sample survey and efficiency testing amongst appliances deployed under the CPA as specified in section D.7.2 Step 2: Calculation of the adjusted average efficiency at 90% confidence level and 10% precision (annual inspections) or 95% confidence level and 5% precision (biennial inspections) following the statistical standard approach for a heterograde test of independent units that have a standard normal distribution. η_{new} is determined following the Water Boiling Test (WBT) protocol, performed by a dedicated monitoring team according to the sampling procedure described in section D.7.2. and following the WBT protocol. Tests will be reported in spreadsheet templates. All equipment used will fulfil the requirements of EB 61 Annex 21 Paragraph 17. (c) i.e. the equipment will be recalibrated at appropriate intervals according to manufacturer specifications but at least once in three years. Checks are conducted with the aim to achieve the required precision (10% or 5%) for this parameter. The CME has the option to establish a dedicated monitoring team itself or to outsource the monitoring of η_{new} to a qualified third party.
Monitoring frequency	The CME may decide to do annual or biennial monitoring of the parameter.
QA/QC 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 (*"...the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen…"*) in the event that 90/10 or 95/5 precision could not be achieved because of a small sample size. No deductions have to be made if 90/10 or 95/5 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.). 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	Improved cook stoves programme for Rwanda #CPA2 Cameroon is applying the same model of the Save80 stove as CPA 1 in Rwanda. During the first monitoring period of CPA#1 an efficiency of 45% was achieved (see monitoring report here: https://cdm.unfccc.int/PoAIssuance/iss_db/poaiss267785262/view). The assumed efficiency of 40% for the ex-ante estimates of ER is reasonable and conservative.

Data / Parameter	$N_{i,y}$
Unit	n/a
Description	Adjusted total number of appliances deployed until period y
Source of data	Stove Records Database

Value(s) applied	10,000
Measurement methods and procedures	The total number of appliances deployed until period y is calculated based on information monitored through the stove records database. $N_{i,y} = \sum_{j=1}^{y} n_{i,j} \cdot OT_{adjusted,i,j,y}$

Parameter	Description
$n_{i,j}$	Number of ICS deployed in period j per baseline scenario i as reported in the stove records database
$OT_{adjusted,i,j,y} = \begin{cases} 1 & , j < y \\ \frac{d_{average,i,y}}{mp_{length}} & , j = y \end{cases}$	Adjustment factor for reduced operational time of appliances deployed in period y per baseline scenario i
$d_{average,i,y}$	Average number of days that appliances deployed in period y have been operational in period y as determined by respective deployment dates of appliances counted for n_y . Delivery dates are determined mutatis mutandis as in the context of n_j above.
mp_{length}	Length of monitoring period y

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. $N_{i,y}$ is recorded permanently as part of the ongoing sales documentation.
Purpose of data	Calculation of baseline emissions
Additional comment	y = current monitoring period, j = term for monitoring period, i = comprises the four options according to the scenario 1)-4) illustrated in section D.4.

Data / Parameter	DO_y
Unit	%
Description	Statistically adjusted drop out from total population of appliances under scenario 1) to 3) in period y
Source of data	Primary data collection: dedicated monitoring team; database maintenance: CME
Value(s) applied	5.0

Measurement methods and procedures	Monitoring of the statistically adjusted drop out will be performed by either monitoring all appliances or a sample thereof, and will in the latter involve two steps: Step 1: Sample survey amongst appliances deployed under the CPAs as specified in section B.7.2 Step 2: Calculation of the adjusted drop out rate at 90% confidence level and 10% (annual inspections) or 95% confidence level and 5% precision (biennial inspections) following the statistical standard approach for a homograde test of independent units that have a standard normal distribution. The 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, performed by a dedicated monitoring team according to the sampling procedure described in section B.7.2. Interviews will be reported in a questionnaire. Checks are conducted with the aim to achieve the required precision (10% or 5%) for this parameter. All questionnaires and information gathered during the sampling by the monitoring team are handed over to the CME that takes care of entering the information to an electronic database and updating sample databases where appropriate.
Monitoring frequency	The CME may decide to do annual or biennial inspections.
QA/QC procedures	All formulae applied to determine the statistical precision used 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 95/5 precision could not be achieved because of a small sample size. No deductions have to be made if 90/10 or 95/5 precision is achieved by sampling an appropriate number of appliances. 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	Results for monitoring period one of the first CPA in Rwanda showed that 100% of the deployed cook stoves could be found during spot checks. See monitoring report here: https://cdm.unfccc.int/PoAIssuance/iss_db/poaiss267785262/view However we do not expect this result to remain constant, therefore a value of 5% for DOy is estimated, in order to be conservative.

D.7.2. Description of the monitoring plan

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According to AMS-II.G. *"Monitoring shall consist of checking the efficiency of all appliances or a representative sample thereof, at least once every two years (biennial) to ensure that they are still operating at the specified efficiency (ηnew) or replaced by an equivalent in service appliance."*

Database records

Electronic database(s) will be operated and maintained by the CME or IEs appointed by the CME to ensure completeness and accuracy of monitoring information:

Stove records database:

The following information is collected for every ICS distributed[16]:

- Type of appliance (ICS type) deployed
- Serial number (Stove-ID) of system
- Delivery date of appliance (to user)
- User details (Name, Address, etc.)
- Implementing Entity/ Contact Person
- Type of stove predominantly used before purchasing of the ICS

Database management

The information in this database will be updated continuously for every ICS distributed. Original copies of the sales invoices or sales receipts (or whatever format is used to collect the data required) will be kept and maintained by the monitoring team of the CME or monitoring team of IEs appointed by the CME and kept for two years after the end of the crediting period. There will be data back-up of the electronic database on CME level.

The CME will appoint a monitoring manager responsible for overseeing the database management and for assigning a monitoring team responsible for all monitoring obligations.

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 (EB65 Annex 2).

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 may not be economically feasible and therefore a sample may be monitored to ensure that all the appliances deployed are still operating or to record end of operation and/or replacement of the appliances in order to determine the statistically adjusted annual or biennial value for drop out (***DO_y***).

Sampling methods may also be applied to determine the annual or biennial value for the efficiency of the ICSs (η_{new},) and the annual or biennial value for the average number of eaters for whom meals are prepared on the ICS ($N_{eaters\_project}$).

Where replacements are made, monitoring shall also ensure that the efficiency of the new appliances is similar to the appliances being replaced.
Therefore data for the following parameters will be compiled as a result of conducting the survey:
$N_{eaters\_project}$, η_{new} and $DO_{y,}$

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., para 15 and 16. All of the sampled parameters will be monitored in the same frequency, i.e. either annually or biennially.

iii. Estimated parameter values

[16] 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 estimated parameter values are as per the values used for ex-ante calculation of emission reductions (please refer to Section D.7.1).

Data / Parameter	DO_y
Unit	%
Description	Statistically adjusted drop out from total population of appliances under scenario 1) to 3) in period y
Value(s) applied	5.0
Additional comments	Results for monitoring period one of the first CPA in Rwanda showed that 100% of the deployed cook stoves could be found during spot checks. See monitoring report here: https://cdm.unfccc.int/PoAIssuance/iss_db/poaiss267785262/view However we do not expect this result to remain constant, therefore a value of 5% for DOy is estimated, in order to be conservative.

Data / Parameter	η_{new}
Unit	%
Description	Adjusted average efficiency of the device being deployed as part of the CPA
Value(s) applied	40
Additional comments	Improved cook stoves programme for Rwanda #CPA2 Cameroon is applying the same model of the Save80 stove as CPA 1 in Rwanda. During the first monitoring period of CPA#1 an efficiency of 45% was achieved (see monitoring report here: https://cdm.unfccc.int/PoAIssuance/iss_db/poaiss267785262/view). The assumed efficiency of 40% for the ex-ante estimates of ER is reasonable and conservative.

Data / Parameter	$N_{eaters\_project}$
Unit	Number
Description	Average number of eaters for whom meals are prepared on the ICS
Value(s) applied	5.73
Additional comments	See: Results for first monitoring period one of CPA#1 of PoA6207. See monitoring report here: https://cdm.unfccc.int/PoAIssuance/iss_db/poaiss267785262/view

i. Sampling requirements as per sampling standard and applicable methodology

Precedence of methodology

Para 4 of the Sampling Standard, EB 65, Annex 2 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. Para 22, *"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 95/5 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 95/5 precision"*.

Additional requirement for PoAs as per sampling standard

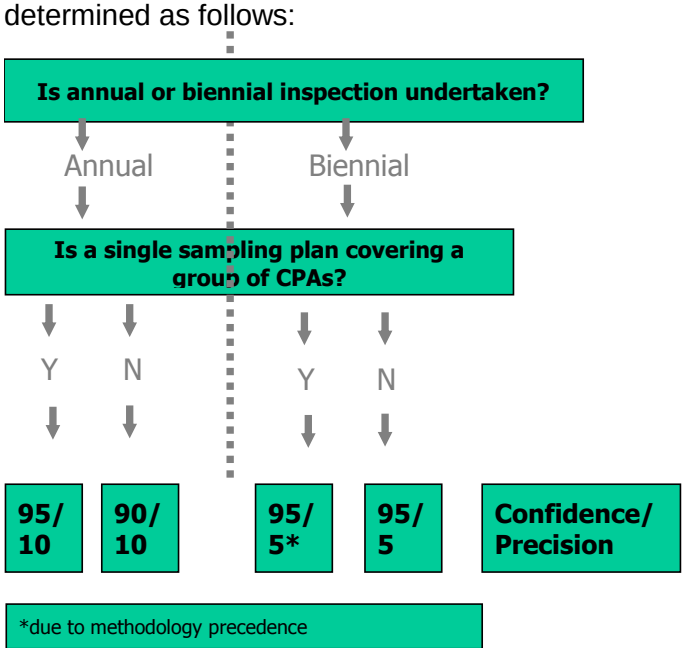
In case a single sampling plan for more than one CPA is used, "parameter values shall be estimated by sampling in accordance with the requirements in the applied methodology separately and independently for each of the CPAs included in a PoA except when a single sampling plan covering a group of CPAs is undertaken applying 95/10 confidence/precision for the sample size calculation", as per para 19 of the sampling standard, EB 65, Annex 2.

Furthermore, as per para 285 of Standard: Clean development mechanism project standard Version 07, CME can prepare two separate monitoring reports whereby the two monitoring reports shall contain two mutually exclusive batches of CPAs. Accordingly, CME will have a separate batch for CPAs in Rwanda and a separate batch for CPAs in Cameroon.

Sampling may therefore be across a country's CPAs and hence a single sample plan may be applied, but only if the CPAs are deploying the same ICS type, i.e. the same stove type such as SAVE80, to reduce monitoring efforts.

ii. Confidence/precision criteria to be met

As mentioned above, according to AMS-II.G., Para 22, confidence/precision criteria to be met is determined as follows:



Note: As per para 22 of AMS-II.G. 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_y and n_{new};

All ICS which are included up to the specific monitoring period.

For the monitoring parameter $N_{eaters\_project}$:

All ICS which are included up to the specific monitoring period however stoves which are found to qualify as drop outs (DO_y) will not be considered to determine $N_{eaters\_project}$.

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 randomly samples households across all the CPAs deploying the same ICS type.

To reduce monitoring efforts a single sample is drawn from the stove records database based on which all of the parameters shall be monitored. (As already stated above, if different CPAs deploy the same ICS type, the database may include stoves from several CPAs and a sample may be drawn across CPAs), in accordance with footnote 6 EB 65 Annex 2 which says that the largest number for the sample size can be chosen for the sampling effort with one common survey. 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 again the required precision for these parameters is achieved.

Random distribution

The method of selecting users to be included in the sample databases for deployed appliances will be random using simple random 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. Therefore, providing traceability of the selection.

i. Identification of strata or clusters if applicable

Not applicable since only single stage sampling will be done

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 is 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) which can be applied to do a more accurate sampling these may be used to determine the sample size and justification will be provided to the verifying DOE.

Parameter of interest	Expected value	Source	Estimated standard deviation	Source
$\boldsymbol{DO_y}$	5% (p.a.)	See tables under 1. a. iii. above	Not applicable since the parameter is a proportion	Not applicable
η_{new}	40%	See tables under 1. a. iii. above	2.55	Project planner's own knowledge of data (Experiences from the verification of the first monitoring period of atmosfair's registered PoA 6207/ CPA 1[17])
$N_{eaters\_project}$	5.73	See tables under 1. a. iii. Above	1.94	Project planner's own knowledge of data (Experiences from the

[17] See Monitoring Report : Issuance of project PoA 6207 and the corresponding CER calculation spread sheet on the project page: http://cdm.unfccc.int/PoAIssuance/iss_db/poaiss267785262/view

				verification of the first monitoring period of atmosfair's registered PoA 6207/ CPA 1[18])

Estimated sample size for different sampling options[19]:

Simple Random Sampling

	Annual Sampling / Sampling per CPA (90/10)	Annual Sampling / Sampling across CPA (95/10)	Biennial Sampling / Sampling per CPA (95/5)	Biennial Sampling / Sampling across CPA (95/5)
DO_y	20	29	116	116
η_{new}	2	2	9	9
$N_{eaters\_project}$	44	63	252	252

Note: Response rate is assumed to be 70%.

For subsequent monitoring periods, the values determined during the previous monitoring period will be used for calculation of sample sizes for each monitoring period.

However in order to be conservative, minimum sample sizes will apply in all of the 4 sampling options if the calculated sample size for the specific parameter and sampling option (which depends on the expected value and the estimated standard deviation) is lower than the minimum sample size thresholds below. Therefore the sample size in each sampling option will be as calculated or the minimum sample size, whichever is higher.

Minimum sample sizes for each sampling option (only applicable if the calculated sample size is lower):
η_{new}: 10
DO_y: 60
$N_{eaters\_project}$: 30

e. Sampling Frame

i. Identification or description of sampling frame

The sampling frame is the list containing all ICS which were included up to the specific monitoring period.

ii. List of sampling frame (if known)

The full list of all ICS included will only be available after the end of the specific monitoring period. At time of submitting the PoA for registration and the 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:

Type of appliance (ICS type) deployed	Serial number (Stove-ID) of device	Delivery date of appliance (to user)	User details (Name, Address, etc.)	Administrative unit
Save80	6207 C1	xx/xx/2xxx	XXX	XXX
Save80	6207 C2	xx/xx/2xxx	XXX	XXX

[18] See Monitoring Report : Issuance of project PoA 6207 and the corresponding CER calculation spread sheet on the project page: http://cdm.unfccc.int/PoAIssuance/iss_db/poaiss267785262/view

[19] The calculations spread sheet is provided to the DOE. The sample size is calculated according to the formulae provided in the BEST PRACTICE EXAMPLES FOCUSING ON SAMPLE SIZE AND RELIABILITY CALCULATIONS AND SAMPLING FOR VALIDATION/VERIFICATION EB 67 Annex 6.

Save80	6207 C3	xx/xx/2xxx	XXX	XXX
…	…	…	…	…

The serial number (Stove ID) serves as the unique code in the sampling process i.e. as a result of the sampling a list of serial numbers is determined which are allocated to the specific stoves. Those stoves will be monitored according to the procedures described in this section.

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
$\boldsymbol{DO_y}$	Statistically adjusted drop out from total population of appliances in period y
η_{new}	Adjusted average efficiency of the device being deployed as part of the CPA
$N_{eaters\_project}$	Average number of eaters for whom meals are prepared on the 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_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_y is determined by asking the user a yes or no question.

η_{new} : The WBT protocol is applied to measure the efficiency of the ICS deployed. The WBT protocol is taking 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.

$N_{eaters\_project}$

$N_{eaters\_project}$ is determined by asking the user about average number of eaters for whom meals are prepared on the ICS 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 the former is not affected by seasonal fluctuations.

v. Description of measurement methods

DO_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.

η_{new}

η_{new} is determined applying the Water Boiling Test (WBT) protocol (see D.7.1). Tests will be reported in spreadsheet templates. All equipment used will fulfill the requirements of EB 61 Annex 21 Paragraph 17. (c).

$N_{eaters\_project}$

The average number of eaters for whom meals are prepared on the ICS will be either determined through monitoring recording sheets by the users themselves, or through interviews. Interviews will be conducted using a questionnaire.

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 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 ICS, this ICS will count as Drop-Out. If the reason is e.g. a time constraint which cannot be solved by repeating the survey effort at this household at another date, the household will be replaced by another household.

In case of non-respondent the household will be replaced by another household in the survey (See above, 30% estimate of non-response).

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 of 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.6.3 of the Generic Component Project Activity within the PoA-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. 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 the present document.

As a result of the sampling effort the results will be transferred to the Sample Database by the CME or an entity appointed by the CME:

The Sample Database includes the following information for the ICS which are part of the monitoring sample:

- Continuous operation of appliance (yes/no), and/or
- Average Number of eaters per ICS ($N_{eaters\_project}$), and/or
- Efficiency tested (η_{new})
- Date of the check

The information in this database will be updated for every Monitoring period.

SECTION E. Approval and authorization

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A Letter of Approval from the Designated National Authority for Cameroon has been obtained on the 28 May 2014.

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Appendix 1. Contact information of CPA implementer(s) and responsible person(s)/ entity(ies) for completing the CDM-SSC-CPA-DD-FORM

CPA implementer and/or responsible person/ entity	☒ CPA implementer(s) ☒ Responsible person/ entity for completing the CDM-SSC-CPA-DD-FORM
Organization	atmosfair gGmbH
Street/P.O. Box	Zossener Strasse 55-58
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State/Region	Berlin
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Country	Germany
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E-mail	info@atmosfair.de
Website	www.atmosfair.de
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Salutation	Mr.
Last name	Bratschke
Middle name	
First name	Sven
Department	
Mobile	
Direct fax	
Direct tel.	
Personal e-mail	bratschke@atmosfair.de

Appendix 2. Affirmation regarding public funding

The letter regarding none diversion of ODA is submitted to the DOE.

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

The applicability of the selected methodology AMS-II.G Version 03 has been provided in section D.2.

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

Background information on ex ante calculation of emission reductions has been provided under section D.6.3.

Appendix 5. Further background information on monitoring plan

The monitoring plan has been explained in section D.7.2.

Appendix 6. Summary of post registration changes

There are no post registration changes for the CPA till date.

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Document information

Version	*Date*	*Description*
04.0	9 March 2015	Revisions to: • Include provisions related to statement on erroneous inclusion of a CPA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Provisions related to the Host Party; • Editorial improvement.
03.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the component project activity design document form for small-scale CDM component project activities (these instructions supersede the "Guidelines for completing the component project activity design document form for small-scale component project activities" (Version 01.0)); • Include provisions related to standardized baselines; • Add contact information on a CPA implementer and/or responsible person/ entity for completing the CDM-SSC-CPA-DD-FORM in A.14. and Appendix 1; • Add general instructions on post-registration changes in paragraph 4 and 5 of general instructions and • Change the reference number from *F-CDM-SSC-CPA-DD* to *CDM-SSC-CPA-DD-FORM*; • Editorial improvement.
02.0	13 March 2012	EB 66, Annex 17 Revision required to ensure consistency with the "Guidelines for completing the component project design document form for small-scale component project activities".
01.0	27 July 2007	EB33, Annex44 Initial adoption.

Decision Class: Regulatory
Document Type: Form
Business Function: Registration
Keywords: component project activity, project design document, SSC project activities