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: Project Gaia Cook Stove Programme of Activities - CPA0002 Djibouti

Version number of the CPA-DD: Version 01

Completion date of the CPA-DD: 15/10/2015

Title of the PoA to which the CPA is included: Project Gaia Cook Stove Programme of Activities (PoA)

Host Party: Djibouti

Estimated amount of annual average GHG emission reductions: 20,809 tCO_2e

SECTION A. General description of CPA

A.1. Title of the proposed or registered PoA

Project Gaia Cook Stove Programme of Activities (PoA)

A.2. Title of the CPA

Title: Project Gaia Cook Stove Programme of Activities - CPA0002 Djibouti
Version: 1.0
Date of Completion: 15/10/2015

A.3. Description of the CPA

The purpose of the CPA, under the **Project Gaia Cook Stove Programme of Activities (PG PoA)** is to displace the use of non-renewable biomass and fossil fuel for cooking in households through the dissemination of energy efficient cook stoves powered by ethanol, a renewable energy source. The CPA is of the small-scale type falling under sectoral scope: Energy industries renewable/non-renewable sources (1).

The CPA will be implemented within the national boundary of Djibouti as described in section A.7 of the CPA-DD. Cook stoves distributed under this CPA will not exceed a total installed/rated capacity of 45MWth while individual stoves will have a rated capacity not exceeding 150 kWth.

Project Gaia Inc will be the Coordinating/Managing Entity (CME) of the programme while the CPA implementer will be Gaia Association.

As the CPA implementer, Gaia Association will be responsible for the following:

- Ensure that the CPA is implemented.
- Operate and maintain the CPA for the duration of the project;
- Keep records of parameters as per the monitoring plan and provide hard and electronic records to the CME on a regular basis and provide the CME and DOE with required documents and access to stove users.
- Make available staff for validation and verification where applicable.

Upon implementation, the CPA will achieve total emission reductions of 145,666 t CO_2e during the first crediting period and an annual average of 20,809 t CO_2e.

Besides reducing the greenhouse gases (GHG), the project will result in the following sustainable development benefits in line with the PG PoA.

Environmental Benefits

1. The project will reduce deforestation and forest degradation in areas where non-renewable biomass is used as a source of fuel. This will contribute to the overall stability of forest ecosystems, which support biodiversity and maintain cultural and aesthetic value of forestlands.

Social-economic Benefits

1. The project will reduce indoor air pollution through reduced combustion of non-renewable biomass and fossil fuels in households. According to the WHO report on indoor air pollutions (2007)[1], toxic smoke from the combustion of firewood and fossil fuels is responsible for a range of deadly chronic and acute health effects such as child pneumonia, lung cancer, chronic obstructive pulmonary disease, and heart disease, particularly for women and children who spend a large portion of their time near the fireplaces.

[1] World Health Organization, Indoor Air Pollution: National burden of Disease Estimates., Geneva: WHO (2007)

2. The project will reduce the amount of money spent to purchase fossil fuels and fuel wood
3. The project will also help to free time spent in search of wood fuel in places where non-renewable biomass is the fuel of choice. This will ensure that household members, particularly women have enough time to care for their children and attend to other responsibilities such as pursuing income-generating activities, education, leisure and rest. According to the Global Alliance for Cook Stoves[2] lack of access to cooking fuel forces women and children to spend many hours gathering firewood up to 5 hours per day or spend significant household income on fuel purchase.
4. The project will reduce the risks and danger faced by women and girls when collecting firewood for cooking. Women and girls are the primary collectors of firewood. The search for firewood exposes them to attack, rape and gender violence as they venture into unsafe territories.
5. The project will contribute to the national hydrocarbon balance by reducing the amount of kerosene imports for cooking purposes at the household level.

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

The entity responsible for the proposed CPA is Gaia Association an NGO based in Ethiopia and with a presence in Djibouti. Gaia Association will also be the distribution organisation (DO) for the dissemination of the stoves in Djibouti's households.

Project Gaia Inc will be the Coordinating/Managing Entity.

A.5. Technical description of the CPA

Facilities, systems and equipment in operation in the baseline scenario

According to world energy outlook, in developing countries and especially in rural areas, 2.5 billion people rely on biomass, such as firewood, charcoal, agricultural waste and animal dung, for their cooking needs. In these countries, this resources account for over 90% of the household energy consumption.

The World Bank Report on Household Energy Distribution in Djibouti further reports that about 12.7% of the households in Djibouti use wood fuel for cooking. Djibouti households consume an annual estimate of 70,000m^3 of fuel wood according to the UN data[3]. Considering a wood density conversion factor of 0.725t/m^4 this fuel wood consumption would translate to an equivalent of 50,750 tonnes. The use of inefficient technologies for energy conversion purpose has had adverse effects on the population in which it is employed ranging from social, health, environmental and economical development effects.

Figure 1 below shows a typical open fire cooking technique.

[2] http://cleancook stoves.org/impact-areas/women/; Accessed on 1 April 2015.

[3] UNDATA (2012): *household fuelwood consumtion-Djibouti: https://data.un.org/Data.aspx?d=EDATA&f=cmID%3AFW%3BtrID%3A1231* (Accessed on 20/05/2015)

[4] FAO. *Definitions and Conversion factors.* ftp://ftp.fao.org/docrep/fao/010/a1106e/a1106e05.pdf

Figure 1: Open fire cooking

Kerosene use for cooking and lighting also remains widespread in developing countries, despite the global reduced use arising from electrification.[5] These trends can be explained by the classification of kerosene as a cleaner alternative to solid fuels including biomass and coal for cooking. According to the to General Population and Habitat Census in 2009 and the World Bank report on household energy distribution (2005), kerosene is considered the primary source of energy for households in Djibouti. About 1.1 liters[6] of kerosene is purchased by households on daily basis[7] in Djibouti. This translates an average monthly consumption of about 33 litres and an annual of over 400 litres.
Figure 2 shows a typical diagram of the kerosene wick stove alongside a charcoal stove.

Figure 2: Kerosene wick stove alongside a charcoal stove

The baseline scenario is a continuation of the current practice, thus identical to the scenario existing prior to the implementation of the CPA.

Facilities, systems and equipment in the project scenario

The CPA will introduce measures that will reduce the emission of carbon dioxide through the displacement of fossil fuel and the use of non-renewable biomass. The CPA will involve the distribution of energy efficient cook stoves powered by ethanol to households for cooking

[5] http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3664014/; Accessed on 28 May 2015

[6] The World Bank Report on Household Energy Distribution

[7] World Bank Report on household Energy Distribution Page 29

purposes. The CME will work with the CPA implementers in the distribution of the stoves to the end-users.

The stoves to be distributed will have a higher efficiency compared to the baseline technology, which is composed of inefficient wood fuel cook stoves, and/or kerosene powered stoves.

The stoves will be of the following specifications

1. **Single Burner Stainless Steel Stove**
    - The stove is made out of stainless steel burner parts, body of stainless steel; galvanized steel and high quality enamel finish with one burner. The stove has an approximate lifetime of 10 years.
    - Has a power rated capacity of 1.5 kWth per burner
    - The stove burns using only ethanol
    - Can burn 1 litre of ethanol in 4.5 hours under high power and 9 hours under low power
    - Has only one burner for cooking
    - Efficiency of the stove is greater than 60%

2. **Double Burner Stainless Steel Stove**
    - The stove is made out of stainless steel burner parts, body of stainless steel, galvanized steel, and high quality enamel finish with double burner. The stove has an approximate lifetime of 10 years.
    - Has a power rated capacity of 1.5 kWth per burner making a total of 3.0 kWth its capacity
    - Can burn 1 litre of ethanol in 4.5 hours under high power and 9 hours under low power
    - Has double burners for cooking
    - Efficiency of the stove is greater than 60%

3. **Single Burner Aluminium stove**
    - All stainless steel burner parts, body of aluminium, galvanized steel, aluminium single burner with a rated lifetime of 6 years
    - Has a power rated capacity of 1.5 kWth per burner
    - Can burn 1 litre of ethanol in 4.5 hours under high power and 9 hours under low power
    - Efficiency of the stove is greater than 60%

4. **Double Burner Aluminium Stove**
    - All stainless steel burner parts, body of aluminium, galvanized steel, aluminium double burner with a rated lifetime of 6 years
    - Has a power rated capacity of 1.5 kWth per burner making a total of 3.0 kWth its capacity
    - Can burn 1 litre of ethanol in 4.5 hours under high power and 9 hours under low power
    - Efficiency of the stove is greater than 60%

Figure 3 and Figure **4** below show typical stove types to be distributed under the CPA while Figure 5 shows the fuel canister.

Figure 3: Double Burner Stove

Figure 4: Single Burner Stove

Figure 5:Fuel canister

Transfer of technical know how

Transfer of technical know-how will be achieved by the distribution of state-of-the-art Dometic cook stoves from Sweden. The CPA Implementing entities will provide trainings to the users at the time of purchase of the stoves by the users. The trainings will ensue that the users are well aware of the safe operation procedures of the stoves with minimal risks of accidents.

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)
Djibouti (host)	Gaia Association	No

A.7. Geographic reference or other means of identification

The CPA will be implemented within the boundary of the host country (Djibouti) as defined by the figure below and the coordinates.

Figure 6: Djibouti

Point	Latitude	Longitude
Point 1	14.237364°	36.609131°
Point 2	12.467558°	42.392283°
Point 3	10.957506°	42.97985°
Point 4	8.013983°	48.028539°
Point 5	3.991681°	41.936503°
Point 6	4.665675°	36.014278°
Point 7	9.510436°	34.132022°

A.8. Duration of the CPA

A.8.1. Start date of the CPA

01/12/2015

A.8.2. Expected operational lifetime of the CPA

10 years (based on maximum operational lifetime of the stove)

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

Renewable crediting period

A.9.1. Start date of the crediting period

01/01/2016

A.9.2. Length of the crediting period

First crediting period 7 years renewable twice for a total of 21 years.

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
2016	12,918
2017	21,382
2018	24,946
2019	24,501
2020	23,609
2021	23,164
2022	15,146
Total number of crediting years	7
Annual average GHG emission reductions over the crediting period	20,809
Total estimated reductions (tonnes of CO_2e)	145,666

A.11. Public funding of the CPA

No public funding has been received for the development or implementation of the CPA and therefore diversion of Official Development Assistance from any Annex I country will not occur. The CPA implementing Entity will provide a letter to evidence this.

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

In accordance with the methodological tool: Assessment of debundling for small-scale project activities version 04.0, project activities that consist of independent subsystems that are distributed in multiple locations and are not greater than 1% of the small-scale thresholds defined by SSC methodologies, exempted from performing a de-bundling check i.e. considered as being not a de-bundled component of a large scale activity.

The CPA has already demonstrated in section D.5 that it comprises of distribution of ethanol stoves to households. Further to this the CPA through the manufacture's specification has demonstrated that the units are not more than 1% of the small-scale threshold and is therefore exempted from debundling check.

A.13. Confirmation for CPA

The CPA is neither registered as an individual CDM project activity nor is it part of another registered PoA. All cook stoves distributed under this CPA will be uniquely identifiable by a serial number as further documented in CPA eligibility criteria in section D.5 of the CPA-DD.

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

Entity: Carbon Africa Ltd
Name: Elijah Isabu
Date: 15/10/2015

The person/entity is not the CPA implementer

SECTION B. Environmental analysis

B.1. Analysis of the environmental impacts

The Component project activity will not result in significant environmental impacts since it involves the distribution of high quality cook stoves powered by ethanol.

In accordance with the Decree No. 2001-0011 / PR / MHUEAT[8] concerning definition of the environmental impact assessment procedure, all activities capable of causing negative impacts on the environment must be subject to a prior environmental impact study. Public events are also covered by the decree. Activities undertaken by the Component Project Activity do not fall under those that will require an Environemntal Impact Assessment.

SECTION C. Local stakeholder consultation

C.1. Solicitation of comments from local stakeholders

Based on the definition of “stakeholder” from Glossary of CDM terms version (08.0) the following groups of people were identified as stakeholders:

- Members from the wider project area and members of the general public.
- Academia
- Government departments and agencies (local, district and national)
- NGOs, community representatives and donor representatives

General Public: The general public is a stakeholder because they will be the end-users of the ethanol powered stoves.

Academia: Higher learning institutions are considered stakeholders because of relevant data and information they might possess regarding the region that the developer may not be aware of.

Government representatives and Designated National Authority: Government representatives and the Designated National Authority are considered stakeholders because the implementation of the project is expected to impact on the achievement of a number government policies and sustainable development goals in relation to poverty reduction and energy provision.

NGOs, community representatives and donor representatives: NGOs, community representatives and donors are considered stakeholders because of their unique position as direct

[8] http://faolex.fao.org/cgibin/faolex.exe?rec_id=107102&database=faolex&search_type=link&table=result&lang=eng&format_name=@ERALL; Accessed on 23 September 2015

contact with the community members. One such NGO is Gaia Association, which will host the project.

How stakeholder comments were solicited

Comments from the various groups of stakeholders were solicited by the use of emails, newspaper adverts, and consultation meetings, as further described below:

Email invitations: A good number of the stakeholders identified had access to email services and therefore they were invited by the use of emails. The emails were sent approximately 4 weeks prior to the date of the consultation meeting in order to give the stakeholders sufficient time to plan for attending the meeting. Stakeholders who confirmed that they could not attend the meeting due to other commitments were asked to send representatives if possible. As a last measure, in the event that it was impossible for the stakeholders and any of their representatives to be present, their input was solicited via email.

Websites advertisement: The general public was invited through online advertisements on two websites. The announcements were published on 3rd August 2015 on Project Gaia's website and Carbon Africa's website.

C.2. Summary of comments received

The following is a summary of the comments received by stakeholders:

1. Gaia should also work on solar projects which can provide more benefits for Djibouti
2. Emissions from the sugar factory are more compared to emissions produced from using charcoal and kerosene
3. Gaia should set up an office in Djibouti City for easy physical access incase of any inquiry on their products.
4. The Government should be more involved in the planning of the roll out of the project as this is a new technology

C.3. Report on consideration of comments received

1) Gaia Association is currently focusing on ethanol cook stoves and may look into other alternatives like solar cook stoves in the future
2) The emissions are calculated based on approved methodologies under the CDM and Gold Standard. These methodologies where applicable will determine the emissions from the production of ethanol in sugar factories as conservatively as possible.
3) Before the commencement of the distribution of the stoves in Djibouti households, Gaia will have a sales point in Djibouti where grievances and any other concern about the products will be tackled when they arise. Before the project can be rolled out in Djibouti Project Gaia will have to get the approval of the various government entities involved in such projects and will not start without meeting the requirements set by the Government of Djibouti.

SECTION D. Eligibility of CPA and estimation of emissions reductions

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

CPAs included under this PoA will apply a combination of approved small scale methodologies *AMS-I.E* '*Switch from non-renewable biomass for thermal application by the user' version 06.0* and approved baseline and monitoring methodology *AMS-I.I 'Biogas/biomass thermal applications for households/small users' version 04.0*

Tools applicable

Methodology AMS-I.E version 06.0 makes use of the latest version of the following tool:

a) Tool for Project emissions from cultivation of biomass v01.0

Methodology AMS-I.I version 04.0 does not make use of any tool

The CPA will not utilize a standardized baseline.

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

The CPA meets the applicability of approved methodologies AMS-I.E '*Switch from non-renewable biomass for thermal application by the user' version 06.0* and AMS-I.I *'Biogas/biomass thermal applications for households/small users' version 04.0* as justified in the Table 2 and Table 3 below.

The combination of these methodologies is applicable based on the *Standard demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programmes of activities version 03.0 paragraph 30* which states that 'Combinations of technologies/measures and/or methodologies for a PoA are eligible where it is demonstrated that there are no cross effects between the technologies/measures applied.

A cross effect analysis has been carried out in line with the CDM *Guideline for the Consideration of Interactive Effects for the Application of Multiple CDM Methodologies for a Programme of Activities (Version 01.0 - EB 68, Annex 3).* The analysis has proven that there are no cross-effects whatsoever in the combination of the two methodologies as outlined in paragraph 13 of the *Guideline for the Consideration of Interactive Effects for the Application of Multiple CDM Methodologies for a Programme of Activities (Version 01.0 - EB 68, Annex 3).* The analysis is shown in Table 1 below:

Table 1: Cross Effects Analysis

Type of interactive effect	Justification of non-interactive effect by the CPA
a) Type I: interactive effects could occur when there is **an exchange of energy** (thermal, mechanical or electrical) or mass transfer between different measures of the CPA, the transfer occurring from a primary, independent measure to a dependent measure;	**a)** There is no exchange of energy between an ethanol cook stove that displaces kerosene stove and an ethanol cook stove that displaces a wood/charcoal stove.
b) Type II: interactive effects could also occur when several measures rely on the **same information** when estimating emission reductions. For example, several measures refer to historical fuel/electricity/heat consumption. They may also occur when combining methodologies relying solely on default factors for setting the baseline.	**b)** Emission reduction calculations are a function of consumption of baseline fuel and stove efficiency. The CPA relies on different information for the estimation of baseline fuel consumption and baseline stove efficiency. Information about project stove efficiency is the same but this is not relevant in terms of cross effects.

Applicability criteria for AMS-I.I *'Biogas/biomass thermal applications for households/small users' version 04.0.*

Table 2: Applicability of AMS-I.I version 04.0

Methodology Applicability	Justification

This category comprises activities for generation of renewable thermal energy using renewable biomass or biogas for use in residential, commercial, institutional applications (e.g. for supply to households, small farms or for use in built environment of institutions such as schools). 1 Examples of these technologies that displace or avoid fossil fuel use include but are not limited to biogas cook stoves, biomass briquette cook stoves, small scale baking and drying systems, water heating, or space heating systems.	CPA included under this PoA will distribute stoves that generate renewable thermal energy using ethanol, which is a renewable biomass.
The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW thermal	The estimated, cumulative rated thermal energy generation capacity installed under the CPA will not exceed 45 MW thermal
Each unit (e.g. cook stove, heater) shall have a rated capacity equal to or less than 150 kW thermal. Projects that include units with rated capacity greater than 150 kW thermal may explore AMS-I.C Thermal energy production with or without electricity	The stoves distributed under the CPA have a maximum rated capacity of 3.0 kWth, which is less than 150kW
For the specific case of biomass residues processed as a fuel (e.g. briquettes, wood chips), it shall be demonstrated that: a) It is produced using solely renewable biomass (more than one type of biomass may be used). Energy use for renewable biomass processing (e.g. shredding and compacting in the case of briquetting) may be considered as equivalent to the upstream emissions associated with the processing of the displaced fossil fuel and hence disregarded; b) The General guidance on leakage in biomass project activities (attachment C to appendix B of 4/CMP.1 Annex II) shall be followed; c) The project participant can monitor the mass, moisture content and NCV of the resulting biomass fuel, through sampling that meets the confidence/precision level of 90/10; d) Where the project participant is not the producer of the renewable fuel, the project participant and the producer are bound by a contract that shall enable the project participant to monitor the source of renewable biomass to account for any emissions associated with biomass production (as per 4(b) above). Such a contract shall also ensure that there is no double counting of emission reductions.	Not applicable as the CPA does not use biomass residues processed as fuel. Instead, the CPA derives its fuel from molasses, which is a by-product of sugar processing (industrial waste).
The methodology is applicable to a programme of activities; no additional leakage estimations are necessary other than that indicated under	The CPA is part of the Project Gaia Cook Stove Programme of Activities. The CPA will comply with the necessary leakage estimations

leakage section above.	indicated above

Applicability criteria for AMS-I.E '*Switch from non-renewable biomass for thermal application by the user' version 06.0*

Table 3: Applicability of AMS-I.E version 06.0

Applicability	**Justification**
This methodology comprises of activities to displace the use of non-renewable biomass by introducing renewable energy technologies. Examples of these technologies include, but are not limited to biogas stoves, solar cookers, passive solar homes, renewable energy based drinking water treatment technologies (e.g. sand filters followed by solar water disinfection; water boiling using renewable biomass).	CPA included under this PoA will distribute stoves that will displace the use of non-renewable wood fuel (firewood and charcoal) with stoves that use ethanol as fuel, which is a renewable biomass.
Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics.	The project participant has evidenced that non-renewable biomass has been in use since 31 December 1989.as shown in Table 4 below.
The methodology is applicable for technologies displacing use of non-renewable biomass by renewable energy	The technologies implemented under this CPA will be energy efficient cook stoves that use ethanol which is a renewable biomass that will displace the use of wood fuel which is a non-renewable biomass used by the baseline stoves.
The use of this methodology in a project activity under a programme of activities (PoA) is legitimate if the following leakages are estimated and accounted for, if required, on a sample basis using a 90/30 precision for the selection of samples, and accounted for: (a) Use of non-renewable woody biomass saved under the project activity to justify the baseline of other CDM project activities can also be a potential source of leakage. If this leakage assessment quantifies a portion of non-renewable woody biomass saved under the project activity that is then used as the baseline of other CDM project activities then By is adjusted to account for the quantified leakage; (b) Increase in the use of non-renewable woody biomass outside the project boundary to create non-renewable woody biomass baselines can also be a potential source of leakage. If this leakage assessment quantifies an increase in the use of non-renewable woody biomass outside the project boundary, then By is adjusted to account for the quantified leakage;	a) The CPA accounts for leakage that arises from non-renewable woody biomass saved under the CPA. b) Leakage arising from the increased use of non-renewable woody biomass is accounted for in the CPA.

(c) As an alternative to subparagraphs (a) and (b), *By* can be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.	c) Applicable since the CPA applies the net to gross adjustment factor to account for leakages.
The following further conditions apply for the value of fraction of non-renewable (fNRB) applied in a component project activity (CPA) of a PoA. The choice between (a) conduct own studies to determine the local fNRB value and then apply those values in the CPAs; and (b) use default national values approved by the Board; shall be made ex ante. A switch from national value i.e. choice (b) to sub-national values i.e. choice (a) is permitted, under the condition that the selected approach is consistently applied to all CPAs.	The CPA applies (b) the use default national values approved by the Board.

Table 4: Demonstration of use of NRB

In Djibouti the use of non-renewable biomass has been documented for a long time. In 1984 the consumption of firewood was documented to be 25,811 tonnes, with the demand for timber being 1.2 tones per houhsehold in the same year. This figure has been on the increase with statistics in the year 1988 showing an increase in the demand for wood with 143,000 rural households and 6,800 urban dwellers depending on firewood as their source of energy. This demand translated to about 176 000 m3 of wood being harvested.[9]

It has also been documented that the excessive demand for wood products will soon lead to the extinction of some species of trees such as juniper in Djibouti[10]

The following table depicts the predicted forest coverage from the year 2000 to 2010[11]

2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
22000	21274	20571.9	19893.1	19171.1	18476.8	17774.5	17072.2	16370	15668	14965

The above information provides a justification that there has been continuous use of that non-renewable biomass

[9] L'Etude prospective du secteur forestier en Afrique http://www.fao.org/3/a-x6781f.pdf accessed on 30/09/2015

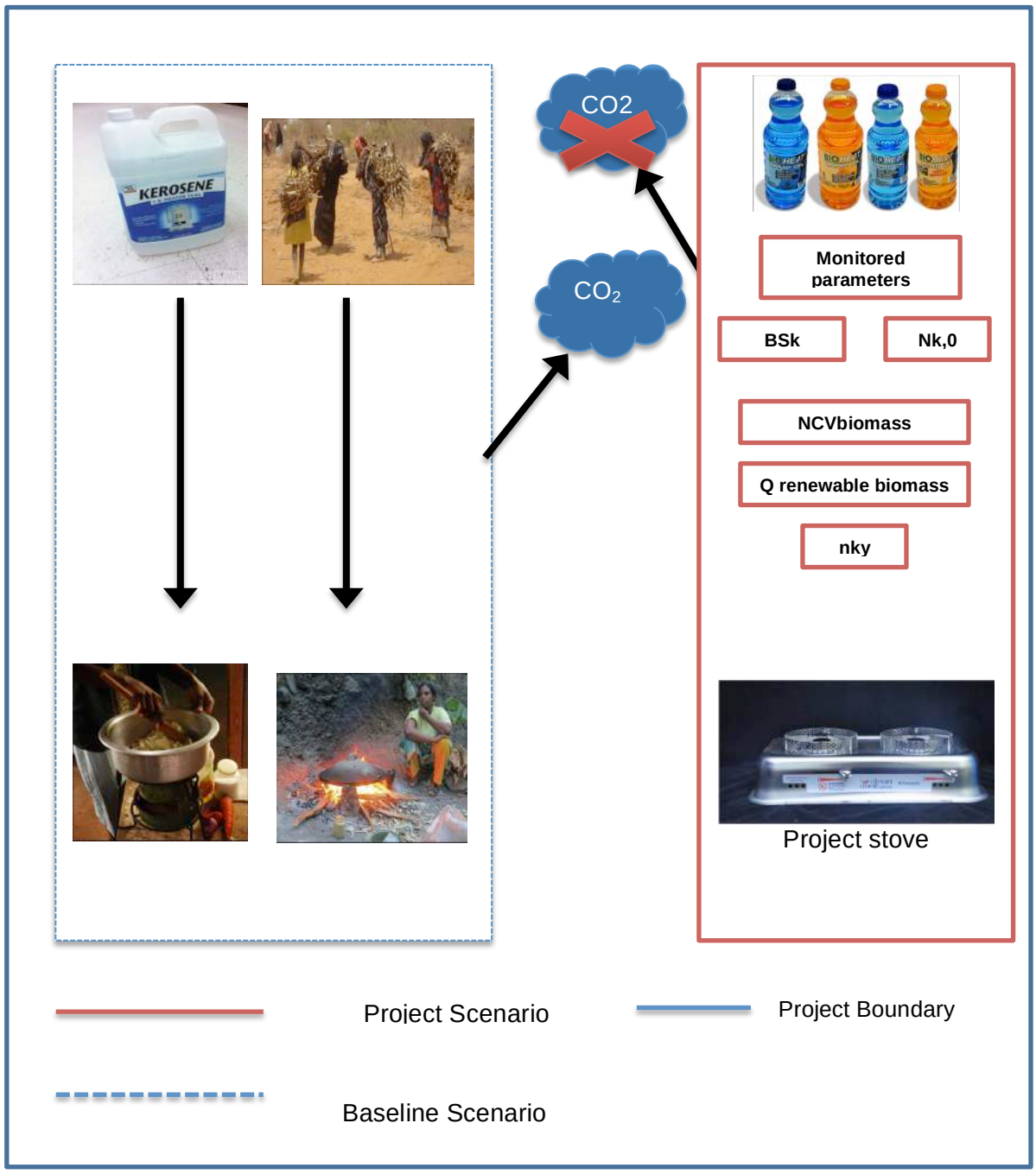
[10] L'Etude prospective du secteur forestier en Afrique http://www.fao.org/3/a-x6781f.pdf accessed on 30/09/2015

[11] http://www.fao.org/3/a-x6781f.pdf accessed o 30/09/2015

D.3. Sources and GHGs

In accordance with the approved small-scale methodology AMS-I.I *'Biogas/biomass thermal applications for households/small users' version 04.0,* the project boundary is the physical, geographical sites of the equipment producing thermal energy during the crediting period. Likewise, according to AMS-I.E '*Switch from non-renewable biomass for thermal application by the user' version 06.0,* the project boundary is the physical, geographical site of the use of biomass or the renewable energy.

Cook stove units distributed under this CPA will be located within the national boundaries of Djibouti. The flow diagram below highlights the equipment, systems, emission sources and gases included in the boundary as well as the monitoring parameters in the CPA boundary.



The greenhouse gases and emission sources included in or excluded from the project boundary are shown in the table below.

Source		Gas	Included	Justification
Baseline Emissions	**Combustion of non-renewable biomass for cooking**	CO_2	Yes	Main source of emission under AMS-I.E
		CH_4	No	Not considered as a source of emissions as per AMS-I.E
		N_2O	No	Not considered as a source of emissions as per AMS-I.E
	Combustion of fossil fuel for cooking	CO_2	Yes	Main source of emission under AMS-I.I
		CH_4	No	Minor source of emissions as per AMS-I.I
		N_2O	No	Not considered as a source of emissions as per AMS-I.I
Project Emissions	**Combustion of non-renewable biomass for cooking**	CO_2	No	Not relevant for the project as it does not involve cultivation of biomass
		CH_4	No	Not relevant under methodology AMS-I.E
		N_2O	No	Not relevant under methodology AMS-I.E
	Combustion of fossil fuel for cooking	CO_2	No	Not relevant under the option chosen in AMS-I.I
		CH_4	No	Not relevant under methodology AMS-I.I
		N_2O	No	Not relevant under methodology AMS-I.I

D.4. Description of the baseline scenario

In accordance with AMS-I.E version 6.0, it is assumed that in the absence of the project activity, the baseline scenario would be the use of non-renewable biomass for meeting similar thermal energy needs. Similarly, AMS-I.I version 4.0 states that the baseline is the fuel consumption of the thermal application used or that would have been used in the absence of the project activity times an emission factor for the fossil fuel displaced.

Therefore, in the baseline scenario of the CPA, CO_2 would have been produced from the combustion of non-renewable biomass and fossil fuels for cooking purposes.

According to world energy outlook, in developing countries and especially in rural areas, 2.5 billion people rely on biomass, such as firewood, charcoal, agricultural waste and animal dung, for their cooking needs. In these countries, these resources account for over 90% of the household energy

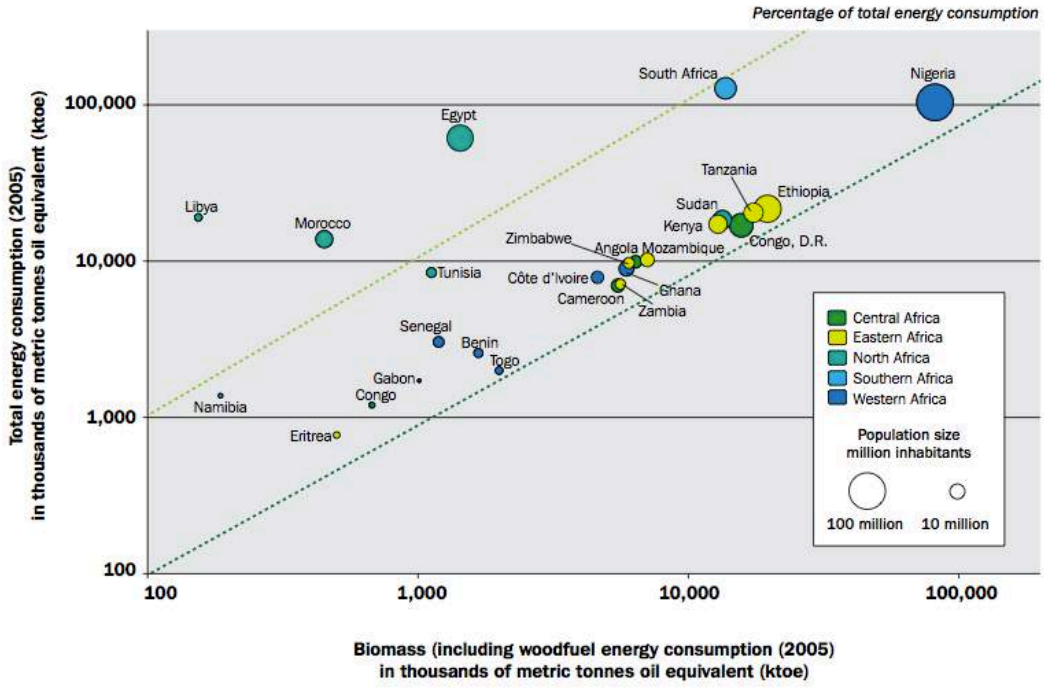
consumption. In absence of better policies this demand is projected to increase from 2.6 billion reliance in 2015 to 2.7 billion reliance in 2030. This will represent one third of the world population relying on biomass as their source of cooking energy.[12] The use of biomass itself hasn't been indicated as being the main concern but rather it's harvesting which has been cited as being done in an unsustainable manner. The use of inefficient technologies for energy conversion purpose has had adverse effects on the population in which it's employed. These effects range from social, health, environmental and economical development effects. [13]

About 4.3 million people die yearly prematurely from illnesses attributed to household air pollution caused by the inefficient use of solid fuels[14]. Valuable time and effort is devoted to fuel collection instead of education or income generation.[15]

Two complementary approaches have been singled out as a remedy to the situation; promoting more efficient and sustainable use of traditional biomass and encouraging people to switch to modern cooking fuels and technologies. [16]

The quantity of household energy demand in developing countries in 2004 was about 1090 Mtoe with household biomass in developing countries accounting for almost 70% of the world primary energy demand, the use being primarily on household cooking followed by heating space and water heating. [17]

In Sub-Saharan Africa about 76% of the population depends on biomass for cooking.[18] Closer look at regions in Africa below show the high consumption of biomass by Africa countries[19]



[12] World Energy Outlook 2006

[13] https://www.iea.org/publications/freepublications/publication/cooking.pdf. Accessed on 25 Sep 2015

[14] http://www.who.int/mediacentre/factsheets/fs292/en/ . Accessed on 25 Sep 2015

[15] https://www.iea.org/publications/freepublications/publication/cooking.pdf. Accessed on 25 Sep 2015

16 World Energy Outlook 2006

[18] World Energy Outlook 2006

[19] Wood-Based Biomass Energy Development for Sub-Saharan Africa

According to the to General Population and Habitat Census in 2009 and the World Bank report on household energy distribution (2005), kerosene is considered the primary source of energy for households in Djibouti. Its consumption is predominant among rural and urban households alike meeting their energy requirements for both cooking and lighting. Kerosene consumption is reported to vary slightly as one moves from urban to rural set-ups where the use of wood fuel is observed to rise and kerosene consumption decrease. Nevertheless, the use of wood fuel and charcoal among Djibouti's households is still generally low owing to the low forest cover rates in Djibouti. In fact most of the wood and charcoal supplied to the country is sourced from Ethiopia and Somalia.[20]

Official data[21] from the government indicates that about nine out of ten of the Djibouti households cook with kerosene. The report also acknowledges that these statistics are not always true since households sometimes use alternative energy sources. The Central Statistics Agency report on Demographics (2009) provides a more accurate data putting kerosene use for cooking among households at 80.6%.[22] The World Bank Report on Household Energy Distribution in Djibouti reported that on average, about 1.1 litres of kerosene is purchased by households on daily basis[23]. This translates an average monthly kerosene consumption of 33 litres

The World Bank Report on Household Energy Distribution in Djibouti further reports that about 12.7% of the households in Djibouti use wood fuel for cooking. About seventy percent of all people who gather wood are adult women. In the peri-urban and rural areas (provincial cities), a lot of time is devoted to firewood collection. The World Bank report indicated the time to average at 11 hours per day.[24] Furthermore, the results of the survey show the poorest households have relatively increased their fuelwood consumption after the fuel prices began to rise with this increase becoming more sgnificant in peri-urban and rural areas (provincial cities). Wood fuel and charcoal retail at a higher market price than kerosene largely due to the scarcity of the country's forest resources and necessitating the need for imports from the neighboring Somalia and Ethiopia. Djibouti households consume an annual estimate of 70,000m^3 of fuel wood according to the UN data[25]. Considering a wood density conversion factor of 0.725t/m^3[26] this fuel wood consumption would translate to an equivalent of 50,750 tonnes per year.

Similar to the health concerns posed by biomass consumption for cooking, recent scientific studies have shown that, depending on the design of the cook stove, household use of kerosene can emit troubling amounts of health-damaging pollutants. Particulate matter, carbon monoxide, and formaldehyde that have been shown to impair lung function, increase infectious illnesses for example, tuberculosis, asthma and cancer risk[27]. On burning, kerosene produces black soot, fine particles with a diameter of up to 2.5 microns ($PM_{2.5}$), which are able to penetrate deep into the lungs and also increases the heating of the earth's surface when released into the atmosphere as black carbon. In addition to the health related concerns the use of kerosene appliances also pose the risks of burns, fires and poisonings associated with household use.

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[20] Enquete Djiboutienne a Indicateurs Multiples (EDIM) 2004, Page 22

21 Enquete Djiboutienne a Indicateurs Multiples (EDIM) 2004, page 12

22 Enquete Djiboutienne a Indicateurs Multiples (EDIM) 2004, page 7

[23] World Bank Report on household Energy Distribution Page 29

[24] Page Vii of the report is not very clear on the frequency of the wood collection i.e. per day or per week. However, given the clear scarcity in finding wood and since wood collection is also a source of livelihood for the population in question, it is assumed that this values rfers to hours per day.

[25] UNDATA (2012): *household fuelwood consumtion-Djibouti: https://data.un.org/Data.aspx?d=EDATA&f=cmID%3AFW%3BtrID%3A1231* (Accessed on 20/05/2015)

[26] FAO. *Definitions and Conversion factors.* ftp://ftp.fao.org/docrep/fao/010/a1106e/a1106e05.pdf

[27] Lam, N. L., K. R. Smith, A. Gauthier, and M. N. Bates. 2012. "*Kerosene: A Review of Household Uses And Their Hazards in Low- and Middle-Income Countries*." http://ehsdiv.sph.berkeley.edu/krsmith/publications/2012/kerosene_review_12.pdf

D.5. Demonstration of eligibility for a CPA

In accordance with paragraph 208 of the *CDM Project Standard version 09.0*, the CME is required to consider any specific guidance in applied methodologies regarding the preparation of separate generic CPA-DDs for each different technology/measure, taking into account differences in the means of demonstration of additionality, emission reduction calculations, and monitoring methods. Based on this guidance, the programme will have two CPA types based on the host country of implementation although additional CPA types might be added in future:

- CPA Type I: Project Gaia Cook Stove Programme Of Activities - CPA000 [Insert identification number] Ethiopia
- CPA Type II: Project Gaia Cook Stove Programme Of Activities - CPA000 [[Insert identification number] Djibouti

This CPA will fall under CPA Type II. The eligibility to be used for the inclusion of the CPA into the PoA has been developed in accordance to the CDM project standard (version 09.0) and *Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for Programme of Activities version 03.0 and following General Guidelines for SSC CDM methodologies version 21 while taking into consideration the applied methodologies* AMS-I.E version 06.0 and AMS-I.I version 04.0

CPA Type I: Project Gaia Cook Stove Programme Of Activities - CPA0002 (Djibouti)

No	Requirement in PoA Standard[28]	Eligibility Criteria Description	Documentary Evidence used by CPA to demonstrate compliance (Tick where appropriate)
16 a.	**The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA**	All distributed stoves in each CPA are located in the geographic boundary of Djibouti.	☒ GPS Coordinates ☒ Area map or Address
16 b	**Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g. programme logo)**	Double counting could occur in cases where an individual stove is included in more than one CPA under the same programme or included more than once in the same CPA. Furthermore, double counting can occur if the cook stove is included in a registered single CDM Project Activity or included in a registered PoA	For CPA 0001, all the following are fulfilled: ☒Contractual agreements between CME or CPA implementer and end-user on CER transferring. ☒ Agreement between CME and CPA implementer confirming that the CPA has not been registered as single CDM Project Activity or included in a registered CDM PoA. And, individual programme system/unit is identifiable by: ☒ Unique serial numbers that uniquely

[28] Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for Programme of Activities

			identify individual units to the programme. ☒ End user details (i.e. name, address)
16 c.	**The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications;**	The CPA involves the distribution of energy efficient cook stoves powered by a renewable source.	As evidenced by the technical description/manufacturer specifications of the units: ☒ The stoves distributed under this CPA are powered by ethanol, a renewable source. ☒ Each unit (ethanol stove) shall have a rated capacity equal to or less than 150 kW thermal. ☒ The total or cumulative installed/rated thermal energy generation capacity of the systems/units is equal to or less than 45 MW thermal. ☒ Confirmation by CPA implementer that each unit (ethanol stove) meets the industry standards of quality.
16 d.	**Conditions to check the start date of the CPA through documentary evidence;**	CPA Start date shall not be before the start date of the PoA [29] {i.e. 12 February 2015}	The start of the CPA is {01/12/2015}, the date when real action occurred: ☐ It is the date for which the first order for the first project unit was placed. ☒ It is the date for which the first project unit was distributed to the end user.
16 e.	**Conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs**	The CPA has confirmed its compliance among other requirements, with the applicability of AMS-I.E version 6.0 and AMS-I.I version 4.0 in section D.2 of the CDM-SSC-CPA-DD-FORM. A cross effect analysis of the applicability of the methodological	☒ Compliance with applicability of AMS-I.E met in section D2 of specific CPA-DD ☒Compliance with applicability of AMS-I.I met in section D2 of specific CPA-DD ☒ A cross effect analysis

[29] Stat date of PoA is defined as the date when notification on Prior Consideration was sent to the UNFCCC Secretariat.

		combination has been carried out in section D2 of specific CPA-DD	has been carried out in section D2 of specific CPA-DD
16 f.	**The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality as specified in Section A above;**	In line with paragraph 11 of the Methodological tool: Demonstration of additionality of small-scale project activities Version 10.0, documentation of barrier 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). Distribution of cook stoves to households/ communities/SMEs form part of the positive list in accordance with paragraph. 11 (c) which states that: *"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 documented in section A.5 of the specific CPA-DD, the CPA is implemented in: ☒ Households ☐ Communities ☐ SMEs As evidenced by the technical specification of the cook stoves, and the cumulative number of units distributed under the CPA as explained on the threshold calculation in the emission reduction spread sheet, the cook stove units: ☒ Have a cumulative capacity not exceeding 45 MWth ☒ Have a capacity of less than 5% of the small-scale thresh hold.
16 g.	**The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis;**	The PoA shall undergo Local Stakeholder Consultations and Environmental Impact Assessment where required:	As evidenced by the CDM PoA-DD, CDM CPA-DD and the LSC report, a Local stakeholder consultation is undertaken at: ☐ PoA level ☒ CPA level The Host Country requires the EIA? ☐ Yes ☒ No If Yes, has the CPA

			carried out an EIA? ☐ Yes ☐ No
16 h.	**Conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance;**	If the CPA has not received any public funding from an Annex I country, it shall confirm so by providing a written confirmation letter. If a CPA has received any public funding from an Annex I country, it shall seek a confirmation letter from the Annex I country or any related agencies that the funding will not lead to a diversion of Official Development Assistance.	The CPA shall prove compliance through one of the two conditions: Through a signed confirmation letter, the CPA has proven that it has not received any public funding from an Annex I country. ☒ Yes ☐ No The CPA has received public funding from an Annex I country. Through a letter from the Annex I country or any related agencies, the CPA has confirmed that the funding will not result in diversion of Official Development Assistance. ☐ Yes ☐ No
16 i.	**Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, grid-connected/off-grid) and distribution mechanisms (e.g. direct installation);**	In section A.7 of the CPA-DD, the CPA has already demonstrated that the CPA is implemented within the geographical boundaries of Djibouti. The CPA will further demonstrate the target group in section A.5. of the CPA-DD.	As documented in section A.5 of the CPA-DD, the CPA is implemented in: ☒ Households ☐ Communities ☐ SMEs
16 j	**Where applicable, the conditions related to sampling requirements for the PoA in accordance with the "Standard for sampling and surveys for CDM project activities and programme of activities";**	Sampling will be carried out in line with the *Standard for sampling and surveys for CDM project activities and programme of activities version 04.1* "and latest *Guidelines for Sampling and surveys for CDM project activities and programmes of activities*	As evidenced in section D.7.2 of the CPA-DD, the CPA has established sampling procedures that are in line with the CDM requirements ☒ Yes ☐ No
16 k.	**Where applicable, the conditions that ensure that every CPA in aggregate meets the small-scale or microscale threshold criteria and remains within those thresholds throughout the crediting period of the CPA;**	The cumulative number of units distributed under each CPA will not exceed 45 MWth.	As evidenced by the technical specification of each cook stove and the maximum number of cook stoves that can be distributed in the CPA as provided in emission reduction spread sheet,

			the cook stove units will: ☒ Have a cumulative capacity not exceeding 45 MWth
16 l.	**Where applicable, the requirements for the debundling check, in case CPAs belong to small-scale (SSC) or microscale project categories.**	In accordance with the methodological tool: Assessment of debundling for small-scale project activities version 04.0, project activities that consist of independent subsystems that are distributed in multiple locations and are not greater than 1% of the small-scale thresholds defined by SSC methodologies, these project activities are exempted from performing a de-bundling check i.e. considered as being not a de-bundled component of a large scale activity. The CPA has already demonstrated in eligibility criteria 16i that it comprises of distribution of energy efficient cook stoves powered by a renewable source to multiple locations (households/communities / SMEs). The CPA will therefore have to meet the following additional eligibility criteria in order to be exempted from performing a de-bundling check.	As evidenced by the technical description/manufacturer specification of the cook stoves, each independent units (cook stove): ☒ Has a rated capacity not exceeding 450 kWth

D.6. Estimation of emission reductions

D.6.1. Explanation of methodological choices

The CPA will utilize a combination of two methodologies to estimate the emission reductions achieved by ethanol stoves distributed under the CPA.

a) AMS-I.E '*Switch from non-renewable biomass for thermal application by the user' version 06.0* and approved baseline and monitoring methodology
b) AMS-I.I *'Biogas/biomass thermal applications for households/small users' version 04.0*

The combination of these methodologies is applicable based on the *Standard demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programmes of activities* version 03.0 paragraph 30 which states that 'Combinations of

technologies/measures and/or methodologies for a PoA are eligible where it is demonstrated that there are no cross effects between the technologies/measures applied.

A cross effect analysis has been carried out and it has been proven that there are no cross-effects as indicated in section D.2 of the CPA-DD.

Further to the cross effect analysis, the combination of the two methodologies is permissible based on paragraph 31.C of the Standard demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programmes of activities version 03.0, based on the following argument:

- A principle technology/measure is applied consistently in each CPA using multiple combinations of methodologies. For example, wastewater treatment projects with different ways of utilizing recovered methane (AMS-I.C for heat, AMS-I.D and AMS-I.F for electricity, or both), biomass/biogas projects with different fuel displacement (AMS-I.C and AMS -I.I for fossil fuel, AMS-I.E for non - renewable biomass, or both). The CPAs included under this PoA will apply only one technology/measure that is distribution of efficient cook stoves that utilize renewable biomass to replace either the non-renewable biomass powered cook stoves (firewood and charcoal) or fossil fuel powered cook stoves.

Calculation of emission reductions from the displacement of non-renewable biomass and displacement of fossil fuel

The CPA will utilize the two methodologies to calculate the amount of emission reductions achieved by the project. The methodological application will take into account the baseline fuel being displaced by the project appliance as either non-renewable biomass or fossil fuel.

Calculation of emission reduction from the displacement of non-renewable biomass applying methodology AMS-I.E version 06.0

The methodology assumes that in the absence of the project activity the baseline would be the use of non-renewable biomass for meeting similar thermal needs.

The following steps will be used to calculate emission reduction as per the methodology:

Baseline emissions

Equation 1 of the methodology will be used to estimate the emissions reductions

$$ER_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossil\_fuel} - PE_{BC,y} \qquad \text{Equation (1)}$$

Where:

ER_y	=	Emission reductions during the year y in t CO_2e
B_y	=	Quantity of woody biomass that is substituted or displaced in tonnes
$f_{NRB,y}$	=	Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass using survey methods or government data or approved default country specific fraction of non-renewable woody biomass (fNRB) values available on the CDM website
$NCV_{biomass}$	=	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)
$EF_{projected\ fossil\ fuel}$	=	Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 t CO_2/TJ
$PE_{BC,y}$	=	Project emissions due to cultivation of biomass

Determination of By

In accordance with paragraph 12 of AMS-I.E version 06.0, the CPA will determine B_y using the following option:

(a) Calculated as the product of the number of appliances multiplied by the estimate of average annual consumption of woody biomass per appliance (tonnes/year); This can be derived from historical data or estimated using survey methods; or

B_y will be determined using the following equation:

$$By = Q_{biomass} * N_{k,0} * n_{k,y} * P_{non-renewable}$$

Where:

Parameter	Description
B_y	Quantity of woody biomass that is substituted or displaced per appliance/household in tonnes per year
$Q_{biomass}$	Average annual consumption of woody biomass per appliance/household.
$N_{k,0}$	Number of cook stoves distributed by the CPA in year 1
$P_{non-renewable}$	Proportion of distributed cook stoves that are displacing non-renewable biomass
$n_{k,y}$	Proportion of distributed cook stoves that remain operational in year 1 of operation

Determination of $f_{NRB,y}$

a) The CPA has applied option (a) of the methodology AMS-I.E to determine the fraction of non-renewable biomass $f_{NRB,y}$

Project emissions

No project emission will be accounted for, since the project does not involve cultivation of biomass.

Leakage

Leakage related to the non-renewable woody biomass saved by the project activity shall be assessed based on ex post surveys of users and the areas from which this woody biomass is sourced (using 90/30 precision for a selection of samples). The following potential source of leakage shall be considered:

(a) The use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources. If this leakage assessment quantifies an increase in the use of non- renewable woody biomass used by the non-project households/users that is attributable to the project activity then B_y is adjusted to account for the quantified leakage. Alternatively, B_y is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.

The CPA will apply the gross adjustment factor as mentioned above, to account for leakage. Therefore, ex post surveys will not be required.

In accordance with paragraph 20 of the methodology, the general guidance on leakage in biomass project activities shall be followed to quantify leakages pertaining to the use of biomass residues. This document has since been reclassified as the methodological tool: Leakage in biomass small-scale project activities version 04 (EB 83 Annex 15). In line with paragraph 23 of the methodological tool, the CPA will evaluate ex ante if there is a surplus of the biomass in the region of the project activity, which is not utilised. If it is demonstrated (e.g., using published literature, official reports, surveys etc.) at the beginning of each crediting period that the quantity of available biomass in the region (e.g., 50 km radius), is at least 25% larger than the quantity of biomass that is utilised including the project activity, then this source of leakage can be neglected otherwise this leakage shall be estimated and deducted from the emission reductions.

Most ethanol distributed in Djibouti is derived from molasses, a by-product of sugar processing.[30]The molasses is obtained from sugar processing in Ethiopia. According to the definition of renewable biomass from EB 23 Annex 18, ethanol derived from molasses can best fit under “non-fossil fraction of an industrial or municipal waste” and not “biomass residue". This would in turn classify molasses as industrial waste and not biomass residue. Therefore, no leakage arising from the competing use of biomass will be accounted for.

Thus:

Net Emission Reductions = Emission Reductions per cook stove* Number of appliances– Leakage from biomass residues-$PE_{BC,y}$

Calculation of emission reduction from the displacement of non-renewable biomass applying methodology AMS-I.I version 04.0

Baseline emissions

The methodology describes the baseline as; in the absence of the project the alternative would be the use of fossil fuel for provision of thermal needs to the end-user.

Emissions reductions are calculated following the steps below:
Emission reductions are determined using option (2) of the methodology, based on the thermal energy generated and applying equation 4 as follows:

$$ER_y = \sum_k N_{k,0} * n_{k,y} * BS_{k,y} * EF * \eta_{PJ/BL} * NCV_{biomass} - LE_y$$

Where:

$N_{k,0}$	Number of thermal applications k commissioned
$\eta_{k,y}$	Proportion of $N_{k,0}$ that remain operating at year y (fraction)
$BS_{k,y}$	The net quantity of renewable biomass or biogas consumed by the thermal application k in year y (mass or volume units, dry basis)
EF	CO2 emission factor (tCO2/GJ)

$$EF = \sum_j x_j * EF_{FF,j}$$

Where:
x j is a fraction representing fuel type j used by the baseline thermal applications displaced by biomass/biogas

$\eta_{PJ/BL}$	Ratio of efficiencies of project equipment and baseline equipment (e.g. cook stove using coal) measured once prior to validation applying the same test procedure (e.g. lab test), as per a national or an international standard. Official data or scientific literature can be used for cross-check purposes
$NCV_{biomass}$	Net calorific value of the biomass (GJ/unit mass or volume, dry basis).

Project emissions

No project emissions are accounted under the selected option for calculating emission reductions.

Leakage emissions
The project equipment will not be transferred out of the project boundary and so no leakage emissions are to be accounted based on paragraph 15 of the methodology, which states that ‘If the energy generating equipment introduced by the project activity is transferred from outside the boundary to the project activity, leakage is to be considered.’

[30] Asheden Awards Case Study pg 5

In accordance with paragraph 4(b) of the methodology, the general guidance on leakage in biomass project activities shall be followed to quantify leakages pertaining to the use of biomass residues. This document has since been reclassified as the methodological tool: Leakage in biomass small-scale project activities version 04 (EB 83 Annex 15). In line with paragraph 23 of the methodological tool, the CPA will evaluate ex ante if there is a surplus of the biomass in the region of the project activity, which is not utilized. If it is demonstrated (e.g., using published literature, official reports, surveys etc.) at the beginning of each crediting period that the quantity of available biomass in the region (e.g., 50 km radius), is at least 25% larger than the quantity of biomass that is utilised including the project activity, then this source of leakage can be neglected otherwise this leakage shall be estimated and deducted from the emission reductions.

Ethanol distributed in Djibouti will be derived from molasses, a by-product of sugar processing.[31]The molasses will be obtained from sugar processing in Ethiopia. According to the definition of renewable biomass from EB 23 Annex 18, ethanol derived from molasses can best fit under “non-fossil fraction of an industrial or municipal waste” and not “biomass residue". This would in turn classify molasses as industrial waste and not biomass residue. Therefore, no leakage arising from the competing use of biomass will not be accounted for.

D.6.2. Data and parameters fixed ex-ante

Data / Parameter:	$NCV_{biomass}$
Data unit:	TJ/tonne
Description:	Net calorific value of the non-renewable biomass that is substituted
Source of data:	IPCC Default
Value(s) applied:	0.015
Choice of data or Measurement methods and procedures:	The selection of the data is based on the recommendation by the methodology on paragraph 11 that allows the application of IPCC defaults
Purpose of data	Calculation of baseline emissions
Additional comment:	Applicable to AMS-I.E

Data / Parameter:	f_{NRB}
Data unit:	%
Description:	Fraction of non-renewable biomass
Source of data:	Published f_{NRB} values for host countries on the CDM website. [32]
Value(s) applied:	100%
Choice of data or Measurement methods and procedures:	As recommended by the methodology the project can establish fNRB using survey methods or government data or approved default country specific fraction of non-renewable woody biomass (fNRB) values available on the CDM website.
Purpose of data	Calculation of baseline emissions
Additional comment:	Applicable to AMS-I.E

[31] Ashden Awards Case Study pg 5

[32] https://cdm.unfccc.int/filestorage/H/2/9/H29X6EKQMJU7RY85DIT4ZPFAL3O1GW/eb67_repan22.pdf?t=ZFR8bnY4MHp1fDDv3pvMi93SK1cmeGgxbHaz.

Data / Parameter:	$Q_{biomass}$
Data unit:	Tonnes/yr
Description:	Average annual consumption of woody biomass per appliance
Source of data:	Calculated based on data from UN Data (2012) and FAO report: Wood Energy Supply/Demand Scenarios in the context of poverty mapping
Value(s) applied:	3.03
Choice of data or Measurement methods and procedures:	According to UN Data (2012), households in Djibouti used about 70,000m^3 while the FAO report Wood Energy Supply/Demand Scenarios in the context of poverty mapping provides the density of air dried biomass as 725 Kg/m^3. This translates to a total household consumption of fuel wood of 50,750 tonnes per year. Assuming the total population in Djibouti as 818,159 and an average household composition of 6 persons the average of woody biomass per household/device results in approximately 3.03 tonnes per household per year. Further information on the calculation is provided in the emission reductions spreadsheet.
Purpose of data	Calculation of baseline emissions
Additional comment:	Applicable to AMS-I.E

Data / Parameter:	x_j
Data unit:	Fraction
Description:	A fraction representing fuel type *j* used by the baseline thermal applications displaced by biomass/biogas
Source of data:	According to the World Bank report on household energy distribution (2005), kerosene is the most widely used fuel for cooking in Djibouti and is therefore the only fossil fuel that is displaced by the project activity.
Value(s) applied:	1
Choice of data or Measurement methods and procedures:	In line with the methodological choices and the available surveys, kerosene is the only fossil fuel type that will be replaced through the use of the project cook stoves. The stoves solely use ethanol as fuel and thus will replace the kerosene entirely
Purpose of data	Calculation of baseline emissions
Additional comment:	Applicable to AMS-I.I

Data / Parameter:	$EF_{FF,J}$
Data unit:	tCO_2/GJ
Description:	CO_2 emission factor of fuel type *j* used by the baseline thermal applications displaced by biomass
Source of data:	IPCC default value
Value(s) applied:	0.0741
Choice of data or Measurement methods and procedures:	As conservative approach the IPCC emission factor default value for kerosene has been selected for calculation of ex-ante emission reductions. Kerosene is considered as the only fuel that will be replaced through the use of the project.
Purpose of data	Calculation of baseline emissions
Additional comment:	IPCC default emission factor for kerosene

Data / Parameter:	η_{PJ}
Data unit:	Dimensionless
Description:	Efficiency of the project stove
Source of data:	Manufactures specification
Value(s) applied:	60%
Choice of data or Measurement methods and procedures:	The efficiency of the project stove has been based on manufacturer specifications since these are the expected performance level as designed by the equipment manufacturer.
Purpose of data	Calculation of baseline emission
Additional comment:	Applicable to AMS-I.I

Data / Parameter:	η_{BL}
Data unit:	Dimensionless
Description:	Efficiency of baseline stove
Source of data:	Holistic Feasibility Study of a National Scale-up Programme for Ethanol Cook stoves and Ethanol Micro Distilleries (EMDs) in Ethiopia
Value(s) applied:	42%
Choice of data or Measurement methods and procedures:	The data has been sourced from credible literature
Purpose of data	Calculation of baseline emissions and emission reductions
Additional comment:	Applicable to AMS-I.I

D.6.3. Ex-ante calculation of emission reductions

The ex-ante emission reductions estimates will be based on the combined application of methodologies AMS-I.E *'Switch from non-renewable biomass for thermal application by the user' version 06.0* and AMS-I.I *'Biogas/biomass thermal applications for households/small users' version 04.0*

The emissions reduction will be calculated separately following the methodology and aggregated for the CPA-DD as follows:

Emission Reductions from the use of non-renewable biomass – Application of AMS-I.E

Emission reductions from the use of non-renewable biomass is estimated using AMS-I.E version 06.

Emissions Reductions

Equation 1 of the methodology will be used to estimate the emissions reductions

$$ER_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossil\_fuel} - PE_{BC,y}$$

Where

Parameter	Description	Value	Unit	Source
ER_y	Emission reduction per device during the year y	3.52	tCO_2e	Calculated
By	Quantity of woody biomass that is substituted or displaced per appliance/ household in tonnes	3.03	t/hh/yr	Calculated

f_{NRB}	Fraction of non-renewable biomass used in the absence of the project activity in year y that can be established as non-renewable biomass using survey methods or government data or approved default country specific fraction of non-renewable woody biomass (fNRB) values available on the CDM website	100%	fraction	CDM Website
$NCV_{biomass}$	Net calorific value of the non-renewable biomass that is substituted	0.015	TJ/tonne	IPCC default
$EF_{projected\_fossil\_fuel,y}$	Emission factor for the substitution of non-renewable woody biomass by similar.	81.6	tCO_2/TJ	Methodology default
$PE_{BC,y}$	Project emission due to cultivation of biomass	0	tCO_2e	N/A
Leakage	Net Gross Factor accounting for leakage	0.95	-	Methodology default

Determination of B_y

$$By = Q_{biomass} * N_{k,0} * n_{k,y} * P_{non-renewable}$$

Where

Parameter	Description	Value	SI Unit	Source
B_y	Quantity of woody biomass that is substituted or displaced per appliance/household in tonnes per year.	3.03	t/hh/yr	Calculated (see emission reduction spread sheet)
$Q_{biomass}$	Average annual consumption of woody biomass per appliance	3.03	Tonnes/year	Calculated based on Literature data as shown in the emission reduction spread sheet
$N_{k,0}$	Number of cook stoves distributed by the CPA in year 1 (2015)	5,000	Number	Project developer
$P_{non-renewable}$	Proportion of distributed cook stoves that are displacing non-renewable biomass	13.61 %	Percentage	Calculated (see emission reduction spread sheet)
n_{ky}	Proportion of distributed cook stoves that remain operational in year 1 of operation	100%	Percentage	Assumed based on the manufactures specification on the cook stove lifetime

Therefore, the total emission reductions per appliance in year 1 of operation under the CPA is calculated as:

Total Emission Reductions =3.03*0.95*100%*0.015*81.6-0 = 3.52 t CO_2e

Project emissions ($PE_{BC,y}$)

No project emissions will be accounted for, as the project does not involve the cultivation of biomass

Thus:

$PE_{BC,y}=0$

Leakage

Leakage shall be accounted for by multiplying B_y with a net gross factor of 0.95 for the use/diversion of non-renewable woody biomass saved under the project activity by non-project household/users that previously used renewable energy sources. .

The methodological tool: *Leakage in biomass small-scale project activities version 04 (EB 83 Annex 15* used to quantify leakages pertaining to the use of biomass residues will not be applied as has been justified in section D.6.1 above.

The calculation is as shown in the equation below:

Net Emission Reductions = Emission Reductions per cook stove* Number of appliances– Leakage from biomass residues- 0

Assuming that the number of cook stoves commissioned in year 1 of operation (2015) amounts to a total of 5,000 stoves, net emission reductions for all the appliance is calculated as:

Net Emission Reductions = Emission Reductions per appliance * Number of appliance* Proportion of distributed appliances displacing non-renewable biomass = 3.52*5000*13.61%
= 2,396 t CO_2e

Emission reduction from the use of fossil fuel – Application of AMS-I.I

Emission reductions from the displacement of fossil fuels are calculated based on AMS-I.I *version 04.0.* The calculation is based on the thermal energy generated using the measured quantity of biomass using equation 4 of the methodology as follows:

$$ER_y = \sum_k N_{k,0} * \eta_{k,y} * BS_{k,y} * EF * \eta_{PJ/BL} * NCV_{biomass} - LE_y$$

Where:

Parameter	Description	Value	SI Unit	Source
$N_{k,0}$	Number of thermal applications *k* commissioned by the CPA in year 1 (2015)	5000	Number	Gaia Distribution plan
$\eta_{k,y}$	Proportion of $N_{k,0}$ that remain operating at year *y* (fraction)	100%	Fraction	Assumed based on the manufactures specification on the cook stove lifetime. It's expected that in year 1 of operation, all stoves will still be operational.
$BS_{k,y}$	The net quantity of renewable biomass or biogas consumed by the thermal application *k* in year *y* (mass or volume units, dry basis)	0.53	Tonne/year	Calculated as shown in the emission reduction spread sheet
EF	CO_2 emission factor (t CO_2/GJ) $EF = \sum_j x_j * EF_{FF,j}$ Where: x_j is a fraction representing fuel type	=0.0741*1	t CO_2/GJ	Calculated. Kerosene is the only fossil fuel displaced by the project cook stoves. Therefore, the fraction is assumed as 1

	j used by the baseline thermal applications displaced by biomass/biogas			
$\eta_{PJ/BL}$	Ratio of efficiencies of project equipment and baseline equipment (e.g. cook stove using coal) measured once prior to validation applying the same test procedure (e.g. lab test), as per a national or an international standard. Official data or scientific literature can be used for cross-check purposes	1.43	Fraction	Calculated as shown in the emission reduction spread sheet
$NCV_{biomass}$	Net calorific value of the biomass (GJ/unit mass or volume, dry basis)	*27*	GJ/tonne	Default IPCC value
P_{FF}	Proportion of cook stoves displacing kerosene in Djibouti	86.39%	Percentage	Calculated

The achieved emission reduction is therefore as follows:

ERy = 5000*100%*86.39%*0.53*0.0741*1.43*27= 6,549 t CO_2e

Leakage emissions (LE)
The project equipment will not be transferred out of the project boundary and so no leakage emissions are to be accounted based on paragraph 15 of the methodology, which states that 'If the energy generating equipment introduced by the project activity is transferred from outside the boundary to the project activity, leakage is to be considered.

Leakage from competing use of biomass is not accounted for since molasses is considered as an industrial waste and not biomass residue.

Total emission reductions = Emission Reductions from AMS-I.E + Emissions Reductions from AMS-I.I for the year 1 of operation

= 2,396 t CO_2e + 6,549 t CO_2e

= 8,945 t CO_2e

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)
2016	12,918	0	0	12,918
2017	21,382	0	0	21,382
2018	24,946	0	0	24,946
2019	24,501	0	0	24,501
2020	23,609	0	0	23,609
2021	23,164	0	0	23,164
2022	15,146	0	0	15,146
Total	145,666	0	0	145,666
Total number of crediting years	7			

Annual average over the crediting period	20,809	0	0	20,809

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

The application of the monitoring methodology and description of the monitoring plan are provided in sections D.7.1 and D.7.2 below.

D.7.1. Data and parameters to be monitored

Data / Parameter:	$Q_{renewable\ biomass}$ and $BS_{k,y}$
Data unit:	Tonnes/year
Description:	The net quantity of renewable biomass consumed by the thermal application *k* in year *y* (mass or volume units, dry basis)
Source of data:	Calculated, see emission reduction spreadsheet
Value(s) applied	0.53
Measurement methods and procedures:	This will be measured through surveys carried out during monitoring. Interviews will be carried out on the selected households to be surveyed through sampling. The surveys will satisfy 90/10 confidence precision level when done annually and 95/10 when carried out biennially. For estimation of the sample size ex-ante 0.53 tonne will be used. The CME or third party contracted to carry out the survey will visit the households that possess the selected stoves. Through interviewing the end-user of the stove the surveying entity will capture the amount of ethanol that the end-user consumes per day or per week. This value shall be reciprocated for the whole year for the sampled end-users and a mean derived out of it to be used for ex-post emission reductions. The interviews will only be carried out on households that the project stove is found to be in operation
Monitoring frequency:	Annually or Biennial
QA/QC procedures:	The data collected shall be transferred from the surveying entity to the CME in cases where its not the CME carrying out the survey. The data shall be checked for any inconsistency that might lead to biased results and rectified. Depending on the frequency of monitoring the sample results will be required to attain a set precision. In case the required precision is not attained then the surveying entity will apply the reliability procedures described under the monitoring plan. When biennial inspection is chosen, a 95% confidence interval and 10% margin of error requirement shall be achieved for the sampling parameter on other hand, when the project proponent chooses to inspect annually, a 90% confidence interval and 10% margin of error requirement shall be achieved for the sampling parameter. In the case where the confidence precision level is not reached oversampling will be carried out to achieve this from a buffer sample that will have been calculated during sample drawing otherwise the lower bound of a 90 per cent or 95 per cent confidence interval of the parameter value may be chosen as alternative.
Purpose of data	Calculation of baseline emissions
Additional comment:	Applicable for both AMS-I.E version 06.0 and AMS-I.I version 04.0

Data / Parameter:	$NCV_{biomass}$
Data unit:	GJ/tonne
Description:	Net calorific value biomass type (ethanol)
Source of data:	Laboratories tests carried out by the CME according to relevant international standards. For ex-ante estimation IPCC value of 27 has been used
Value(s) applied	27
Measurement methods and procedures:	The parameter shall be monitored through sampling where a sample size shall be calculated as described in of monitoring plan section under sample size calculation. The sample size will satisfy a 90/10 confidence precision level. The CME or contracted third party will visit the selected households for surveys A sample of ethanol from households where the project appliance has been found to be in operation shall be collected and a lab analysis carried out. The lab analysis shall meet international standards. Based on the results, an average shall be calculated and shall be used for ex-post emission reductions. Where necessary, the amount of ethanol that will be taken to be tested will be replaced with the same amount of ethanol from the CME to avoid cases of non-response as a result of the end-users getting a loss.
Monitoring frequency:	Annually
QA/QC procedures:	The tests done on the renewable biomass used by the stoves shall be confirmed to meet national/international standards. This shall be confirmed by the CME or the third party entity contracted to perform the tests. The sample results will meet the required precision level and in case they do not then the reliability test shall be conducted. The consistency of the measurements shall be checked by comparing the measurement results with measurements from previous years, relevant data sources (e.g. values in the literature, values used in the national GHG inventory) and default values by the IPCC
Purpose of data	Calculation of baseline emissions
Additional comment:	Applicable for the methodology AMS-I.I version 04.0

Data / Parameter:	$N_{k,0}$
Data unit:	Dimensionless
Description:	Number of thermal applications k commissioned
Source of data:	Records of installation date of each system.
Value(s) applied	Please refer to ER spreadsheet for the distribution plan

Measurement methods and procedures:	At the time of installation all project activity systems shall be inspected and undergo acceptance testing (commissioning) for proper operation by qualified personnel in compliance with specifications. Proper operation of the cook stoves shall be confirmed and evidenced through a signed delivery note between the end-user and the CPA Implementing Entity. The records will be archived in a project data base which will capture the following: - The customer address - Sales date of the stove - Phone number if applicable - Stoves serial number - The baseline stoves
Monitoring frequency:	Continuous
QA/QC procedures:	All project activity systems shall be inspected and undergo acceptance testing (commissioning) for proper operation in compliance with specifications. The serial numbers of the stoves captured in the distribution will be counter checked with the serial number of the stoves from the batch to make sure that the serial number is well captured,
Purpose of data	Calculation of baseline emissions
Additional comment:	Applicable for the methodology AMS-I.I version 04.0 and AMS I.E version 06.0. For the methodology AMS I.E this parameter is used to calculate the parameter By (the quantity of woody biomass that is substituted or displaced in tonnes).

Data / Parameter:	$n_{k,y}$
Data unit:	Fraction
Description:	Proportion of $N_{k,0}$ that remain operating at year y
Source of data:	Stove inspections to determine if they are still operational through sampling annually or biennially
Value(s) applied	Please refer to the ER spread sheet
Measurement methods and procedures:	The parameter shall be measured by way of sampling where a sample size shall be calculated based on 95/10 or 90/10 confidence precision level The CME or third party contracted to carry out the survey will visit the households in which the selected stoves are located and through visual inspections of the stoves. The proportion of stoves that are still operating shall be determined by relating the stoves operating to the stoves surveyed The CME or third party contracted to carry out the survey will capture the type of stove that was used by the end-user prior to acquiring the project stove. This will be used to determine which type of fuel the stove replaced i.e either fossil fuel of non-renewable biomass. Based on the proportion of stoves replaced the population shall be classified based on the fuel replaced. When sampling is done on annual basis the survey will meet 90/10 confidence precision level and 95/10 confidence precision level shall be chosen, when surveys are done biennially.
Monitoring frequency:	At least once every two years (biennial) during the crediting period or annually

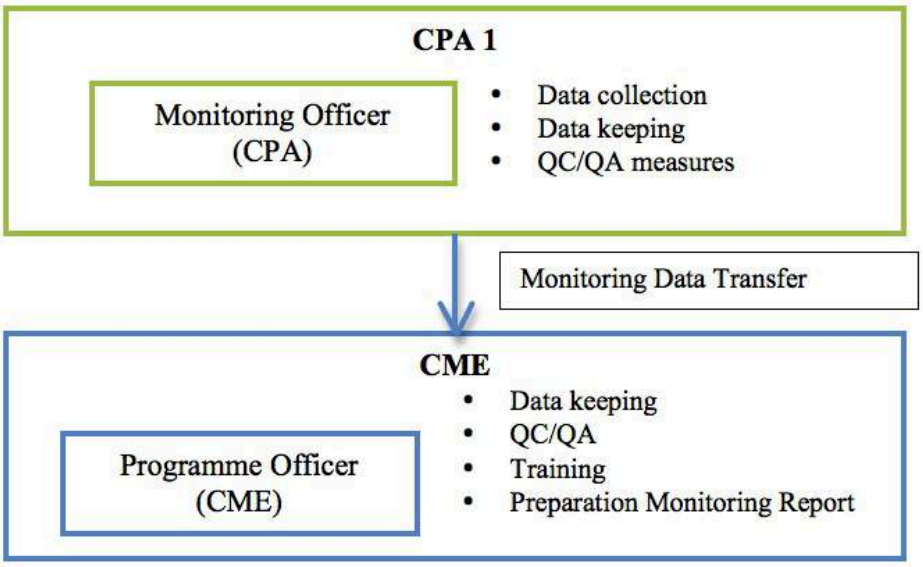
QA/QC procedures:	The data collected shall be transferred from the surveying entity to the CME in cases where its not the CME carrying out the survey. The data shall be checked for any inconsistency that might lead to biased results and rectified Depending on the frequency of monitoring, the sample results will be required to attain a set precision. In case the required precision is not attained then the surveying entity will apply the reliability procedures described under the monitoring plan. When biennial inspection is chosen, a 95% confidence interval and 10% 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 10% margin of error requirement shall be achieved for the sampling parameter. In the case where the confidence precision level is not reached oversampling will be carried out to achieve this from a buffer sample that will have been calculated during sample drawing
Purpose of data	Calculation of baseline emissions
Additional comment:	Applicable for the methodology AMS-I.I version 04.0 and AMS I.E version 06.0. For the methodology AMS I.E this parameter is used to calculate the parameter By (the quantity of woody biomass that is substituted or displaced in tonnes).

D.7.2. Description of the monitoring plan

Operational and management structure

The overall responsibility for monitoring of the Project Gaia Cook Stove Programme of Activities will rest with Project Gaia Inc. as the CME.The CME will ensure that each CPA is implemented and monitored as described in the PoA-DD and CPA-DD. In order to achieve this, the CME will enter into a contractual agreement with each CPA implementing entity prior to the CPA inclusion into the PoA. The contract will outline the roles and responsibilities of the CME and CPA Implementing Entity in order to ensure a smooth implementation and monitoring of the CPA. Third Party entities will also be outsourced to facilitate the monitoring of the CPA if need be and they will also get into a contract with the CME.

An overview of the organization of the monitoring process is as follows:



Responsibilities of the CME

Once a DOE has approved the inclusion of a CPA and the project activity has begun operations, the CME will take charge of the following:

- Receiving and compiling monitoring records from the CPA implementing entity
- Archiving and keeping monitored data for two years after the end of the crediting period or the last issuance of CERs, whichever occurs later.
- Coordinating monitoring activities and data management during the lifetime of the PoA.
- Contracting a DOE for validation and verification purposes.
- Preparing and submitting monitoring reports and facilitating the verification of the same.
- Acting as the focal point with the CDM Executive Board for matters related to the PoA.
- During the lifetime of the PoA, maintaining all monitoring reports of all CPAs.
- Provide training as required to the CPA implementer's staff that will work on the monitoring of parameters relevant to the emission reduction assessment of the CPA.

The CME will further be responsible for ensuring that the CPA Implementer understands the requirements of the monitoring plan. The CME Programme Manager/Officer in charge will maintain regular communication with the CPA Implementer's staff.

CPA monitoring training

Before the implementation of the CPA or the start of the CPA crediting period, the CME will provide training and guidance regarding the implementation of the CPA monitoring plan to the CPA Implementer's staff. The training will include the following components:

- CDM Project Cycle and the significance of monitoring
- Management structure and work scope
- Components of the monitoring plan
- QA/QC procedures
- Monitoring report template
- Preparation for verification
- Questions and answers

The CME will ensure that the training materials provided to the CPA Implementer for monitoring will be regularly updated in line with changes to the CDM or PoA requirements. The relevant CME Programme Manager/Officer will responsible for updating the training materials.

The CME will maintain an electronic database that will incorporate the monitored parameters and values required in emission reduction calculations for each CPA, as well as other relevant information. The database will ensure that monitored data is kept and archived for two years after the end of the crediting period or the last issuance of CERs, whichever occurs later.

Responsibilities of the CPA implementer

CPA Implementers will be responsible for the implementation of individual CPAs under the PoA and will also be in charge of:

- Operations and maintenance of the CPA for the duration of the project.
- Record keeping of parameters as per the monitoring plan and provide hard and electronic records to the CME on a regular basis.
- Make available staff for any training conducted by the CME on monitoring approaches and systems.
- Make staff available for validation and verification where applicable.
- Provide the DOE with required documents and access to sites as needed.

More specifically, the CPA implementer will be responsible for the technical aspects related to monitoring activities such as:

- Employment and training of personnel responsible for gathering and recording monitoring data

- Continuous record keeping of the number of cook stoves and the dates when they were distributed to end-users.
- Ensure that the stoves are in good working condition before the transfer of ownership is made to the end-users.
- Ensure that the end-users are well trained on the proper operation of the cook stoves before the transfer of ownership is made. This might be in the form of user manuals, one-on-one training sessions or any other appropriate methods.
- Ensure that the end users are well aware of the emergency procedures and the contact persons in case of such emergencies. This might be in the form of user manuals, warranty cards or any other appropriate methods.
- Continuous record keeping of the number and date when cook stoves have been replaced or serviced.
- If the CPA implementing entity will also distribute fuel to be used to the end-users, ensure continuous recording of the amounts of ethanol distributed.
- Incase the CPA implementing entity does not distribute ethanol to end-users, the CPA in liaison with the CME will estimate the amounts of ethanol distributed to end-users through an appropriate sampling method as further described in the sampling plan.
- Contracting a survey company where needed
- Electronic archiving of all monitored data and parameters.
- Submission of monitoring data to the CME on a regular basis.

As such, the CPA will appoint a monitoring officer who will be in charge of the CPA's monitoring responsibilities as described above. The records will be crosschecked for consistency by another employee of the CPA who is not directly in charge of data recording and finally approved by the director of the CPA. The CPA will thereafter submit on a regular basis, the monitored records to the CME accompanied by the respective copies of records/invoices for sold units as evidence.

Data and parameters to be monitored

The following data and parameters will be monitored as required by the two methodologies AMS-I.E and AMS-I.I

Parameter	Description	Monitoring / recording frequency
$Q_{renewable\ biomass}$	The net quantity of renewable biomass consumed by the thermal application k in year y	At least once every two years (biennial) during the crediting period)
$N_{k,0}$	Number of thermal applications k commissioned	At the time of installation all project activity systems shall be inspected and undergo acceptance testing (commissioning) for proper operation in compliance with specifications. The installation date of each system shall be recorded as soon as it is sold
$n_{k,y}$	Proportion of $N_{k,0}$ that remain operating at year y (fraction)	At least once every two years (biennial) during the crediting period
$BS_{k,y}$	The net quantity of renewable biomass or biogas consumed by the thermal application k in year y	At least once every two years (biennial) during the crediting period
$NCV_{biomass}$	Net calorific value of biomass type (ethanol)	Annually

Sampling Plan

In accordance to the applied methodologies, AMS.I.E ver 6.0 and AMS-I.I ver 4.0, a statistically valid sample of the locations where the systems are deployed, with consideration, in the sampling design, of occupancy and demographics differences can be used to determine parameter values used to determine emission reductions, as per the relevant requirements for sampling in the "Standard for sampling and surveys for CDM project activities and programme of activities". When

biennial inspection is chosen a 95 per cent confidence interval and a 10 per cent margin of error requirement shall be achieved for the sampling parameter. On the other hand when the project proponent chooses to inspect annually or the methodology dictates so, a 90 per cent confidence interval and a 10 per cent 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 per cent or 95 per cent 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 or rather discounting the emission reductions by not less than 3 times the percentage of missed precision as outlined and recommended by the *"Standard for Sampling and surveys for CDM project activities and programme of activities" ver 04.1* paragraph 16

Methodology AMS-I.E ver 6.0 specifically requires the following that:

- Monitoring shall consist of checking of all appliances or a representative sample thereof, at least once every two years (biennial) to ensure that they are still operating or are replaced by an equivalent in service appliance.
- Monitoring should confirm the displacement or substitution of the non-renewable woody biomass at each location. In the case of appliances switching to renewable biomass the quantity of renewable biomass used shall be monitored. For this, project proponents may apply the "Standard for sampling and surveys for CDM project activities and programme of activities".

Parameters to be sampled under methodology AMS-I.E are provided in the table below:

Parameter	Description
$n_{k,y}$	Proportion of distributed units that remain operational at least once in two years.
$Q_{renewable\ biomass}$	The net quantity of renewable biomass consumed by the thermal application k in year y

Likewise, AMS-I.I ver.4.0 specifically requires that:

- At the time of installation all project activity systems shall be inspected and undergo acceptance testing (commissioning) for proper operation in compliance with specifications. The installation date of each system shall be recorded.
- According to the methodology, emission reductions can only be applied to systems that are demonstrated to be operational and in compliance with manufacturer required maintenance procedures, at least once every two years (biennial) during the crediting period. In order to determine this, a statistically valid sample of the residences where the systems are installed, can be used to determine the percentage of systems operating. The only exception to carrying out an actual site visit is where there are on-going rental/lease payments or a recurring maintenance fee by users.

Parameters to be sampled under AMS-I.I are provided in the table below:

Parameter	Description
$n_{k,y}$	Proportion of $N_{k,0}$ that remain operating at year y (fraction)
$BS_{k,y}$	The net quantity of renewable biomass consumed by the thermal application k in year y
$NCV_{biomass}$	Net calorific value of biomass (ethanol)

In order to ensure that parameter values obtained through sampling are non biased and that data collection minimizes non-sampling (non-random, systematic) errors, the CPA will observe sound practices in designing samples and administering surveys and field measurements as outlined in the "Guidelines for sampling and surveys for CDM project activities and programme of activities"

and estimation of sample size will be guided by the type of parameter being sampled i.e. proportion parameter or mean parameter.

Sampling design

Sampling design shall be based on the methodologies and the nature of the sampled parameter.

Sampling design to be employed for sampling parameters under methodology AMS-I.E

(i) Objectives and Reliability Requirements

The objective of the sampling effort will be to assess the number of distributed units that are still in operation and the amount of renewable biomass used by the appliances. The sample size results will meet either a 90% confidence and a 10% precision level when monitoring is carried out annually and a 95% confidence and 10% precision level when monitoring is done once in two years as described under methodology AMS-I.E version 06.0

The parameters to be sampled are as shown below together with the confidence precision level target

Parameter	Descriptions	Confidence/precision
$n_{k,y}$	Proportion of distributed units that remain operational at least once in two years.	Annually: 90/10 Biennial: 95/10
$Q_{renewable\ biomass}$	The net quantity of renewable biomass consumed by the thermal application k in year y	Annually: 90/10 Biennial: 95/10

ii) Target Population

The target population will be households in which the cook stoves have been distributed as identified by the CME sales records.

(iii) Sampling method

The PoA will employ simple random sampling method, as the population targeted is homogeneous in nature based on the following

- Technology implemented: The CPA will involve the distribution of cook stoves of the same technology and specification in terms of fuel used and efficiency of the stoves as specified by the manufacturer
- End-users: The end-users in which the stoves will be distributed will be similar in nature that is they will be will be households
- Boundary covered by the stoves: Stoves distributed will be within the confinement of the CPA boundary as defined in the project boundary.

Sampling will be done on single CPA basis and can be carried out on cross-CPA as long as homogeneity of the CPAs is established based on the above criteria.

A sample will be selected from population contained in a specific CPA based on calculation procedures indicated in the guidelines of sampling and surveys and through application of a random number generator. The selected stoves location will be visited by the CME or a third party hired to carry out the survey. Each stove will be uniquely identified through its serial number.
The survey of the monitored parameters will involve the following:

Parameter	Process of carrying our the survey

$n_{k,y}$	The CME or third party contracted to carry out the survey will visit the households in which the appliances have been distributed and through visual inspections of the stoves the proportion of stoves that are still operating shall be determined by relating the stoves operating to the stoves surveyed. The CME or third party contracted to carry out the survey will capture the type of stove that was used by the end-user prior to acquiring the project stove. This will be used to determine which type of stove and fuel the project stove replaced i.e. either fossil fuel powered stove or fuel wood stove. Based on the proportion of stoves replaced the population shall be classified based on the baseline fuel replaced by the project appliance.
$Q_{renewable\ biomass}$	The CME or third party contracted to carry out the survey will visit the households that have the selected stoves from the sample size calculation. Through interviewing the end-user of the project stove the surveying entity will capture the amount of ethanol that the end-user consumes per day or per week. This value shall be extrapolated for the whole year for the sampled end-users and a mean derived out of it to be used for ex-post emission reductions. The interviews for this parameter will only be carried out on households that the project stove is found to be in operation.

In order to make sure that reliability is met, oversampling of 30% will be carried out on the initial calculated sample size to cater for non-response. A buffer list will also be created which will include the stoves to be chosen incase the reliability is not met on the first survey exercise. The buffer will be at least 30% of the calculated sample size of the parameter.
The use of buffer in meeting the reliability of the sample will be carried out in stages. Where 10% will first be drawn as additional stoves to be monitored followed by another 10% then if need be the whole 30%. The CME will draw samples from each CPA.

iv) Sample size calculation

The formula to be used for calculation of the sample size will depend on the type of parameter being sampled i.e. whether the parameter is a proportion/percentage parameter or if the parameter of interest is a mean.

Sample size calculation for $n_{k,y}$

Calculation for $n_{k,y}$ will be calculated following equation (1) paragraph 15 of appendix 2 of the *Guidelines: sampling and surveys for CDM Project Activities and Programme of Activities version 03.0*

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

$n_{k,y}$	Proportion of appliances that remain operational

Where:	
n	Sample size
N	Total population
p	Expected proportion of cook stoves that are still in operation
1.96	Represents 95% confidence required when biennial survey is chosen. When annual survey is selected 1.645 will be value used for sample size calculation as shown on sample size calculation spreadsheet.
0.1	Represents 10% precision level on both sides of p

Required data for calculation of the sample size

Parameter	Source
N	Sales records of stoves that have been sold determined per CPA distribution
p	Based on developers own experience or from similar CDM projects

For ex-ante estimation the following data shall be used for calculation of expected sample size for $n_{k,y}$

Data	Value	Source
N	10000	Based on the number of stoves expected to be distributed until the end of first crediting.
p	65%	Based from similar CDM cook stoves projects
n	203	Calculated- See Sample size calculation sheet
Oversampled size of 30%	264	Calculated- See Sample size calculation sheet

If the calculation of the sample size returns a value of less that 30 then the surveyor will apply a sample size of 30 as recommended by the Standard Sampling and surveys for CDM project activities and programme of activities version 04.1

Sample size calculation for $Q_{renewable\ biomass}$

$Q_{renewable\ biomass}$ being a mean parameter, the sample size calculation will be based on equation (4) paragraph 27 of appendix 2 of the *Guidelines: sampling and surveys for CDM Project Activities and Programme of Activities version 03.0*

$$n = \frac{1.96^2 NV}{(N-1)\times 0.1^2 + 1.96^2 V}$$

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

Where:

n	Sample size
N	Total number of population
V	Variance
SD	Expected standard deviation
0.1	Precision
1.96	Represents the 95% confidence required when biennial survey is chosen. When annual survey is selected 1.645 will be value used for sample size calculation as shown on sample size calculation spreadsheet.
Mean	Expected mean

Required data for calculation of the sample size:

Parameter	Source
N	CME sales records
SD	Estimated
Mean	Based on project proponent experience

For ex-ante estimation the following data shall be used for calculation of expected sample size for $Q_{renewable\ biomass}$

Parameter	Value	Source
N	10000	Based on the number of stoves expected to be distributed until the date of first monitoring
SD	0.13	Estimated - See Sample size calculation sheet

Mean	0.53 tone/yr	Estimated based on project proponent experience - See Sample size calculation sheet
Sample size n	48 (24 sample per stove type)	Calculated- See sample size calculation sheet
Student t-value	54 (27 sample per stove type)	Calculated- See sample size calculation sheet

If the calculation of the sample size returns a value of less that 30 then the surveyor will apply student t-distribution since the parameter of interest is a mean as recommended by the Standard Sampling and surveys for CDM project activities and programme of activities version 04.1. The sample size of this parameter shall be calculated based on the type of stove i.e. single burner or double burner

Reliability for sampling results

Depending on the monitoring frequency the sample size will be expected to reach either 90/10 confidence precision level for annual monitoring or 95/10 for the case of biennial monitoring.
In case the sample will not attain the required precision the following options shall be used depending on which is appropriate as recommended by *Standard Sampling and surveys for CDM project activities and programme of activities version 04.1*.

- Perform additional data collection that is a supplemental or new sample to reach the required precision level; or
- Apply a correction to the estimates using the options below:
  (i) Discounting the emission reduction estimates by either,
    a) Taking the lower or the upper bound, whatever is conservative, of the 90 or 95 per cent confidence interval, depending on the type of methodologies applied; or
    b) Discounting by no less than three times (x3) the percentage precision points missed (e.g. if the attained precision is 90/11 then the emission reduction estimates are discounted by 3 per cent)

Sampling design to be employed for sampling parameters under methodology AMS-I.I

(i) Objectives and Reliability Requirements

The objective of the sampling effort will be to assess the number of distributed units that are still in operation, the amount of renewable biomass used by the appliances and the net calorific value of the renewable biomass used by the stoves. The sample size results will meet either a 90% confidence and a 10% precision level when monitoring is carried out annually or a 95% confidence and 10% precision level when monitoring is done once in two years as described under methodology AMS-I.I version 04.0

The parameters to be sampled are as shown below together with the confidence precision level target.

Parameter	Descriptions	Confidence/precision
$n_{k,y}$	Proportion of *Nk,0* that remain operating at year *y* (fraction)	Annually: 90/10 Biennial: 95/10
$BS_{k,y}$	The net quantity of renewable biomass consumed by the thermal application *k* in year *y*	Annually: 90/10 Biennial: 95/10
$NCV_{biomass}$	Net calorific value of biomass type (ethanol) and satisfies a 90/10 confidence precision level	Annually: 90/10

ii) Target Population

The target population will be households in which the cook stoves have been distributed as identified by the CME sales records.

(iii) Sampling method

The PoA will employ simple random sampling method, as the population targeted is homogeneous in nature based on the following:

- Technology implemented: The CPA will involve the distribution of cook stoves of the same technology and specification in terms of fuel used and efficiency.
- End-users: The end-users in which the stoves will be distributed will be similar in nature that is they will be will be households
- Boundary covered by the stoves: Stoves distributed will be within the confinement of the CPA boundary as defined in the project boundary.

Sampling will be done on single CPA basis and can be carried out cross-CPAs as long as homogeneity of the CPAs is established based on the above criteria.

A sample will be selected from population contained in a specific CPA based on calculation procedures indicated in the guidelines of sampling and surveys and through application of random generator the stoves will be selected and the stoves selected visited by the CME or a third party hired to carry out the survey. Each stove will be uniquely identified through its serial number

The survey of the monitored parameters will involve the following

Parameter	Process of carrying our the survey
$n_{k,y}$	The CME or third party contracted to carry out the survey will visit the households in which the selected stoves are located and through visual inspections of the stoves the proportion of the stoves that are still operating shall be determined by relating the stoves operating to the stoves surveyed. The CME or third party contracted to carry out the survey will capture the type of stove that was used by the end-user prior to acquiring the project stove. This will be used to determine which type of stove and fuel the stove replaced i.e. either fossil fuel powered stove or fuel wood stove. Based on the proportion of stoves replaced the population shall be classified based on the baseline fuel replaced by the project appliance.
$BS_{k,y}$	The CME or third party contracted to carry out the survey will visit the households that have the selected stoves from the sample size calculation. Through interviewing the end-user of the stove the surveying entity will capture the amount of ethanol that the end-user consumes per day or per week. This value shall be extrapolated for the whole year for the sampled end-users and a mean derived out of it to be used for ex-post emission reductions. The interviews will only be carried out on households that the project stove is found to be in operation.
$NCV_{biomass}$	The parameter shall be monitored through sampling where a sample size shall be calculated that satisfies a 90/10 confidence precision level. The CME or contracted third part will visit the selected households for surveys. A sample of the fuel will be taken from households where the project appliance has been found to be in operation and a lab analysis carried out. Based on the results, an average shall be calculated and shall be used for ex-post emission reductions. Where necessary, the amount of ethanol that will be taken to be tested will be replaced with

	the same amount of ethanol from the CME to avoid cases of non response as a result of the end-users getting a loss.

In order to make sure that reliability is met, oversampling of 30% will be carried out on the initial calculated sample size to cater for non-response. A buffer will also be created which will include the stoves to be chosen in case the reliability is not met on the first survey exercise. The buffer will be at least 30% of the calculated sample size of the parameter.

The use of buffer in meeting the reliability of the sample will be carried out in stages. Where 10% will first be drawn as additional stoves to be monitored followed by another 10% then if need be the whole 30%. The CME will draw samples from each CPA

v) Sample size calculation

The formula to be used for calculation of the sample size will depend on the type of parameter being sampled i.e. whether the parameter is a proportion/percentage parameter or if the parameter of interest is a mean.

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Sample size calculation for $n_{k,y}$

Calculation for $n_{k,y}$ will be calculated following equation (1) paragraph 15 of the *Guidelines: sampling and surveys for CDM Project Activities and Programme of Activities version 03.0*

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

$n_{k,y}$	Proportion of $N_{k,0}$ that remain operating at year y (fraction)

Where:	1.
n	Sample size
N	Total population
p	Expected proportion of cook stoves that are still in operation
1.96	Represents 95% confidence required when biennial survey is chosen. When annual survey is selected 1.645 will be value used for sample size calculation as shown on sample size calculation spreadsheet.
0.1	Represents 10% precision level on both sides of p

Required data for calculation of the sample size

Parameter	**Source**
N	Sales records of stoves that have been sold determined per CPA distribution
p	Based on developers own experience or from similar CDM projects

For ex-ante estimation the following data shall be used for calculation of expected sample size for $n_{k,y}$

Data	**Value**	**Source**
N	10000	Based on the number of stoves expected to be distributed in the first year of implementation of the project
p	65%	Based from similar CDM cook stoves projects
n	203	Calculated See Sample size calculation sheet
Oversample size of 30%	264	Calculated See Sample size calculation sheet

If the calculation of the sample size returns a value of less that 30 then the surveyor will apply a sample size of 30 as recommended by the *Standard Sampling and surveys for CDM project activities and programme of activities version 04.1*

Sample size calculation for $BS_{k,y}$

$BS_{k,y}$ being a mean parameter the sample size calculation will be based on equation (4) paragraph 27 of the *Guidelines: sampling and surveys for CDM Project Activities and Programme of Activities version 03.0*

$$n = \frac{1.96^2 NV}{(N-1)\times 0.1^2 + 1.96^2 V}$$

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

Where:

n	Sample size
N	Total number of population
V	Variance
SD	Expected standard deviation
0.1	Precision
1.96	Represents the 95% confidence required when biennial survey is chosen. When annual survey is selected 1.645 will be value used for sample size calculation as shown on sample size calculation spreadsheet.
Mean	Expected mean

Required data for calculation of the sample size

Data	Source
N	CME sales records
SD	Calculated based on the emission reduction spreadsheet
Mean	Calculated based on the emission reduction spreadsheet

For ex-ante estimation the following data shall be used for calculation of expected sample size for $BS_{k,y}$

Data	**Value**	**Source**
N	10000	Based on the number of stoves expected to be distributed until the date of first monitoring
SD	0.13	Conservatively estimated see sample size calculation sheet
Mean	0.53 tonnes	Estimated based on project proponent experience - See Sample size calculation sheet
Sample size n	48 (24 sample per stove type)	Calculated- See sample size calculation sheet
Student t-value	54 (27 sample per stove type)	Calculated- See sample size calculation sheet

If the calculation of the sample size returns a value of less that 30 then the surveyor will apply student t-distribution since the parameter of interest is a mean as recommended by the *Standard Sampling and surveys for CDM project activities and programme of activities version 04.1*

Sample size calculation for $NCV_{biomass}$

$NCV_{biomass}$ being a mean parameter the sample size calculation will be based on equation (4)

paragraph 27 of the *Guidelines: sampling and surveys for CDM Project Activities and Programme of Activities version 03.0.*

$$n = \frac{1.96^2 NV}{(N-1)\times 0.1^2 + 1.96^2 V}$$

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

Where:

n	Sample size
N	Total number of population
V	Variance
SD	Expected standard deviation
0.1	Precision
1.96	Represents the 95% confidence required when biennial survey is chosen. When annual survey is selected 1.645 will be value used for sample size calculation as shown on sample size calculation spreadsheet.
Mean	Expected mean

Required data for calculation of the sample size

Data	**Source**
N	Proponent sales records
SD	Conservatively estimated based on international accepted values of IPCC
Mean	Conservatively estimated based on international accepted values of IPCC

For ex-ante estimation the following data shall be used for calculation of expected sample size for $NCV_{biomass}$

Data	**Value**	**Source**
N	10000	Based on the number of stoves expected to be distributed in the end of first crediting period
SD	10.05	Conservatively estimated
Mean	27	Conservatively estimated based on international accepted values of IPCC
Sample size n	53	Calculated
Oversampling n	69	Calculated

If the calculation of the sample size returns a value of less that 30 then the surveyor will apply student t-distribution since the parameter of interest is a mean as recommended by the *Standard Sampling and surveys for CDM project activities and programme of activities version 04.1*

Reliability for sampling results

Depending on the monitoring frequency the sample size will be expected to reach either 90/10 confidence precision level for annual monitoring or 95/10 for the case of biennial monitoring.
In case the sample will not attain the required precision the following options shall be used depending on which is appropriate as recommended by Standard Sampling and surveys for CDM project activities and programme of activities version 04.1

- Perform additional data collection that is a supplemental or new sample to reach the required precision level; or
- Apply a correction to the estimates using one of the options below:

(i) Discounting the emission reduction estimates by either,

a. Taking the lower or the upper bound, whatever is conservative, of the 90 or 95 per cent confidence interval, depending on the type of methodologies applied; or

b. Discounting by no less than three times (x3) the percentage precision points missed (e.g. if the attained precision is 90/11 then the emission reduction estimates are discounted by 3 per cent)

Sampling frame

The PoA will be composed of different sampling frames based on the characteristics of the CPAs and the host country of CPA implementation.

At minimal the CME will classify the sampling frame based on the below characteristics:

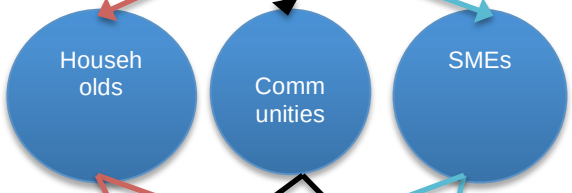
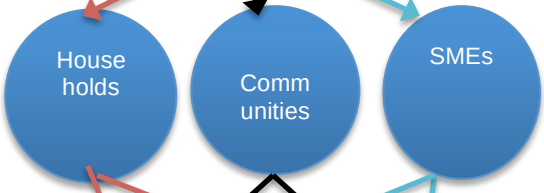
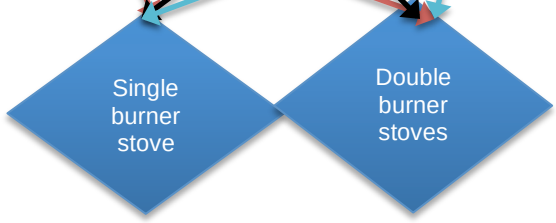
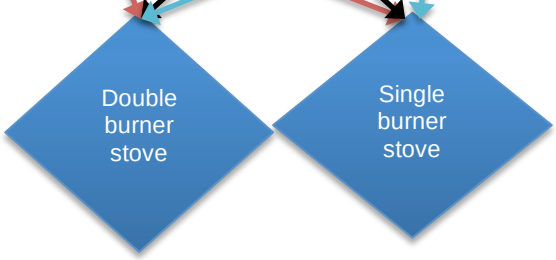
Country**:** Since the PoA is envisaged to include CPAs from different countries the sampling frame will start to be identified at the country level in that CPAs will be differentiated by country

End User**:** Among the eligibility criteria of the PoA is the end-users who in this case can be residential, SMEs or institutions. This will form the next differentiation of the sampling frame.

Stove type**:** The stoves can sufficiently be classified as homogenous due to having similar characteristic that is use of similar fuel, having the same efficiency and with the only difference of double burner and single burner stoves, which does not necessarily affect the end-user usage characteristics.

A naming system will be developed to identify the different sampling frame based on the above.

Identification of a sampling frame:

Category		
Country		
End users		
Stove type		
Sample Frame	CA-HH/C/S-SB CA-HH/C/S-DB	CB-HH/C/S-DB CB-HH/C/S-SB

The sampling frames are not fixed and may be altered from time to time with the CME in order to fit the characteristics of the CPA at hand.

Quality control /Quality assurance

In order to tackle the issue of data quality and analysis together with non-response of the end-users the CME will put in place a quality control mechanism in order to ensure that the monitoring is undertaken in a professional and conservative manner

1) **End- user awareness** at the time of sale, the end user will be made aware that they are required to participate in monitoring activities. This will be via a written statement (in English and local language where appropriate) on the carbon waiver form, or via alternative means such as training sales personnel explaining the importance of monitoring to each customer.

2) **Questionnaire design**. The design of the questionnaire will ensure that the questions are non-intrusive and easy to understand for both the interviewee and interviewer.

3) **Drawing on local knowledge.** Local third parties to be hired in each country will play an important role in tailoring the monitoring approach to suit local circumstances. For example, in some instances, it may be essential for a local person to conduct the interview in order to obtain accurate results. If the end-user needs to explain on the amount of ethanol that he/she uses, the data that they provide should be as accurate as possible. For this to happen however, the question should be well understood by the end-user and the importance of the monitoring exercise too. At most times this will be well put across by a person who understands the use of local dialect.
4) **Quality of contractors**. Any third parties hired by the CME to carry out sampling of data will be

required to demonstrate a high level of cultural awareness, local language skills and appropriate experience with data entry and data management. The CME will ensure that contractors are adequately trained for the tasks they are contracted. Training will also be provided on how to deal with non-responses, refusals and other problems should these occur.

If the sampling results are insufficient to achieve the target reliability levels, the CME has a number of options to address this e.g. selecting a larger than necessary sample size (buffer) before commencing monitoring and having a buffer in which he can rely on in doing extra surveys

The data contained in each individual CPA Monitoring Record and collected during field measurements will be transferred to the CME by the Monitoring Agents. Either the originals of the CPA Monitoring Records or scanned copies of each Record will also be provided to the CME to enable cross-checking. The CME will crosscheck the data provided by contractors against the original Monitoring Records.

5) **Sample size calculation**. The calculation of the sample size will be carried out using estimates for proportions, mean of values and standard deviations as the actual characteristics of the population/sampling frame are unknown ex-ante. In order to ensure the quality of the sampling results, the CME can draw on the provisions for reliability calculations as provided by Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities. In the event that the initial sampling results do not fulfill the required level of precision, the CME will Perform additional data collection that is a supplemental or new sample to reach the required precision level; or

- Apply a correction to the estimates using one of the options below:

(i) Discounting the emission reduction estimates by either,

a. Taking the lower or the upper bound, whatever is conservative, of the 90 or 95 per cent confidence interval, depending on the type of methodologies applied; or

b. Discounting by no less than three times (x3) the percentage precision points missed (e.g. if the attained precision is 90/11 then the emission reduction estimates are discounted by 3 per cent)

As a last resort, the sampling exercise may be repeated entirely with an increased sample size.

The data contained in each individual CPA monitoring record and collected during field measurements will be transferred to the CME by the Monitoring Agents. Either the originals of the CPA Monitoring Records or scanned copies of each record will also be provided to the CME to enable cross-checking.

The CME will be responsible for maintaining a secure PoA Distribution and Monitoring Database, which includes all the data relating to the CPAs within the PoA. The Database will be located on the CME's secure server. The system automatically backs up on regular basis any files that have been modified. The files are backed up onto separate hard drives that are regularly swapped to ensure there is always one drive located securely offsite. The CME may improve this system over time with new technology.

6) **Dealing with discrepancies in data**

In cases where the surveyor based on his experiences sees that the data being provided by the end user is not true then the survey will be deemed nullified and more sample from the buffer will be drawn from the buffer selected to cater for that which has been nullified**.**

7) **Dealing with non- cooperation by the end-user**

In cases where the end-users refuses to be interviewed during monitoring, the surveyor will not

force him/her to do so but rather will treat the case as non-respondance and will draw an extra stove from the buffer.

8) **Quality check of the data**

Through out the lifetime of the project the project developer will have random checks to confirm that the data entered for a specific stove is correct, this will be either through calling or having physical visitation to the end-user household.

The data to be checked will include but not limited to:

- The serial number of the stove visa vie what has been captured on the records.
- The type of stove
- The physical address
- The phone number
- The type of fuel used and the source

If this is found not to be correct the developer will correct this to avoid missing the location of the end-user during monitoring.

Data Analysis

The data obtained from sampling of each group of CPAs will be used to estimate values for the parameters described above. The values will then be factored into the emissions reduction calculations and the monitoring report for each monitoring period, and this will result in the request for issuance of CERs.

SECTION E. Approval and authorization

At the time of writing this CPA-DD, the letter of Approval had not been provided by the Designated National Authority of Djibouti.

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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	Gaia Association
Street/P.O. Box	Bole Sub-City Kebele 03 1460 Addis Ababa 1250 Ethiopia
Building	House Number 2003 2/B
City	Addis Ababa
State/Region	Addis Ababa
Postcode	1250 Ethiopia
Country	Ethiopia
Telephone	+251 11 618 3540
Fax	+251 11 662 7402
E-mail	gaiaassociation@ethionet.et
Website	www.projectgaia.com
Contact person	Wubshet Tedele
Title	Project Cordinator
Salutation	Mr
Last name	Tedele
Middle name	-
First name	Wubshet
Department	-
Mobile	-
Direct fax	+251 11 662 7402
Direct tel.	+251 11 618 3540
Personal e-mail	wubshet.t.tsehayu@gmail.com

CPA implementer and/or responsible person/ entity	☐ CPA implementer(s) ☒ Responsible person/ entity for completing the CDM-SSC-CPA-DD-FORM
Organization	Carbon Africa Ltd
Street/P.O. Box	Muthangari Drive
Building	Gath Plaza
City	Nairobi
State/Region	Nairobi
Postcode	14938-00800 Nairobi
Country	Kenya
Telephone	+254 731 851 754 or +254 706 374 150
Fax	-
E-mail	info@carbonafrica.co.ke

Website	www.carbonafrica.co.ke
Contact person	Adriaan Tas
Title	Director
Salutation	Mr
Last name	Tas
Middle name	-
First name	Adriaan
Department	-
Mobile	-
Direct fax	
Direct tel.	+254706374150
Personal e-mail	adriaan@carbonafrica.co.ke

Appendix 2. Affirmation regarding public funding

Not applicable

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

Not applicable

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

Not applicable

Appendix 5. Further background information on monitoring plan

Not applicable

Appendix 6. Summary of post registration changes

Not applicable

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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 **Error! Reference source not found.**; • 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