



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

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

**BASIC INFORMATION**

<b>Title of the PoA</b>	PoA for the Reduction of emission from non-renewable fuel from cooking at household level
<b>Version number of the PoA-DD</b>	Version number: 23
<b>Completion date of the PoA-DD</b>	Date: 22/08/2019
<b>Coordinating/managing entity</b>	Green Development AS
<b>Host Parties</b>	Ethiopia Kenya Madagascar Malawi Mozambique Nigeria Uganda Zambia Chad Dominic Republic Ivory Coast Liberia Namibia Rwanda Sierra Leone Somalia Ghana South Africa Zimbabwe
<b>Applied methodologies and standardized baselines</b>	AMS I.E., Version 04
<b>Sectoral scopes</b>	01

## **PART I. Programme of activities (PoA)**

### **SECTION A. Description of PoA**

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

- a) The purpose of the CPA is to reduce the demand for wood and charcoal and to contribute to a sustainable development.
- b) The CME will have the formal responsibility for all aspects of the PoA and will be directly responsible for collecting baseline information, and the annual monitoring process and all dialog with DOE, DNA and UNFCCC.
- c) The PoA is a voluntary action by the CME.
- d) The goal of the project is to provide solutions that will reduce GHG emissions, and other negative effects of the use of dirty non-renewable fuel from cooking at a household level.

Implementation of ethanol stoves, biogas stoves and water purification systems will be done through local partners.

#### **General operating and implementation framework of SSC-PoA**

The purpose and goal of the Small Scale Programme of Activities ("SSC-PoA") is to reduce emissions from household cooking stoves. The use of non-renewable fuel such as wood and charcoal for cooking, leads to the emission of greenhouses gasses, deforestation and poor indoor climate. The programme will use a number of different technologies to reach this goal.

The solutions are based on two concepts that fall under the same CDM methodology:

1. Reduce the need for boiling water for drinking and thus reduce the need for non-renewable fuel for boiling water. This is achieved by providing clean and safe drinking water to participating households. The purified water is provided either through:
  - a. Water purification system provided at the household level or
  - b. Community based water purification system where the households will get the purified water at water stations.
2. Provide clean renewable fuel for cooking and thus eliminate the need for non-renewable fuel consumption for cooking. This is done through providing highly efficient stoves that are using renewable fuel. The renewable fuel can either be:
  - a. Denatured alcohol or
  - b. Biogas.

Each project (CPA) under the proposed SSC-PoA will be implemented in a limited geographical areas such as a country, county or a district. The emission reduction from each CPA will be within the limits of 45 MW thermal capacity according to General Guidelines to SSC CDM Methodologies version 17, EB 61, Annex 21.

The Coordinating/Managing Entity (CME) aims to set up at least one project (CPA) in each of the countries included in the SSC-PoA. The success and benefits from these projects (CPAs) will then facilitate for replication of the solutions in other areas where new CPAs could be implemented either by the CME or by its partners. The program partners might or might not be a Local Project Implementation Partner (LPIP) with responsibility for a CPA.

Each CPA will include one or several of the technologies included in the PoA depending on the local conditions. Each household may use one single solution or a combination of solutions depending on its needs and local conditions. There will be no cross over effects between the various solutions as all solutions only contribute with its part to the reduction of non-renewable fuel.

In a case where the project is deploying one or both technologies for renewable energy for cooking (Denatured alcohol and/or Biogas) and the project is deploying technologies for water purification (community / household based water purification), both solutions will result in a reduction in the use of woody biomass for cooking without reducing the use from the other technology. If no water purification technology is deployed, the water would have to be boiled, and this could then be boiled with the renewable energy (biogas or denatured alcohol) and hence no additional emission would occur from boiling of the water. The volume of renewable energy (biogas or denatured alcohol) would however be higher as a result of the need to boil water in addition to other cooking needs. The increase in the thermal energy used to boil the water with renewable energy would be equal to the thermal energy used to boil the water with woody biomass in the baseline. Hence there is no crossover effect.

The goal of the project is to provide solutions that will reduce GHG emissions, and other negative effects of the use of dirty non-renewable fuel from cooking at a household level. The significant reduction of smoke from cooking stoves will improve the indoor air quality and greatly improve the health of the participating households. In addition, time will be saved on collecting and carrying non-renewable fuels such as wood and charcoal and on carrying water to the household. Furthermore the project will reduce the rate of deforestation, which is a major problem in all the countries included in this PoA.

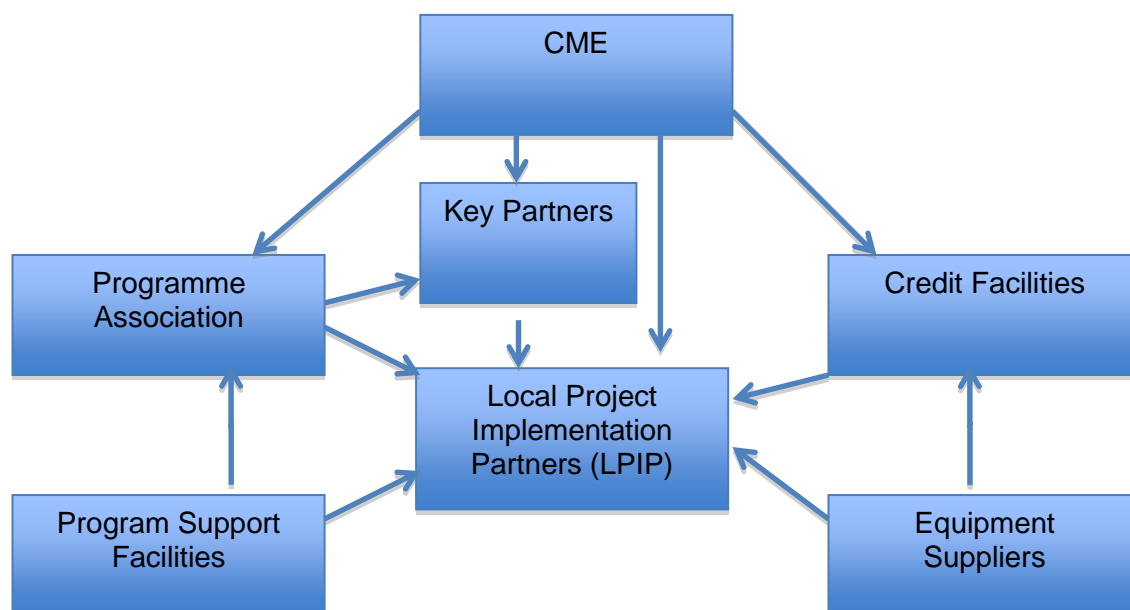
The Coordinating/Managing Entity (CME) will cooperate with LPIP to implement the SSC-PoA and the CPAs under this PoA. In some cases, particularly in the initial CPAs, CME will be responsible for the implementation of the CPAs, while it is the goal of the program to have partners to take on the role as LPIP at a later stage. Hence it is essential for the program to develop partnerships with trusted institutions that seek to assist with the project implementation. Such partnerships have been made with the World Bank, UNDP, the Lutheran Church and a number of NGOs with experience in these type of projects.

An association has been established to coordinate the activities of the program and act as a common platform to secure the interests of all the stakeholders involved. This includes ensuring that the program does not lead to negative effects on the environment or society. This includes ensuring that biogas and denatured alcohol is produced according to the guidelines set forth by the association, to ensure that the process of producing denatured alcohol or biogas for the program does not lead to extensive GHG emissions or deforestation, or use land that would otherwise be used for food production.

CME aims at registering 100 CPAs, each with an emission reduction of at least 50 000 tCO<sub>2</sub> annually. When this goal is achieved, the program of activity will result in the reduction of 5 000 000 tCO<sub>2</sub> annually.

None of the projects has been started prior to the application of the SSC-PoA.

## Organization



Part of the income from the carbon credits will be paid from CME directly to the LPIP or to the LPIP through the key partners. In return the LPIP will provide the solutions included in the program to the participating households at a discounted price.

### CME

Green Development AS will be the Coordinating and Managing Entity (CME) for the program. CME will be the owner of the carbon credits generated from the program, and will use the income from the carbon credits to support the structure that will make the solutions included in the program affordable and available for households that want to become program participants.

CME has or will set up partnerships with key partners and directly with LPIPs. The CME will prequalify equipment suppliers and might set up a credit facility for the LPIP that will enable these to distribute the required equipment for households to participate in the program. Credit facilities might be provided partly by CME directly and partly through 3<sup>rd</sup> party financial institutions.

CME has also established an association for all the partners and participants in the program.

### Key Partners

The Key partners are organizations that have the ability and the willingness to set up a number of LPIPs. A typical key partner is a church that has several hundred branches that want to be part of the program to provide clean renewable energy for their local community.

### Local Project Implementation Partners

These will be local entrepreneurs or organizations that will manage the local project components and be the first line support to the participating households.

There might be a single LPIP in a single CPA, or there could be several LPIPs within a CPA. A micro distillery that produces between 500 to 5,000 litre of alcohol to be denatured each day would be a typical LPIP but there might also be micro suppliers that produce alcohol to be denatured or biogas for a small local community of less than 5 households. Hence there may be several denatured alcohol, biogas or suppliers of purified water within a single CPA.

CME will in some cases take the direct ownership in the process of producing denatured alcohol, biogas and / or purified water to the households, in which case CME and the LPIP will be the same entity within a CPA.

**Credit facility**

A standard credit facility might be provided to the program participants to reduce the initial equity needed to take part in the program. Micro finance will be an option to participating households but the preferred credit facility will be a small loan given to the LPIP.

The small-scale loan given to the LPIP will then be used to pay for part of the cost of the equipment needed to produce denatured alcohol, biogas and purified water in order to enable the supplier to keep the unit cost of denatured alcohol, biogas and purified water as low as possible. Furthermore, the loan will be used to finance the equipment provided to the participating households, including ethanol stoves, biogas stoves and water purification systems.

The borrower, which will be the LPIP, will be responsible for the payback of the loan, but the income from the carbon credits will go directly to the credit facility until the loan is fully paid back.

**Equipment Suppliers**

Equipment suppliers will provide the equipment to the LPIP. The LPIP will then distribute the equipment to the households that want to participate in the program. The households will then either lease the stoves or buy them at a discounted price from the LPIP.

**Program support facilities**

Pilot projects will be set up that will be used as demonstration and training of new LPIPs. The facilities will be able to explain and show the various solutions that might be included in the program, and explain the cost and benefit of the various solutions.

The training program support facilities will also include an organization that can provide training to new LPIPs. It is the goal of the program that the key partners gradually will take on such a role on their own, and if so, the program support facility will provide 3rd line support and training to the organizations established by the key program partners.

The support facility will include staff that can assist in setting up a micro distillery, build biogas digesters and install water purification systems. The support facility will also include staff that can provide training to LPIPs.

**Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity**

The project SSC PoA will be implemented on a voluntary basis by the CME as well as by all of its partners. There is no law that mandates the adaptation of low emission stoves or the alternatives to boiling water in any of the countries or regions included in the SSC-PoA.

**Policy/measure or stated goal of the SSC-PoA**

During the course of the next 28 years, the goal of the SSC-PoA is to transform the kitchens of households in the program area, through the distribution of solutions that will reduce emission from cooking at household level. The program of activities will have multiple benefits of reducing global greenhouse gas emissions, reducing pressure on forests and woody biomass resources, and also reducing indoor air pollution associated with the use of traditional stove-fuel mix.

The SSC-PoA will contribute to substantial reduction in CO<sub>2</sub> emissions, reduction in deforestation, improved the health by the participating households, create local jobs, and improve the financial situation of the local communities and the households that participate in the program. There are no major negative environmental or social implications by the programme.

The project participant has considered all applicable national and/or sectoral policies and regulations within the countries included in the PoA. There has been found no policies or regulations in any of the countries included in the PoA that prevents or restricts households from using purified water as an alternative to boiling or from using biogas or denatured alcohol for cooking.

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

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The physical boundary of the project is the geographical boundary of the following countries:

Country	Latitude (average)	Longitude (average)
Ethiopia	8	38
Kenya	1	38
Madagascar	-20	47
Malawi	-13	34
Mozambique	-18	35
Nigeria	10	8
Uganda	1	32
Zambia	-15	30
Chad	15	19
Dominic Republic	19	-70
Ivory Coast	8	-5
Liberia	6.5	-9.5
Namibia	-22	17
Rwanda	-2	30
Sierra Leone	8.5	-11.5
Somalia	6	46
Ghana	8	-2
South Africa	-29	24
Zimbabwe	-20	30

<http://opendata.socrata.com/dataset/Country-List-ISO-3166-Codes-Latitude-Longitude/mnkm-8ram>

The SSC-CPAs that will be included under the SSC-PoA will be within the defined geographical location of the SSC-PoA and will follow applicable national and / or policies and regulations.

**A.3. Technologies/measures**

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Each Small Scale CDM Project Activity under the SSC-PoA will include one or several of the components included in the program in order to reduce the emissions from non-renewable fuel from cooking at household level.

The emission reductions will be achieved by the followings solutions<sup>1</sup>

**1. Reduce the need for boiling water and hence the need for fuel for this process.**


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<sup>1</sup> The product descriptions used in this section refers to the solutions that will be used with the first CPAs under the PoA. Future CPAs might use slightly different variations of the solutions with different capacity etc. as long as they still remain within the framework described in this document and comply with the methodology. The most cost-efficient solutions most suitable for the local conditions might be used as long as they still remain within the framework described in this document and comply with the methodology. These shall include the use of membrane-based systems for household water purification systems and community based water purification systems using filtering technology.

This will be done by providing clean drinking water as an alternative to boiling water. Clean drinking water will be provided by two alternative solutions, depending on the project specific conditions.

- a. Household water purification systems. This will be a membrane-based system, to be installed at household level which will use no energy and which has been designed so that no unsafe drinking water will ever be available through the system. Such systems will be gravity based, and will hence require no external power consumption.

The water purification technology to be installed may consist of the following process

Pouring of water into a raw water container

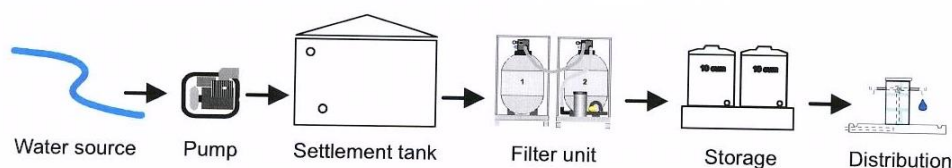
Filtering of the water through a water purification filter

Collection of the purified water in a safe drinking water container

Disease-causing bacteria and cysts do not pass through such membranes. Also the concentration of heavy metals and pesticides is significantly reduced.

- b. Community based water purification systems using filtering technology, where households can buy clean drinking water from a water station. Such solutions require that the households buy purified water to fill up a water container and carry to their home.

The water purification technology to be installed may consist of a multistep processes as illustrated below;



1. Water source - local river, lake or similar
2. Pump - pumping raw water to settlement tank adding flocculent
3. Settlement tank - Flocculation/settlement of finer contaminants
4. Filter unit - Purification by sand- and active carbon filters
5. Storage tanks - for potable, safe water
6. Distribution - to water collection points

The pumps will use renewable fuel, such as denatured alcohol, so that there will be no emission from the operation of the water purification systems.

The water purification solutions will provide clean safe drinking water that meet WHO's interim performance targets on households water treatment or applicable national standards/guidelines.

None of the solutions rely on non-renewable fuel for operations. The household water purification system relies on gravity only and need no external energy. The community based water purification systems use minor pumps to distribute the purified water through the filters or to the distribution points. These pumps will be fuelled by renewable energy.

The technology deployed, based on local conditions, shall be identified and described at the time of CPA implementation and inclusion and shall also be described as part of the monitoring process, for each household selected for monitoring.

## 2. Replace non-renewable fuel with renewable fuel.

This will be done by providing energy efficient stoves that will use renewable fuel. Each household will be using biogas or denatured alcohol, based on what is locally available.

- a. Biogas stoves will be implemented as the first choice wherever biogas sources are available at affordable prices. The use of biogas sources will not only reduce the use of non-renewable fuel but also reduce the emission of methane into the atmosphere (the reduction of methane emission is however not included in the project. This is conservative)
- b. Ethanol stoves will be implemented as the second choice wherever renewable denatured alcohol is available.

The income generated from the carbon credits will be used to finance the equipment included in the solutions (water purification facilities and new stoves) and or aftersales support to ensure that the system remain operational.

### A.4. Coordinating/managing entity

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The coordinating and managing entity of the SSC-PoA will be Green Development AS (GD).

### A.5. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Norway	Green Development AS (private)	No
Republic of Korea	Green Development AS (private)	No
Ethiopia (host Party)	Green Development AS (private)	No
Kenya (host Party)	Green Development AS (private)	No
Madagascar (host Party)	Green Development AS (private)	No
Malawi (host Party)	Green Development AS (private)	No
Mozambique (host Party)	Green Development AS (private)	No
Nigeria (host Party)	Green Development AS (private)	No
Uganda (host Party)	Green Development AS (private)	No
Zambia (host Party)	Green Development AS (private)	No
Chad (host Party)	Green Development AS (private)	No
Dominic Republic (host Party)	Green Development AS (private)	No



Parties involved	Project participants			Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Ivory Coast (host Party)	Green (private)	Development	AS	No
Liberia (host Party)	Green (private)	Development	AS	No
Namibia (host Party)	Green (private)	Development	AS	No
Rwanda (host Party)	Green (private)	Development	AS	No
Sierra Leone (host Party)	Green (private)	Development	AS	No
Somalia (host Party)	Green (private)	Development	AS	No
Ghana (host Party)	Green (private)	Development	AS	No
South Africa (host Party)	Green (private)	Development	AS	No
Zimbabwe (host Party)	Green (private)	Development	AS	No

#### A.6. Public funding of PoA

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No public funding from Annex 1 countries is provided for the proposed project.

### SECTION B. Management system

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#### Record keeping for each CPA

The CME "Survey and Data Collection Department" will be responsible for collecting all the data needed for identifying the baseline and for the monitoring to determine the emission reductions for each CPA to be included in the program. The "Survey and Data Collection Manager" will produce all the data upon request.

The baseline data in hardcopy (or a scanned copy of a hard copy) will be forwarded to CME "Recording and Data Department" that will keep all the data for all the CPAs. The data will then be put into a database and stored for the duration of the program plus two years. Baseline data will be collected for each CPA prior to each CPA inclusion

Monitoring data will be collected at least every two years to determine the annual emission reduction.

Registration of data related to each project participating household shall be registered electronically in a database. This data might be submitted through a smartphone application, through a written end user contract or through any other means that technology will allow for that provide a safe and verifiable registration of end user households included in the program.

#### Unique Identification Number

Under the "PoA for the Reduction of emission from non-renewable fuel from cooking at household level", each SSC-CPA will be assigned a unique code by CME for easy identification. Furthermore, each project participating household will be registered with a unique identification number under each CPA. The code is assigned as per scheme below:

Country Code	CPA code	Region name	Participating households ID nr.
The name in which the CPA is located. E.g. MA is for Madagascar.	CME assigned serial number of SSC-CPA. E.g. 001, 002, 003 etc. for each CPA registered in each country.	The name of the region in which the CPA is located. Additional names might also be added to the CPA	Number from 1 to 50 000

Example of the first CPA und the proposed SSC-PoA will be registered as:

CPA – MA - 001 Ambohidratrimo District - 05

This unique identification refers to the 5th project participating household, registered in Ambohidratrimo district, which is the first CPA registered in the country of Madagascar under this CDM PoA.

The database for the project participating households will be updated continuously as households become project participating households. A household will be considered a project participating household when it has been assigned a unique identification number and it has been registered in the database. The household will hence become a project participating households after accepting the terms in the contract stating that the solutions used by the household is part of the CDM PoA and that the carbon credits generated from this belong to Green Development AS, as it might take a few days from a contract is signed until it is provided to CME for registration in the database.

The Reporting and Data Registration Department of the CME will be responsible for assigning a unique Identification number to each project participating household, register the data in the database and archive the contract with the project participating household. The file name of the stored copy of the end user agreement shall be the unique identification number, so that it can easily be found for cross-reference with the data in the database. The Reporting and Data Registration Department of the CME will also write the unique identification number on the contract prior to archiving the contract.

The database is designed so that it is easy to confirm that the same unique identification number is not used twice and hence eliminate the risk for double counting.

### **Supply and distribution of the water purification systems, biogas and ethanol stoves**

The various technical solutions will be distributed by CME and/or LPIPs, to the participating households and local communities.

The equipment will be purchased from 3rd party vendors and the purchasing records will be kept as records of how many, and what kind of stoves and water purification systems that are being distributed within the relevant CPA. The sales records for all the equipment will be forward to the CME "Recording and Data Department". The number of items that will be supplied will be compared to the number of participating households that will be part of the CPA

The stoves and water purification systems will be sold or leased to the end user at a price that is below cost. The actual number of units which it is claimed carbon credits for are however based on the number of participating households multiplied with the average emission reduction from each of the households monitored.

### **Ensure that CPA is aware that they are part of the PoA.**

There will be a contract between each CPA implementer and CME, where it will be stated that the proposed CPA is part of the PoA.

### **Ensure that project participating households are aware that they are part of the PoA.**

There will be a contract with each project participating household, where it will be stated that the household is part of the PoA and that the carbon credits will be the sole ownership of CME.

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

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A SSC-CPA under this PoA will reduce anthropogenic CO<sub>2</sub> emission below those that would have occurred in the absence of the registered PoA by deploying solutions based on renewable energy, which will reduce woody biomass consumption from non-renewable sources.

(i) The SSC CPA under this PoA is a voluntary coordinated action;

The proposed PoA is a voluntary and coordinated action. There are no mandatory requirements in any of the countries included in the PoA stipulating the use of renewable energy solutions as alternative to using woody biomass. In addition, the PoA requires individual households to take voluntary action to participate in project activities.

(ii) The proposed voluntary coordinated action would not be implemented in the absence of the PoA.

The solutions promoted by the PoA is new to the users and hence there is a barrier due to prevailing practice. Furthermore, there are financial barriers, as the project participant has no other revenues from the projects than the income from the carbon credits generated. The proposed solutions cost more than alternative solutions and hence the project participant will ensure that the proposed solutions are provided to end user at a price that is below cost.

According to the "Guidelines of the demonstration of additionality of small-scale project activities", EB 68, Annex 27, it is not required to document barriers for the positive list of technologies and project activity types that are defined as automatically additional for projects sized up to and including small-scale CDM thresholds. The positive list include "Project activities solely composed of isolated units where the user 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 threshold.

As the proposed solutions fall within this definition, the projects are considered additional.

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

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

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01/10/2012 or the date of registration, whichever is later.

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

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28 years (fixed)

## **SECTION E. Environmental impacts**

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

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Environmental Analysis is done at CPA level if required by national or local authorities.

Environmental Analysis may be done at national level for the first CPAs in that particular country.

The choice of having the Environmental Analysis done at a national level for first CPAs in each country is justified by the fact that there are no major negative social or economic or environmental implications from the project. The national environmental analysis will be used as a base for the environmental analysis for each subsequent CPA, where local conditions will be considered as additional input to the CPA specific environmental analysis.

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

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To be provided at CPA level. National Environmental Impact Analysis may be done prior to the registration of the first CPA in that country.

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

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Not applicable, as this is provided at CPA level.

# **SECTION F. Local stakeholder consultation**

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

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Solicitation from local stakeholder will be done prior to CPA registration for each CPA.

For the first CPA in each country the stakeholder consultation may be done by inviting stakeholders from the whole country.

The choice of having the stakeholder consultation at a national level for the first CPA is to ensure that stakeholders with a better understanding of the solutions promoted, can provide input to the program. The national stakeholder consultation will be followed up with a stakeholder consultation for each subsequent CPA, where local conditions will be considered as additional input to the CPA specific stakeholder consultation.

The stakeholder consultation conducted at national level will enable the program to include stakeholders with good understanding of the program. Description on how comments by local stakeholders has been invited and complied will be provided at SSC-CPA-DD

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

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Stakeholder consultations was carried out in each country prior to registration of the first CPA in each host country.

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

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Summary of comments received will be provided in SSC-CPA-DD

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

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Report on consideration of comments received will be provided in SSC-CPA-DD.

**SECTION G. Approval and authorization**

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The letter of approval has been received from all parties that wish to be involved in the PoA.

The Letter of Approval from all the parties has been submitted to DOE.

**PART II. Generic component project activity (CPA)****SECTION H. Description of generic CPA****H.1. Title of generic CPA**

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Not Applicable. As no title was provided for generic CPA in earlier version of registered PoA-DD.

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

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Generic CPA Type 1.

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

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The purpose of the CPA is to reduce the demand for wood and charcoal and to contribute to sustainable development.

A typical CPA will include a district or a county or any other easily defined area. In this area households will be offered a number of solutions that they might adapt to reduce their usage of non-renewable fuel for cooking and for improving their indoor environment. The solutions will be dependent on local conditions such as the availability of fuel (biogas/denatured alcohol) and to what degree drinking water is being cooked for sterilization in the baseline scenario.

A typical CPA will be a country, district, county, town or city, which is well defined. In a typical CPA most of the households will use inefficient stoves for cooking, causing extensive emission of CO<sub>2</sub> and extensive emission of soot, which causes indoor pollution. In a typical CPA the households are poor and have limited funds to invest in clean energy solutions, and hence they rely on suboptimal solutions that do not require large upfront investments.

In a typical CPA there will be a number of different solutions provided as part of the program. There will be several types of ethanol and biogas stoves provided, so as to provide a competitive environment that give the end user a choice of suppliers.

Ethanol stoves will be provided as the standard solution for the households, thus eliminating the use of non-renewable fuel such as wood and charcoal. The denatured alcohol will primarily be provided by the local micro distilleries, which will be making denatured alcohol from bagasse from local sugarcane farmers or other renewable sources. Initially denatured alcohol will also be sourced from sugar factories that produce ethanol as a by-product from sugar production, until local distilleries are able to provide the required fuel. Dried bagasse might be used as energy source for the boiler for the distillation process. The supply of denatured alcohol is outside of the project boundary as described in the AMS I.E.

Part of the households will also be provided with biogas stoves. This will be limited to households that have access to biogas. The project will assist in developing biogas sources, but in most areas

the biogas potential is limited and hence the number of households that can use biogas will also be limited. Wherever biogas is available these sources will have priority over denatured alcohol sources.

The stoves will be provided to the households at a subsidized price, as it will be partly financed by the income from the carbon credits. It is of absolute importance for the project that the initial investment in the stove is minimal and that the cost of fuel is below that of wood and charcoal.

A CPA will typically include solutions for use of ethanol stoves, biogas stoves and water purification. A CPA might however exclude one or two of these solutions if CME is unable to prove additionality for such solutions for one or two of these technologies.

Baseline survey will be conducted prior to CPA inclusion for each CPA and will be carried out in accordance with the procedures described in the Program Management Manual. The baseline survey shall include 68 randomly selected households in the proposed CPA area.

#### H.4. Technologies/measures

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Each Small Scale CDM Project Activity under the SSC-PoA will include one or several of the components included in the program in order to reduce the emissions from non-renewable fuel from cooking at household level.

The emission reductions will be achieved by the followings solutions<sup>2</sup>

##### 1. Reduce the need for boiling water and hence the need for fuel for this process.

This will be done by providing clean drinking water as an alternative to boiling water. Clean drinking water will be provided by two alternative solutions, depending on the project specific conditions.

- a. Household water purification systems. This will be a membrane-based system, to be installed at household level which will use no energy and which has been designed so that no unsafe drinking water will ever be available through the system. Such systems will be gravity based, and will require no external power consumption.

The water purification technology to be installed may consist of the following process

Pouring of water into a raw water container

Filtering of the water through a water purification filter

Collection of the purified water in a safe drinking water container

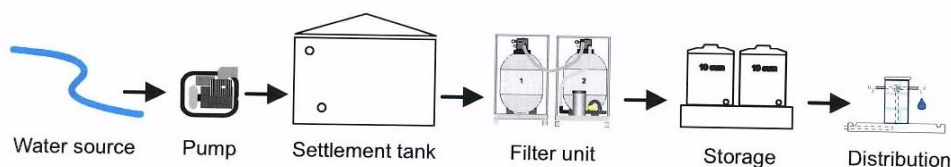
Disease-causing bacteria and cysts do not pass through such membranes. Also the concentration of heavy metals and pesticides is significantly reduced.

- b. Community based water purification systems using filtering technology, where households can buy clean drinking water from a water station. Such solutions require that the households buy purified water to fill up a water container and carry to their home.

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<sup>2</sup> The product descriptions used in this section refers to the solutions that will be used with the first CPAs under the PoA. Future CPAs might use slightly different variations of the solutions with different capacity etc. as long as they still remain within the framework described in this document and comply with the methodology. The most cost-efficient solutions most suitable for the local conditions might be used as long as they still remain within the framework described in this document and comply with the methodology. These shall include the use of membrane-based systems for household water purification systems and community based water purification systems using filtering technology.

The water purification technology to be installed may consist of a multistep processes as illustrated below;



1. Water source - local river, lake or similar
2. Pump - pumping raw water to settlement tank adding flocculent
3. Settlement tank - Flocculation/settlement of finer contaminants
4. Filter unit - Purification by sand- and active carbon filters
5. Storage tanks - for potable, safe water
6. Distribution - to water collection points

The pumps will use renewable energy, such as denatured alcohol, so that there will be no emission from the operation of the water purification systems.

The water purification solutions will provide clean safe drinking water that meet WHO's interim performance targets on households water treatment or applicable national standards/guidelines.

None of the solutions rely on non-renewable fuel for operations. The household water purification system relies on gravity only and need no external energy. The community based water purification systems use minor pumps to distribute the purified water through the filters or to the distribution points.

The technology deployed, based on local conditions, shall be identified and described at the time of CPA implementation and inclusion and shall also be described as part of the monitoring process, for each household selected for monitoring.

## 2. Replace non-renewable fuel with renewable fuel.

This will be done by providing energy efficient stoves that will use renewable fuel. Each household will be using biogas or denatured alcohol, based on what is locally available.

- c. Biogas stoves will be implemented as the first choice wherever biogas sources are available at affordable prices. The use of biogas sources will not only reduce the use of non-renewable fuel but also reduce the emission of methane into the atmosphere (the reduction of methane emission is however not included in the project. This is conservative)
- d. Ethanol stoves will be implemented as the second choice wherever renewable denatured alcohol is available.

The income generated from the carbon credits will be used to finance the equipment included in the solutions (water purification facilities and new stoves) and or aftersales support to ensure that the system remain operational.

## SECTION I. Application of methodologies and standardized baselines

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

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#### a) Methodology

AMS I.E., Sectoral Scope:01, EB 60, title "Switch from non-renewable biomass for thermal application by the end user" (Version 04)

## b) Guidelines:

Guidelines on the demonstration of additionality of small-scale project activity. Version 09, EB 68, Annex 27.

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

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AMS I.E is applicable for the following reasons:

- The programme activity involves displacing the use of non-renewable biomass by introducing renewable energy technology.
- The project participants have been using non-renewable biomass since before 31. December 1989.
- The CPA is small scale as the thermal capacity of all the ethanol stoves installed in a CPA is less than 45 MW.
- The methodology is approved for application to CPAs under PoAs

The baseline methodology shall be used in conjunction with the approved monitoring methodology.

**I.3. Application of multiple methodologies**

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Not applicable. The PoA does not use multiple methodologies.

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

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	Source	GHG	Included?	Justification/Explanation
Baseline	Source 1 Emission from combusting non-renewable woody biomass.	CO <sub>2</sub>	Included	Main emission source.
		CH <sub>4</sub>	Excluded	Excluded for simplification. The emission source is assumed to be very small.
		N <sub>2</sub> O	Excluded	Excluded for simplification. The emission source is assumed to be very small.
		---	-	-
	Source 2 Not applicable	CO <sub>2</sub>	-	-
		CH <sub>4</sub>	-	-
		N <sub>2</sub> O	-	-
		---	-	-
Project activity	Source 1 Emission from combustion of renewable fuel.	CO <sub>2</sub>	Excluded	No net CO <sub>2</sub> emission from renewable fuel.
		CH <sub>4</sub>	Excluded	Excluded for simplification. The net emission source is assumed to be very small.
		N <sub>2</sub> O	Excluded	Excluded for simplification. The emission source is assumed to be very small.
		---	-	-
	Source 2 Leakage Emission	CO <sub>2</sub>	Included	A standard adjustment factor of 0.95 has been used in accordance with AMS I.E.



Source	GHG	Included?	Justification/Explanation
	CH <sub>4</sub>	Excluded	Excluded for simplification. The emission source is assumed to be very small.
	N <sub>2</sub> O	Excluded	Excluded for simplification. The emission source is assumed to be very small.
	---	-	-

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

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The baseline scenario is the same as the current practice in accordance with the baseline study. The baseline scenario is that households use non-renewable woody biomass for cooking.

The baseline scenario is identified based on the following sources;

- a) Baseline survey
  - $\eta_{old}$  – Efficiency of the stoves used in the baseline scenario. The baseline survey will determine the portion of stoves that is considered efficient and the portion of baseline stoves that is considered inefficient in accordance with the methodology.
  - $C_p$  – Fraction of woody biomass that is used in the form of charcoal in the project area.
  - Confirm that water is being boiled in the baseline scenario<sup>3</sup>.
- b) Default values from the methodology
  - EF<sub>projected\_fossilfuel</sub>
  - NCV<sub>biomass</sub>
  - LF
- c) IPCC default values
  - NCV<sub>Denatured alcohol</sub>
  - NCV<sub>biogas</sub>
- d) Independent 3<sup>rd</sup> party reports
  - $f_{NRB,y}$
  - $WB_{LB}$
  - $WB_{LBC,Charcoal}$
  - NCV<sub>Charcoal</sub>
  - $C_{CF}$

## I.6. Estimation of emission reductions

### I.6.1. Explanation of methodological choices

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The methodology I.E version 04, requires methodological choices to be made: The SSC-CPA shall indicate choices in the following manner

**Determination of  $B_y$**  (Quantity of woody biomass that is substituted or displaced in tonnes)

$B_y$  is determined by using the following options:

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<sup>3</sup> This apply for households that will get purified water as part of the program. It will be confirmed in the end user contract with the project participating household if the household do boil their drinking water in the baseline scenario. No carbon credits will be claimed for providing purified water to households until it has been determined if the household did boil their drinking water in the baseline scenario.

- 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) Calculated from the thermal energy generated in the project activity as:  

$$B_y = H_{Gp,y} / (NCV_{biomass} * \eta_{old})$$
- c) In the specific case of renewable energy based on water treatment technologies,  $B_y$  is calculated as the product of target population of the project multiplied by the volume of drinking water per person per day and the mass of woody biomass that would have been required to boil one litre of water as per the equation  

$$B_y = N_{p,y} * QDW_{p,y} * WB_{BL} * 365 * 10^{-3}$$

Option b) will be used by the SSC-CPA to calculate  $B_{y,biogas}$  and  $B_{y,Denatured\ alcohol}$

Option c) will be used by the SSC-CPA to calculate  $B_{y,purifiedWater}$

#### Determination of $\eta_{old}$ (Efficiency of systems being replaced).

$\eta_{old}$  is determined by using one of the following options:

1. Measured using representative sampling methods or based on referenced literature values as weighted average values if more than one type of system is replaced, or;
2. Use a default value of 0.10 if the replaced system is a three stone fire, or a conventional system with no improved combustion air supply or flue gas ventilation system, i.e. without a grate or a chimney; for other types of systems a default value of 0.2 might be optionally used.

Option 2, is used, and the weighted average of stoves with a default value of 0.10 and stoves with a default value of 0.2 is used to determine  $\eta_{old}$  by the SSC-CPA.

#### Calculation of 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 their woody biomass is sourced. The following potential source of leakage shall be considered:

“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 and 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 alternative provided by the methodology to multiply  $B_y$  with a net to gross adjustment factor of 0.95 to account for leakage will be used by the SSC-CPA.

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

<b>Data / Parameter</b>	$f_{NRB,y}$
Data Unit	Fraction.
Description	Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass.
Source of data	Determined by approved 3 <sup>rd</sup> party or use approved default values such as from EB 67, annex 22, "Information note default values of fraction of non-renewable biomass for least developed countries and small island developing states".
Value(s) applied	To be determined by SSC-CPA.
Choice of data or Measurement methods and procedures	Nationally approved methods. If no nationally approved methods are available to determine $f_{NRB}$ , Default values might be used for the Least Developed Countries included in the SSC PoA.
Purpose of data	To calculate emission reductions.
Additional comment	Not applicable.

<b>Data / Parameter</b>	$EF_{\text{projected\_fossilfuel}}$
Data Unit	tCO <sub>2</sub> /TJ.
Description	Emission factor for the substitution of non-renewable biomass that is substituted.
Source of data	Default value in methodology.
Value(s) applied	81.6
Choice of data or Measurement methods and procedures	Not applicable.
Purpose of data	Calculation of baseline emissions.
Additional comment	Not applicable.

<b>Data / Parameter</b>	$NCV_{\text{biomass}}$
Data Unit	TJ/tonne.
Description	Net Calorific Value of the non-renewable biomass that is substituted.
Source of data	Default value in methodology.
Value(s) applied	0.015
Choice of data or Measurement methods and procedures	Not applicable.
Purpose of data	Calculation of baseline emissions.
Additional comment	Not applicable.

Data / Parameter	NCV <sub>Denatured alcohol</sub>
Data Unit	TJ / m <sup>3</sup>
Description	Energy Content of denatured alcohol
Source of data	2006 IPCC Guidelines for National Greenhouse Gas inventories combined with default density of ethanol.
Value(s) applied	0.0213 TJ / m <sup>3</sup>
Choice of data or Measurement methods and procedures	<p>"Pure ethanol and alcoholic beverages are heavily taxed as a psychoactive drug, but ethanol has many uses that do not involve consumption by humans. To relieve the tax burden on these uses, most jurisdictions waive the tax when an agent has been added to the ethanol to render it unfit to drink. These include bittering agents such as denatonium benzoate and toxins such as methanol, naphtha, and pyridine. Products of this kind are called denatured alcohol".</p> <p><a href="http://en.wikipedia.org/wiki/Ethanol">http://en.wikipedia.org/wiki/Ethanol</a></p> <p>Denatured alcohol will consist mostly Ethanol. Net calorific value of ethanol is 27.0 TJ/Gg according to 2006 IPCC Guidelines for National Greenhouse Gas inventories. Volume 2 – Energy, Chapter 1 – Introduction, Table 1.2 "Default Net Calorific Values (NCVs)".</p> <p>Density of ethanol is 0.789 g/cm<sub>3</sub> <a href="http://en.wikipedia.org/wiki/Ethanol">http://en.wikipedia.org/wiki/Ethanol</a></p> <p>NCV for ethanol is hence calculated as (27.0 * 0.789 / 1000) = 0.0213 TJ / m<sup>3</sup></p> <p>Denatured alcohol will consist of a mix of ethanol and other types of alcohol or toxins or bittering agents. Ethanol or methanol shall always be the predominant type of fuel in the denatured alcohol mix that will be used by the project.</p>
Purpose of data	Calculation of baseline emissions.
Additional comment	Ethanol is the same as bio gasoline. See 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy, Chapter 1 Introduction, Table 1.1 – Definitions of fuel types used in the 2006 IPCC guidelines.

<b>Data / Parameter</b>	NCV <sub>biogas</sub>
Data Unit	TJ/m <sup>3</sup>
Description	Energy content of the biogas.
Source of data	IPCC default value.
Value(s) applied	0.0000215
Choice of data or Measurement methods and procedures	<p>Default energy value of biogas is used in other methodologies. AMS-I.I</p> <p>“Biogas/biomass thermal application for households/small users” version 04. The default value a is described as;</p> <p>“Net calorific value of the biomass (GJ/unit mass or volume, dry basis). For biogas, use default value: 0.0215 GJ/m<sup>3</sup> biogas (assuming NCV of the methane: 0.0359 GJ/m<sup>3</sup>, default methane content in biogas: 60%)”</p> <p>0.0215 GJ/m<sup>3</sup> equals 0.0000215 TJ/m<sup>3</sup></p> <p><a href="http://cdm.unfccc.int/methodologies/SSCmethodologies/approved">http://cdm.unfccc.int/methodologies/SSCmethodologies/approved</a></p>
Purpose of data	Calculation of baseline emissions.
Additional comment	Not applicable.

<b>Data / Parameter</b>	NCV <sub>Charcoal</sub>
Data Unit	TJ/Tonne
Description	Energy content of the Charcoal
Source of data	To be determined in CPA
Value(s) applied	To be determined in CPA
Choice of data or Measurement methods and procedures	Not applicable.
Purpose of data	Calculation of baseline emissions.
Additional comment	Not applicable.

<b>Data / Parameter</b>	$\eta_{old}$
Data Unit	Fraction
Description	Efficiency of system being replaced.
Source of data	Baseline survey.
Value(s) applied	To be determined by SSC-CPA.
Choice of data or Measurement methods and procedures	Will use the weighted average of the default values of 0.1 and 0.2 according to the definition in the methodology.
Purpose of data	Calculation of baseline emissions.
Additional comment	Not applicable.

<b>Data / Parameter</b>	WB <sub>LB</sub>
Data Unit	Kg/litre.
Description	Mass of woody biomass that would have been required to boil one litre of water.
Source of data	Laboratory test.
Value(s) applied	To be determined in CPA.
Choice of data or Measurement methods and procedures	Water boiling test done according to standard procedures.
Purpose of data	Calculation of baseline emissions.
Additional comment	National laboratory test might be used. The most conservative values from lab test will be used. This will reduce the transaction cost relative to making a Water Boiling test for each CPA within a country. Default values might also be used if and when this becomes available.

<b>Data / Parameter</b>	WB <sub>LB,Charcoal</sub>
Data Unit	Kg/litre.
Description	Mass of Charcoal that would have been required to boil one litre of water.
Source of data	Laboratory test.
Value(s) applied	To be determined in CPA.
Choice of data or Measurement methods and procedures	Water boiling test done according to standard procedures.
Purpose of data	Calculation of baseline emissions.
Additional comment	National laboratory test might be used. The most conservative values from lab test will be used. This will reduce the transaction cost relative to making a Water Boiling test for each CPA within a country. Default values might also be used if and when this becomes available.

<b>Data / Parameter</b>	C <sub>CF</sub>
Data Unit	Number
Description	Charcoal conversion factor.
Source of data	Do be determined by CPA
Value(s) applied	To be determined by CPA.
Choice of data or Measurement methods and procedures	Not applicable.
Purpose of data	Calculation of baseline emissions.
Additional comment	Not applicable.

<b>Data / Parameter</b>	C <sub>P</sub>
Data Unit	Fraction.
Description	Portion of woody biomass that is used in the form of Charcoal in the project area.
Source of data	Baseline survey.
Value(s) applied	To be determined by CPA.
Choice of data or Measurement methods and procedures	Not applicable.
Purpose of data	Calculation of baseline emissions.
Additional comment	Not applicable.

<b>Data / Parameter</b>	LF
Data Unit	Fraction.
Description	Net to gross adjustment factor of 0.95 to account for leakage.
Source of data	Default value in methodology.
Value(s) applied	0.95
Choice of data or Measurement methods and procedures	Not applicable.
Purpose of data	Calculation of leakage.
Additional comment	Not applicable.

<b>Data / Parameter</b>	Thermal output of water purification systems.
Data Unit	kW
Description	Thermal energy output from water purification system.
Source of data	Community water purification system product description.
Value(s) applied	0.5
Choice of data or Measurement methods and procedures	The value of 0.5 kW is based on the thermal output of the equipment used to boil the water, e.g. the baseline stoves. The value of 0.5 kW will be used as a default value in the program.
Purpose of data	Calculate the CPA thermal output to ensure that it is within the 45 MW limit for small-scale projects.
Additional comment	<p>This has no impact on emission reduction and it has marginal impact on the number of systems that can be included in the program.</p> <p>We have used a fixed value of 0.5 kW capacity per user. This represents the maximal thermal output that a stove has in the baseline.</p> <p>It should be clarified that the methodology defines the stoves in the baseline as having a thermal efficiency of 0.1 or 0.2, which equals to 10% or 20%. A stove with 20% thermal efficiency will not have a thermal capacity of less than 0.5 kW, and a stove with thermal efficiency of 10% will have a thermal capacity of half this, e.g. less than 0.25 kW.</p> <p>Using a value of 0.5 kW per household that use purified water is hence conservative</p>

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

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Emission reductions would be calculated as:

$$ER_y = ER_{y, \text{Denatured alcohol}} + ER_{y, \text{Biogas}} + ER_{y, \text{Water}}$$

Where

$$\begin{aligned} ER_{y, \text{Denatured alcohol}} &= B_{y, \text{Denatured alcohol}} * f_{NRB, y} * NCV_{\text{biomass}} * EF_{\text{projected\_fossilfuel}} \\ ER_{y, \text{Biogas}} &= B_{y, \text{Biogas}} * f_{NRB, y} * NCV_{\text{biomass}} * EF_{\text{projected\_fossilfuel}} \\ ER_{y, \text{Water}} &= B_{y, \text{Water}} * f_{NRB, y} * NCV_{\text{biomass}} * EF_{\text{projected\_fossilfuel}} \end{aligned}$$

$ER_y$	=	Emission reductions during the year y, in tCO <sub>2</sub> e
$B_y$	=	Quantity of biomass that is substituted or displaced in tonnes
$f_{NRB, y}$	=	Fraction of biomass used in the absence of the project activity in year y, that can be established as non-renewable biomass.
$NCV_{\text{biomass}}$	=	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonnes)
$EF_{\text{projected\_fossil fuel}}$	=	Emission factor for the substitution on non-renewable biomass by similar consumers. Use a default value of 81.6 tCO <sub>2</sub> /TJ

#### Step 1: By is determined:

By, must be calculated separately for the stoves (ethanol and biogas) and for the purified water consumed (drinking purified water from household water purification systems plus the purified water from the community water purification systems).

Hence  $B_y$  is the sum of  $B_{y, \text{biogas}} + B_{y, \text{Denatured alcohol}} + B_{y, \text{purifiedWater}}$  ;

$$B_{y, \text{Biogas}} = (((HG_{p, y, \text{Biogas}} / (NCV_{\text{biomass}} * \eta_{\text{old}})) * (1 - C_P)) + ((HG_{p, y, \text{Biogas}} / (NCV_{\text{Charcoal}} * \eta_{\text{old}})) * (C_P * C_{CF}))) * LF$$

$$B_{y, \text{Denatured alcohol}} = (((HG_{p, y, \text{Denatured alcohol}} / (NCV_{\text{Biomass}} * \eta_{\text{old}})) * (1 - C_P)) + ((HG_{p, y, \text{Denatured alcohol}} / (NCV_{\text{Charcoal}} * \eta_{\text{old}})) * (C_P * C_{CF}))) * LF$$

$$B_{y, \text{PurifiedWater}} = (((N_{p, y} * QDW_{p, y} * WB_{LB} * 365 * 10^{-3}) * (1 - C_P)) + ((N_{p, y} * QDW_{p, y} * WB_{LB, \text{Charcoal}} * 365 * 10^{-3}) * (C_P * C_{CF}))) * LF * W_{\text{quality}, y}$$

Where

$B_{y, \text{Biogas}}$	=	Quantity of woody biomass that is substituted or displaced in ton as a result of the biogas used by the project in year y.
$HG_{p, y, \text{Biogas}}$	=	Quantity of thermal energy generated by the biogas used the project participating households in year y measured in TJ.
$NCV_{\text{Biomass}}$	=	Net Calorific Value of the non-renewable woody biomass that is substituted.
$NCV_{\text{Charcoal}}$	=	Net Calorific Value of the non-renewable woody biomass that is used in the form of charcoal and which is substituted.
$\eta_{\text{old}}$	=	Efficiency of the old stoves that has been replaced by the project.
$B_{y, \text{Denatured alcohol}}$	=	Quantity of woody biomass that is substituted or displaced in ton as a result of the denatured alcohol used by the project in year y.
$HG_{p, y, \text{Denatured alcohol}}$	=	Quantity of thermal energy generated by the denatured alcohol used by the project participating households in year y, measured in TJ.
$B_{y, \text{PurifiedWater}}$	=	Quantity of woody biomass that is displaced in ton as a result of the purified water replacing the need to boil water.



$N_{p,y}$	=	Total number of people in the project area that get purified water as a result of the project activity.
$QDW_{p,y}$	=	Volume of drinking purified water in litres per person per day.
$WB_{LB}$	=	Mass of woody biomass that would have been required to boil one litre of water (kg/litre).
$WB_{LB,Charcoal}$	=	Mass of woody biomass that is used in the form of charcoal that has been required to boil one litre of water (kg/litre).
$C_{CF}$	=	Charcoal Conversion Factor
$C_P$	=	Portion of woody biomass that is used in the form of charcoal in the project area.
$LF$	=	Net to gross adjustment factor of 0.95 to account for leakage.
$W_{quality,y}$	=	Portion of purified water that meet WHO standards for drinking water in year y.

**Step 2:  $N_{p,y}$  is determined**

$N_{p,y}$	=	Total number of people that get purified water as a result of the project activity. This value will be monitored.
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**Step 3.  $QDW_{py}$  is determined from annual monitoring.****Step 4.  $HG_{p,y}$  is determined** **$HG_{py}$  calculations;**

$HG_{p,y,Biogas}$	=	$NCV_{Biogas} * BG_{Usage,y} * BG_{Stoves,Units,y} * (BG_{stove,efficiency} / 100) * 365$
$HG_{p,y,Denatured\ alcohol}$	=	$NCV_{Denatured\ alcohol} * ET_{Usage,y} / 1000 * ET_{Stoves,Units,y} * (ET_{stove,efficiency} / 100) * 365$

Where

$HG_{p,y}$	=	Quantity of thermal energy generated by the new renewable energy technology in the project area in year y (TJ).
$NCV_{Biogas}$	=	Net Calorific Value of Biogas. Based on default value.
$BG_{Usage,y}$	=	Average Biogas usage in m3 per day per in year y (multiplied by 365 to get annual consumption per user).
$BG_{Stoves,Units,y}$	=	Biogas stoves in use in the project area in year y.
$NCV_{Denatured\ alcohol}$	=	Net Calorific Value of denatured alcohol. Based on default value.
$ET_{Usage,y}$	=	Average denatured alcohol usage per litre per household in year y. Divided by 1000 to get value in m <sup>3</sup> .
$ET_{Stoves,Units,y}$	=	Ethanol stoves in use in the project area in year y.

**Step 5.  $\eta_{old}$  is determined by:**

$\eta_{old}$	=	Thermal efficiency of stoves being replaced.
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$\eta_{old}$  is determined in baseline survey prior to project implementation according to the average of the households that has efficient stove and households that has inefficient stoves.

**Step 6.  $f_{NRB,y}$  is determined by:**

$f_{NRB}$  will be determined by a third party according to nationally approved methods or based on default values. Both such solutions shall be based on the formula above.

#### **Step 7. Determine the average emission reduction from project participating households.**

Emission reduction will be calculated based on the project participating households selected for annual monitoring. The number of project participating households to be monitored will be no less than, and might be larger than 68 if that is required to obtain the required 90/10 confidence level for annual monitoring or 95/5 confidence level if monitoring is done biennially. Furthermore, sample size shall be sufficient to obtain 95/5 confidence level in case annual or biennial sampling is performed for group of CPAs under the PoA. The total emission reduction from these households will then be divided by the number of households that has been subject to monitoring in order to determine the average emission reduction per project participating household.

#### **Step 8. Determine total CPA emission reduction.**

Total emission reduction from the CPA is determined by multiplying the average emission reduction per project participating households with the total number of project participating households at the time of the monitoring.

### **I.7. Monitoring plan**

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

<b>Data / Parameter</b>	$ET_{\text{stoves, units, } y}$
Data unit	Number
Description	Average number of ethanol stoves used by project participating households in year $y$ .
Source of data	Monitoring of random sample of project participating households.
Value(s) applied	To be determined by SSC-CPA.
Measurement methods and procedures	Monitoring of randomly selected project participating household. This will be done according the monitoring process as described in the Program Management Manual. The sample size shall be sufficient to obtain the required 90/10 confidence level for annual monitoring or 95/5 confidence level if monitoring is done biennially. Furthermore, sample size shall be sufficient to obtain 95/5 confidence level in case annual or biennial sampling is performed for group of CPAs under the PoA.
Monitoring frequency	At least every two years.
QA/QC procedures	The number of households that use ethanol stoves in the project area will be cross-checked with the sales records from the ethanol stove suppliers.
Purpose of data	Calculations of baseline emissions.
Additional comments	A project participating household will normally have no ethanol stove or they will have 1 ethanol stove. The average will hence be a value between 0 and 1 ethanol stove per household.

Data / Parameter	ET <sub>usage,y</sub>
Data unit	Litres.
Description	Average daily denatured alcohol usage by project participating households in year y.
Source of data	Monitoring of a random sample of project participating households. The sample size shall be sufficient to obtain the required 90/10 confidence level for annual monitoring or 95/5 confidence level if monitoring is done biennially. Furthermore, sample size shall be sufficient to obtain 95/5 confidence level in case annual or biennial sampling is performed for group of CPAs under the PoA.
Value(s) applied	To be determined by SSC-CPA.
Measurement methods and procedures	The usage of denatured alcohol will be physically recorded in a representative number of households over a period of 7 days. This will be used to calculate the average daily denatured alcohol consumption per household that use ethanol stoves.
Monitoring frequency	At least every two years.
QA/QC procedures	<p>The denatured alcohol consumption will be based on pure denatured alcohol. Hence the denatured alcohol used by the household will be measured to determine its purity. If the NCV of the denatured alcohol is below that of the default NCV<sub>denatured alcohol</sub> 0.0213 TJ/m<sup>3</sup> then the ET usage shall be adjusted for the lower NCV of the denatured alcohol used.</p> <p>If the NCV of the denatured alcohol used is 10% lower than the default value for NCV<sub>denatured alcohol</sub> then the ET<sub>usage,y</sub> shall be reduced by 10% relative to the measured volume of denatured alcohol used.</p> <p>The purity of the denatured alcohol will be measured and registered by the representative sample of households monitored for ET<sub>usage,y</sub></p> <p>The renewability and potential leakage in accordance with General guidance on leakage in biomass might be provided in appendix 5.</p>
Purpose of data	Calculations of baseline emissions.
Additional comments	<p>The purity or strength of the denatured alcohol will be measured at every household which are monitored for ET<sub>usage, y</sub>. This value will then be multiplied with the volume of denatured alcohol used in order to determine the equivalent of denatured alcohol with 100% purity.</p> <p>Example. A household use 5 litre of denatured alcohol with 90% purity, then the calculation will be 5 * 90% = 4.5 liter of denatured alcohol with 100% purity.</p>

<b>Data / Parameter</b>	$ET_{\text{stove, Capacity, } y}$
Data unit	kW
Description	Average thermal capacity of ethanol stove used by project participating households.
Source of data	Monitoring of random sample of project participating households.
Value(s) applied	To be determined by SSC-CPA.
Measurement methods and procedures	Product description for each ethanol stove shall be used to determine its thermal capacity when this is available from stove suppliers. Alternatively, the thermal capacity of the stoves may be determined by a qualified laboratory.
Monitoring frequency	Annually
QA/QC procedures	Not Applicable
Purpose of data	Calculate the CPA thermal output capacity to ensure that it is within the 45 MW limit for small-scale projects.
Additional comments	Not applicable.

<b>Data / Parameter</b>	$ET_{\text{stove, Efficiency, } y}$
Data unit	Percentage.
Description	Average thermal efficiency of ethanol stove used by the project participating households.
Source of data	Monitoring of random sample of project participating households.
Value(s) applied	To be determined by SSC-CPA.
Measurement methods and procedures	Product description for each ethanol stove shall be used to determine its thermal efficiency when this is available from stove suppliers. Alternatively, the stove efficiency shall be determined by a qualified laboratory.
Monitoring frequency	At least every two years.
QA/QC procedures	Not applicable
Purpose of data	Calculation of baseline emissions.
Additional comments	Not applicable.

<b>Data / Parameter</b>	$BG_{\text{Stoves, units, } y}$
Data unit	Number.
Description	Average number of biogas stoves used by project participating household in year y.
Source of data	Monitoring of random sample of project participating households. The sample size shall be sufficient to obtain the required 90/10 confidence level for annual monitoring or 95/5 confidence level if monitoring is done biennially. Furthermore, sample size shall be sufficient to obtain 95/5 confidence level in case annual or biennial sampling is performed for group of CPAs under the PoA.
Value(s) applied	To be determined by SSC-CPA.
Measurement methods and procedures	Monitoring of randomly selected project participating household.
Monitoring frequency	At least every two years.
QA/QC procedures	The number of biogas users in the project area will be crosschecked with the sales records from the biogas stove supplier.
Purpose of data	Calculation of baseline emission.
Additional comments	Not applicable.

<b>Data / Parameter</b>	$BG_{usage,y}$
Data unit	$m^3$
Description	Average daily biogas usage per project participating household in year y.
Source of data	Monitoring of random sample of project participating households. The sample size shall be sufficient to obtain the required 90/10 confidence level for annual monitoring or 95/5 confidence level if monitoring is done biennially. Furthermore, sample size shall be sufficient to obtain 95/5 confidence level in case annual or biennial sampling is performed for group of CPAs under the PoA.
Value(s) applied	To be determined by SSC-CPA.
Measurement methods and procedures	Monitoring from a random sample of project participants. Biogas meters will be installed for a period of one week at participating households targeted for monitoring. This will be used to calculate the average daily biogas usage per biogas user.
Monitoring frequency	At least every two years.
QA/QC procedures	Biogas meters will be calibrated annually.
Purpose of data	Calculation of baseline emissions.
Additional comments	Not applicable.

<b>Data / Parameter</b>	$BG_{stove, Capacity,y}$
Data unit	kW
Description	Average thermal capacity of biogas stove used by the project participating households in year y.
Source of data	Monitoring of random sample of project participating households.
Value(s) applied	To be determined by SSC-CPA.
Measurement methods and procedures	Product description for each biogas stove shall be used to determine its thermal capacity when this is available from stove suppliers. Alternatively, the thermal capacity of the stoves may be determined by a qualified laboratory. The product description with a confirmation that the product has been approved for program inclusion, shall be available at the time of monitoring.
Monitoring frequency	Annually
QA/QC procedures	Not applicable.
Purpose of data	Calculate the CPA thermal output capacity to ensure that it is within the 45 MW limit for small-scale projects.
Additional comments	Not applicable.

<b>Data / Parameter</b>	$BG_{\text{stove, Efficiency, y}}$
Data unit	Percentage.
Description	Average thermal efficiency of biogas stove used by the project participating households in year y.
Source of data	Monitoring of random sample of project participating households.
Value(s) applied	To be determined by SSC-CPA.
Measurement methods and procedures	Product description for each biogas stove shall be used to determine its thermal efficiency when this is available from stove suppliers. Alternatively, the stove efficiency shall be determined by a qualified laboratory.
Monitoring frequency	At least every two years.
QA/QC procedures	Not applicable.
Purpose of data	Calculation of baseline emissions.
Additional comments	Not applicable.

<b>Data / Parameter</b>	$N_{p, y}$
Unit	Number.
Description	Average number of people in project participating households that is drinking purified water provided by the equipment supplied by the program.
Source of data	Monitoring of random sample of project participating households.
Value(s) applied	To be determined by SSC-CPA.
Measurement methods and procedures	Monitoring of randomly selected project participating household. This will be done according the monitoring process.
Monitoring frequency	At least every two years.
QA/QC procedures	Not applicable.
Purpose of data	Calculation of baseline emissions.
Additional comments	Not applicable.

<b>Data / Parameter</b>	$QDW_{p,y}$
Data unit	Liter/Day.
Description	Average nr of litre of purified water used by each person in project participating households in year y.
Source of data	Monitoring of random sample of project participating households. The sample size shall be sufficient to obtain the required 90/10 confidence level for annual monitoring or 95/5 confidence level if monitoring is done biennially. Furthermore, sample size shall be sufficient to obtain 95/5 confidence level in case annual or biennia sampling is performed for group of CPAs under the PoA.
Value(s) applied	To be determined by SSC-CPA.
Measurement methods and procedures	<p>Monitoring of random sample of project participating household. This will be done according to the monitoring process as described in the Monitoring Plan. The households will be monitored for one week, to determine the total consumption of purified water by the household, and this value will be divided by the number of people in the households and by 7 in order to get the average daily consumption of purified water per person.</p> <p>In case of a community based water purification system is being used, a single end user contract might be signed for the whole community which get access to the purified water. Such a contract must state how many households that are included in the community, and then the annual monitoring might optionally monitor the daily distribution of the purified water from the community based water purification facility and divided this with the total number of households registered as receiving purified water from the community based water purification plant.</p>
Monitoring frequency	At least every two years.
QA/QC procedures	The value will be capped at 5.5, in accordance with the methodology.
Purpose of data	Calculation of baseline emissions.
Additional comments	The number of samples will be according to the required samples as calculated in table of expected values to determine the required sample size, under section B.7.2

Data / Parameter	$W_{Quality,y}$
Data unit	Yes or No.
Description	Purified Water Quality – to confirm that purified water meet national or WHO interim microbiological standard for drinking water in year y.
Source of data	Laboratory test or Portable water quality test kits
Value(s) applied	To be determined by SSC-CPA.
Measurement methods and procedures	Yes will be registered as 1.0 No will be registered as 0
Monitoring frequency	At least every two years.
QA/QC procedures	<p>To ensure compliance of the microbiological water quality either with:</p> <ul style="list-style-type: none"> <li>• The community water purification systems shall provide purified water that meet applicable national microbiological standards/guidelines or WHO's interim performance targets on households water treatment, and have energy output of less than 50 kW.</li> <li>• The Household water purification systems shall provide purified water that meet applicable national microbiological standards/guidelines or WHO's interim performance target on household water treatment.</li> </ul> <p>The water quality shall be monitored on sample basis for contamination with thermotolerant (faecal) coliforms or coli (E. coli). A presence/absence test for E. coli colony forming units (CFU) of more than 100 units per 100 ml of water or an equivalent quantitative test for E. coli CFU shall be used. A presence of up to 100 E. coli CFU/100 ml shall be acceptable.</p>
Purpose of data	Calculation of baseline emissions.
Additional comments	<p>WHO classifies a contamination of up to 100 E. coli CFU per 100 ml as intermediate risk. An E. coli count of less than 100 per 100 ml can therefore be used as an indication that the drinking water is safe. See: Table 5.2 on page 78 of "Guidelines for drinking-water quality", second edition, Volume 3 "Surveillance and control of community supplies".</p> <p>Supplementary reference confirming that water with between 10-100 E-Coli CFU / 100 ml may be consumed as it can also be found at the following link:  <a href="http://www.lboro.ac.uk/well/resources/fact-sheets/fact-sheets-hm/WQ%20in%20emergencies.htm">http://www.lboro.ac.uk/well/resources/fact-sheets/fact-sheets-hm/WQ%20in%20emergencies.htm</a></p>

### I.7.2. Sampling plan

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### I.7.3. Other elements of monitoring plan

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Monitoring plan will be at least every two years, years (except for  $ET_{stove, Capacity,y}$  and  $BG_{stove,Capacity,y}$ , which will be monitored annually) and will consist of the following activities

1. Select a time for monitoring. The monitoring shall be done in different months of the year



- for each year of the crediting period.
2. Quantifying the number of participating project participating households that shall be subject to monitoring.
  3. Identifying the households to be subject to monitoring according to a sampling plan.
  4. Ensure that equipment is calibrated.
  5. Sending pre trained staff to the selected households to conduct the monitoring.
  6. The test results is sent to the CME "Recording and Data Department" where the data will be put into a data base and emission reductions will be calculated.

The data collected as part of the annual monitoring will be kept for the duration of the program plus two years and will be stored by the Recording and Data Department.

The monitoring of the households selected for monitoring will provide data to quantify the average emission reduction achieved by each participating household.

The average emission reduction achieved from participating households in a period will be multiplied with the total number of project participating households within the CPA or the group of CPAs at the time of the verification, to determine the total emission reduction achieved in the CPA.

The monitoring plan will also include identification of suppliers of denatured alcohol, biogas and purified water to the project participating household. Potential emission from the supply of biogas and denatured alcohol shall be identified and quantified. If emission from the supply of biogas and denatured alcohol is causing emission that is less than 10% of the project emission reductions, such emission is considered negligible according to the "General guidance on leakage in biomass project", EB 47, Annex 28, paragraph 4.

If emission from the supply of the biogas and denatured ethanol is not negligible, then such emissions emission shall be accounted for. Then suppliers of biogas or denatured alcohol or the project participants that receive the fuel from suppliers which contribute to considerable emission from the supply of biogas and denatured alcohol shall be excluded from the project, so that the project meet the requirement of having insignificant emission from the biogas and denatured alcohol supply. The emission from the supply of biogas and denatured alcohol to the households subject to monitoring shall be enclosed with the monitoring report. This report shall include a list of all the identified suppliers of denatured alcohol that supply denatured alcohol to the households that has been monitored. An analysis shall determine from which of these suppliers the production of the denatured alcohol is significant or not significant. Moreover, in order to establish the renewability of ethanol by the project activities, a detailed information shall be gathered as per the questionnaire provided in Appendix 5. The information can be collected at different stages, such as at the time of CPA inclusion for projects implemented or under implementation, or at the time of time of verification as part of monitoring survey, for the CPAs that has not been implemented at the time of CPA Inclusion. Such analysis might be provided by the Local Project Implementation Partners, The monitoring team, the Ethanol Supplier/Producers, CME, or by independent 3rd party. Such analysis of the ethanol production might be based on observations, measurements and/or available public information.

#### **Area including in the monitoring process:**

The monitoring can be done for a single CPA, or a group of CPAs. The project participant might decide to do the monitoring on groups of CPAs to reduce the total cost of monitoring. The group of CPAs might include all the CPAs included in the Program of Activities<sup>4</sup>.

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<sup>4</sup> EB74, Annex 6, paragraph 20, with further clarifications in footnote 20 of the same document,

**Monitoring plan<sup>5</sup>.**

The monitoring plan sets out to quantify the emission reduction at each CPA or group of CPAs included in the monitoring process. The required data will be obtained by monitoring key data for a random sample of project participants. The monitored data will be used to determine the emission reduction achieved from each of the monitored households, and this will be used as a basis to determine the average emission reduction from participating households in the CPA or group of CPAs included in the monitoring process. The average emission reduction per participating household is then multiplied with the number of participating households in the group of CPAs that has been included in the monitoring process, at the time of request for verification, in order to obtain the total emission reduction for a given period.

**Determine the Sample size**

The sample size shall be calculated to assure the required 90/10 confidence level for annual monitoring or 95/5 confidence level if monitoring is done biennially. Furthermore, sample size shall be sufficient to obtain 95/5 confidence level in case annual or biennial sampling is performed for group of CPAs under the PoA, for all the variables subject to monitoring<sup>6</sup>.

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

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

Where:

n = Sample size – number of households needed to be included in sample.

N = Total number of households that can reply to a particular parameter

Mean = To be estimated or calculated prior to monitoring

SD = To be estimated or calculated prior to monitoring

1.96 = Represents the 95% confidence required

0.1 = represents the 10% relative precision

When calculating the sample size for each of the 3 technologies, it shall always be assumed that there are one million project participating household in the population to be surveyed. This is to be conservative and to ensure that a sufficiently large sample is chosen. As such, the only parameters that will change in order to determine the sample size will be the V-Value that is calculated from the average value and the standard deviation from each of the technologies that are deployed by the program.

**Table of expected values to determine the required sample size<sup>7</sup>**

Calculation of V- Values	Average <sup>8</sup>	Standard deviation <sup>9</sup>	V - Value
Biogas	0.3	0.1	0.111
Ethanol	0.7	0.2	0.082

<sup>5</sup> Further details can be found in the Program Management Manual, which will be updated from time to time, and the latest version of the Program Management Manual will at all times be available from the CME manager or from the web page [www.greendevlopment.no](http://www.greendevlopment.no). The Program Management Manual is perceived as a supplement to the CDM PoA DD for further clarifications, but it is not part of the CDM PoA DD and hence it is not perceived as required to upload all changes to this document to the UNFCCC webpage.

<sup>6</sup> EB 67, Annex 6, paragraph 51.

<sup>7</sup> This sample size calculations is based on random sample. If it makes a big cost savings, the cluster samples might be used. If cluster samples are to be used for cost efficiency, then the number of clusters shall not be less than 10, and the total number of households sampled shall be double that of what is used with the random sample calculations above. EB74, Annex 6, paragraph 13.

<sup>8</sup> Estimated values. These values will be updated when monitoring data become available.

<sup>9</sup> Estimated values. These values will be updated when monitoring data become available.

Purified water	15	4	0.071
Default values			
N	1,000,000		
Confidence level	1.96	3.8416	(Valued square)
Required precision	0.1	0.01	(Valued square)
Required minimum sample size:	Formula		Sample size
Biogas	42.68		43
Ethanol	31.36		32
Purified water	27.32		30

When the V-Value increases, the required sample size increases accordingly.

The sample size for each parameter depends on the mean and the standard deviation and the population size. When the population is larger than 1000, the SD is the primary criteria that determine the required sample size for each criteria. The following sample size and SD values apply for indefinitely large populations:

Mean	1	1	1	1	1	1
SD	1	0.8	0.6	0.4	0.2	0.1
n	165	132	99	66	33	17

It must be n number samples for each parameter to be monitored.

In cases where the initial households selected for annual monitoring do not include sufficient samples of one or more of the parameters to be monitored, then stratified random sample shall be used to select the additional households needed for monitoring those parameters in which more samples were needed in order to obtain the required sample size in order to obtain the required 90/10 confidence level for annual monitoring or 95/5 confidence level if monitoring is done biennially. Furthermore, sample size shall be sufficient to obtain 95/5 confidence level in case annual or biennial sampling is performed for group of CPAs under the PoA. Alternative to account for failure to reach required precision level might be used in accordance with CDM rules and regulations available at the time of verification. This include the option provided in the methodology where it is stated that "In cases where survey results indicate that 90/10 precision or 95/5 precision is not achieved, the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve the 90/10 or 95/5 precision". Moreover, the sampling standard also confirms that alternative approaches is available in case required precision level might not be reached. This is particularly stated in paragraph 17 of version 07 of the sampling standard.

If additional samples are needed to determine one parameter, lets say biogas usage, then the additional households to be sampled shall be selected from the households that are registered as using biogas stoves.

## Summary

- Monitoring will be done at least every two years.
- Monitoring will be done over a 7 days period for each household monitored.
- The monitoring will be done in different months each year of the crediting period.
- Emission reductions will be calculated based on the average emission reduction from the households monitored in each CPA multiplied with the number of participating households

at the time of the request for verification

- Monitoring shall be done by a trained person from the survey and data collection department. Local assistance might be used, but the trained representative from the survey and collection department must quality check and sign off on all the data collected from each household that is monitored.
- The households selected for monitoring shall be selected randomly, and the number of households shall be sufficient to meet the sample size requirement set forth by the UNFCCC guidelines (see guidelines above)

Equipment to bring to the households to be monitored

- Water containers
- Equipment to measure the quality of the water.
- Ethanol containers. Denatured alcohol shall be bought locally.
- Equipment to measure the ethanol content in the fuel
- Digital camera, with GPS
- Biogas meter.
- Water meter (To monitor water delivered from community based water plant)
- Water quality test kit
- Tablet with monitoring form and copies of all the product data sheets.

## Monitoring Process

### 1. Selection of households to be monitored:

The households shall be selected randomly. The process of choosing random houses shall if possible be followed according the following procedure:

- a. Determine which technology has the highest V-Value and determine how many households with this technology will be needed for survey. (Lets assume this is biogas)
- b. List all participating households that use biogas, alphabetical or numeral order based on the database for project participants.
- c. Divide the number of identified participating households with the V-value. This figure is referred to as X.
- d. Pick every X household in the list of participating households that use biogas from the list under point ii. These are the households that shall be monitored for use of biogas.
- e. Select the number of households required for monitoring which use other technologies, (ethanol Stoves and purified water). Which are located close to the households that use biogas.

Alternatively, households shall be selected with the random selection function, from the spreadsheet of all project participating household registered in the CPA or the batch of CPAs included in the program at the time of selection of households to be monitored.

### 3. Process conducted by the surveyor conducting the monitoring

- a. Register the household to be monitored and fill in the monitoring form with the household identification criteria.
  - i. Write down the GPS coordinates for the household to be monitored
  - ii. Write down the starting time of the monitoring process
  - iii. Write down the type of solutions used by household
    1. Ethanol stove
    2. Biogas stove
    3. Household water purification system
    4. Community water purification system
  - iv. Write down the type of biogas or ethanol stove used.

- v. Take picture of the equipment
- vi. Take picture of the house and the household representative

b. Start monitoring:

In case the household use ethanol stove, the ethanol stove shall be filled up with new denatured alcohol, and the households will be provided with 20 liter or alternatively 12 liter of denatured alcohol to be used during the 7 days monitoring period. The denatured alcohol will be purchased together with the participating household from their primary denatured alcohol supplier. All the denatured alcohol the household have in containers at the start of the monitoring will be set aside and the household will be instructed not to use this denatured alcohol during the following week. A sample of the purity of the denatured alcohol purchased shall be tested for strength (Purity) of denatured alcohol or NCV.

In case the households use biogas, a biogas meter shall be installed. The biogas meter shall be installed on the biogas inlet point to the stove.

- i. Households that use purified water, will be given clean but empty water containers. They will be instructed to fill up these containers with purified water that they collect, rather than drink water directly from other containers.
- ii. In case the household gets purified water from a community water purification plant, then a water meter might be installed at the outlet of the water purification plant and the total volume of water produced shall be measured. This value shall then be divided on the number of households that are registered as getting water from the water purification facility.

c. Test of water samples

A water quality test shall be conducted from a sample of water from each of the households that use purified water (or from the community water source). The water quality analysis may be done by a mobile water testing kit, and if so the test shall be conducted by the surveyor. Alternatively, a water sample shall be sent to a laboratory for testing or tested onsite by a certified laboratory.

In case a monitored household get purified water from a community based water purification plant, the water purification plant shall be identified and it shall be determined if the plant is using non-renewable fuel for the water purification process. A short report including the fuel used by the community water purification plant and the contract information for those operating the plant shall be enclosed with the monitoring report.

d. Complete the monitoring. This shall be done exactly one week after the start of the monitoring for each household.

- i. The ethanol tank (canister) in the ethanol stove shall be filled up. The remaining of the 20 (or alternatively 12) litre of denatured alcohol given to the household at the start of the monitoring period shall be measured. The total denatured alcohol consumption for the household during the week will then be 20 (or alternatively 12) litre – minus – the denatured alcohol they have left at the completions of the monitoring period. The value shall be recorded.
- ii. The biogas meter will be read and removed. The biogas usage shall be recorded.
- iii. The total volume of water available in the household after the monitoring period shall be measured and recorded. The water consumption will be based on the number of water containers that has been used during the week, with a subtraction for the water left in the water containers. Alternatively the water from the community water purification plant shall be monitored and the total volume of water produced shall be divided by the number of households obtaining purified water from the community water

purification plant.

- e. Filling in the monitoring form. All the findings from the monitoring process, shall be filled in the monitoring form provided in this document.
- f. Quality control.
  - i. The monitoring manager shall review all the monitoring forms to make sure they are all correctly filled in. He/she shall also ensure that the forms corresponds to the households that were preselected for monitoring
  - ii. In case of unusual replies or readings, the quality control manager shall visit the household and provide a short report explaining the reason for the unusual reading, or alternatively redo the monitoring process.
- g. Households that cannot be found, or which monitoring cannot be conducted or which is found not to use any of the solutions deployed by the program shall be included in the program. These will then be registered as a project participant with no emission reduction.
- h. Returning the monitoring reports to the PoA recording and Data manager. This shall be done by email.
  - i. The surveyor or the survey manager shall save the survey forms on their tablet as a backup.
  - ii. Data Recording and Data Manager shall confirm by email that the survey form has been received and that it is correctly filled.

### **3. Data processing**

- a. PoA recording and Data manager shall review all the monitored data and save these data into a database.
- b. CME will calculate the emission reduction from each of the sampled households, and calculate the average emission reduction and multiply this with the number of project participating households in the group of CPAs in order to determine the total emission reduction during the period. This shall be done through the standard spread sheet used to calculate emission reductions.

**Monitoring form**

Country	
CPA reference	
Household identification reference	
Name of person in the household	
Address	
Phone number	
GPS data	
People in Household	
CPA registration data	
Date and time of Start of Monitoring	
Data and time of completion of Monitoring	
Type of solutions used provided by the program	
Ethanol stove (Yes or No)	
Type of ethanol stove	
Denatured alcohol volume at start of monitoring (liter)	
Denatured alcohol volume at end of monitoring (Liter)	
Purity of the denatured alcohol (%)	
Biogas stove (Yes or No)	
Type of biogas stove	
Biogas readings (in m3)	
Household water purification system (Yes or No)	
Type of purification system	
Household Water consumption during the monitoring period (liter)	
Water quality within predefined qualify standard (Yes or No)	
Did household have access to purified water prior to project registration date? Yes or No	
Thermal energy output from the water purification system (If available)	
Do the household continue to boil their drinking water (Yes or No)	
Solution distributed under project activity operational or non operational	
Whom is the primary fuel supplier:	
Phone Number	
Address	
Fuel supplied	
Name of person that conducted the monitoring	
Phone number of person conducting the monitoring	
Supplier of denatured alcohol, biogas and purified water:	
Special comments or issues:	

In case verification of more than one CPA is carried out at the same time, the DoE may consider the latest guidelines available from the CDM Executive Board (CDM EB) to carry out verification following a sampling approach. In such circumstances, the DOE would undertake a detailed verification (including site visits) for only a sample number of CPAs. The sample size will be calculated as per the sampling guidance issued by the CDM-EB. In case there are discrepancies between the emission reductions (ERs) reported in the monitoring report and the ERs verified by the DoE (on the basis of detailed review), for those sample CPAs that are subject to detailed review, or for those households that has been subject to detailed review, an adjustment factor (as described below) shall be worked out and the same shall be applied to adjust the ERs reported in the monitoring reports of the other CPAs, or for the other households, for which the DoE did not carry out a detailed review (including site visit). Request for issuance of CERs should be made for the adjusted ERs.

$$\begin{aligned} ER_{i,adjusted} &= ER_{i,reported} * F_{adj} \\ F_{adj} &= (\sum ER_{j,verified} / \sum_{j,reported}) \end{aligned}$$

Where,

- $ER_{i,adjusted}$  = Adjusted ERs from CPA  $i$ , which is not subject to detailed review.
- $ER_{i,reported}$  = ERs reported in the monitoring report for CPA $i$ , which is not subject to detailed review.
- $ER_{j,verified}$  = ERs verified by the DoE for CPA  $j$ , which is subject to detailed review.
- $ER_{j,reported}$  = ERs reported in the monitoring report of CPA  $j$ , which is subject to detailed review.
- $i$  = Number of CPAs, which are not subject to detailed review.
- $j$  = Number of CPAs, which are subject to detailed review.

The records and documentation pertaining to monitoring and verifications for all the CPAs participating in the program would be maintained by CME and shall be made available to DoE for checking status at any point of time. The DoE will be provided with all the monitoring reports and other programme related documents of each CPA during verification. The DoE shall hold all technical discussions with the CME and may visit only the sample facilities / CPAs as described above.

### Representative sampling.

A stratified random sample of households might be selected among all project participating households registered under the PoA. The average emission reductions from each of the households subject to annual monitoring will be used as the values to determine emission reduction in each CPA included in the PoA at the time of the annual monitoring.

The sampling approach follows the "Sampling and survey for CDM project activities and programmes of activities" EB 74, annex 6.

The number of samples required to achieve the required 90/10 confidence level for annual monitoring or 95/5 confidence level if monitoring is done biennially shall be used. Furthermore, sample size shall be sufficient to obtain 95/5 confidence level in case annual or biennia sampling is performed for group of CPAs under the PoA. The sample size has also been calculated in accordance with Guidelines for sampling and surveys for CDM Project activities and programme of activities, EB 69 annex 5. Other process for determining sample size and samples might be used in accordance with new and updated guidelines from EB such as EB 74 annex 6, which also allows for cluster sampling.

## SECTION J. Crediting period type and duration

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28 years (fixed)



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

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The SSC-CPAs to be included under this SSC-PoA must present the following characteristics:

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
1	Boundary and Location of the CPA	<p>The CPA is located within geographical areas included in the PoA.</p> <p>It has been considered if there are any time-induced boundaries to be consistent with the geographical boundaries of the PoA. No time-induced boundaries have been found.</p>	<p>Location and boundary is specified in the specific CPA-DD stating that the location is limited to an area within a country included in the PoA.</p> <p><b>Documentation:</b></p> <p>The geographical boundary of the CPA shall be marked in a map in which the country boundary is also marked. It shall be clearly illustrated that all parts of the CPA is within the geographical boundary of the country included in the PoA.</p>

2	No double counting.	<p>A unique numbering system for each project participating household within the CPA. The unique numbering will consist of a country code, a CPA number within the country and a unique ID number for each project participating household in the CPA. A contract with all the participating households will confirm that the households are not part of any other system that generates carbon credits. The contract can be a written contract signed by individually households, or it can be a contract submitted through the representative from the LPIP through a smart phone application, subject to the households approving all the information filled out by the LPIP.</p> <p>The Reporting and Data Recording Department shall implement a system where it will be automatically registered if two project participating households has:</p> <ol style="list-style-type: none"> <li>1. The same contact phone number,</li> <li>or,</li> <li>2. The same ID number</li> </ol>	<p>The specific numbering system included in the specific CPA-DD and the end user agreement with each participating households:</p> <p><b>Documentation:</b></p> <p>End user agreement template.</p>
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3	Technological requirements	<p>The CPA consists of solutions to reduce emission from burning non-renewable woody biomass for cooking. The solutions include:</p> <ul style="list-style-type: none"> <li>• Biogas stove. The type of biogas stove shall have a thermal output of no more than 10 kW and thermal efficiency of no less than 50%.</li> <li>• Ethanol stove that shall have a thermal output of no more than 10 kW and a thermal efficiency of no less than 50%.</li> <li>• The community water purification systems shall provide purified water that meet applicable national microbiological standards/guidelines or WHO's interim performance targets on households water treatment., and have energy output of less than 50 kW.</li> <li>• The Household water purification systems shall provide purified water that meet applicable national microbiological water quality standards/guidelines or WHO's interim performance target on household water treatment. As the system does not have an measurable energy output, the energy output will be estimated based on the energy output per household in the community water purification system.</li> <li>• The water purification system is using renewable energy sources.</li> </ul>	<p>The thermal output and thermal efficiency of the biogas stoves and the ethanol stoves used in the CPA shall be determined by product specification provided by the equipment (stove) supplier.</p> <p>In cases where such documentation is unavailable the thermal output and thermal efficiency shall be determined by a qualified laboratory.</p> <p>The supplier of water purification systems shall also provide reference to installed power capacity and water purification capacity of the water purification plant.</p> <p><b>Document:</b> Product Data sheet or product specification provided by the product supplier or a certified laboratory product test.</p> <p>This will be provided during monitoring and such documentation shall then be provided for all the equipment used in each CPA.</p>
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4	CPA start date	<p>CPA start date shall not be before PoA registration date and not before the CPA baseline study has been conducted.</p> <p>The start date is;</p> <p>A. From the date in which the first households within the CPA is registered as a project participant</p> <p>or</p> <p>B. The start date of the CPA according to the start date in the CPA DD.</p> <p>The start date is the date that is latest of the two dates.</p> <p>Please note that equipment might be deployed in the CPA during the time after the CPA registration date and before the CPA start date according to the CPA DD. In such cases, emission reductions will only be calculated from the project start date, according to the CPA DD.</p>	<p><b>Documentations:</b></p> <ol style="list-style-type: none"> <li>1. Baseline survey – confirming that equipment is not employed at the time of the baseline survey.</li> <li>2. Contract with the first households included in the CPA.</li> </ol>
5	Conditions that ensure compliance with methodology	Households have been using woody biomass since 1989.	<p><b>Documentations:</b></p> <p>Baseline survey will confirm that households that have existed since before 1989, have used woody biomass since before 1989.</p>

6	Additionality by CPAs	<p>The employed technologies are within the positive list of technologies and project activity types that are defined as automatically additional. The project activities solely consist of 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 threshold.</p> <p>As the small scale threshold is 45 MW, the project activity is considered additional if the project activity solely consist of households or communities or small and medium enterprises where the installed capacity at each project participant is less than 2.25 MW.</p>	<p><b>Documentation</b></p> <p>PoA-DD</p>
7	Stakeholder consultation and Environmental Impact Assessment	<p>Stakeholder consultation and environmental impact assessment will be done for each CPA.</p> <p>For the first CPA in each Country, the Stakeholder consultation and the Environmental Impact Assessment might be done on the National level as an alternative to the CPA specific Stakeholder Consultation and the CPA specific Environmental Assessment. If so, the stakeholder consultation must include stakeholders that are represented in the CPA area and or are familiar with the conditions in the CPA area. If a national level Environmental Assessment is done for the first CPA in the country, the conditions in the CPA area should be representative for the country.</p>	<p><b>Documentation:</b></p> <ol style="list-style-type: none"> <li>1. Stakeholder consultation report</li> <li>2. Environmental Assessment report</li> </ol>

8	Non-Diversion of ODA in case of Public funding	The CME shall confirm that in case of public funding there shall not be diversion of Official Development Assistance.	<b>Documentation:</b> The CPA DD shall, in case of public funding, review the structure of the public funding and confirm that there is no diversion of Official Development Assistance.
9	Sampling requirements	<p>Sampling will be done for;</p> <ol style="list-style-type: none"> <li>1. The baseline survey</li> <li>and</li> <li>2. To determine the emission reduction during the monitoring process.</li> </ol> <p>For both of these processes the project will comply with the requirement of a 90% confidence interval and a 10% margin of error.</p> <p>In case it the option for doing verification for a group of CPAs, then the confidence level of 95/10 shall be achieved in accordance with EB74, annex 6 or the latest standards.</p> <p>The emission reduction will be calculated based on ex-post survey.</p> <p>The baseline survey shall be done on a sample size of at least 68 households.</p>	<p><b>Documentations:</b></p> <p><b>1 Baseline survey</b></p> <ol style="list-style-type: none"> <li>a) Spread sheet with all the responses from the baseline survey.</li> </ol> <p>Copy of the baseline questionnaire from each of the households surveyed for baseline data.</p> <p><b>2 Monitoring process</b></p> <ol style="list-style-type: none"> <li>a) Monitoring manual, which is a chapter of the program management manual.</li> <li>b) Spread sheet with all the monitored data and calculations from each CPA</li> <li>c) Copy of the monitoring report from each of the households monitored.</li> </ol>

10	SSC Limit for CPAs	<p>The CPA will remain under the thermal threshold of 45 MW throughout the crediting period of the CPA.</p> <p>Please note that not all equipment necessarily have been deployed at CPA inclusion date, the SSC limit for CPAs shall be checked during verification, and in case any deployed solution will be found to be not in line with CPA SSC limit for CPAs requirement, those equipment's will not be counted for in the emission reduction calculations.</p> <p>For the supply of purified water, the energy output is based on the energy output of 0.5 kW per project participating household that is provided with purified water.</p>	<p><b>Documentation:</b></p> <p>CPA-DD</p>
11	De-bundling	<p>The CPA is exempted from performing the de-bundling check since each individual sub-system and each participating households has thermal energy savings of less than 1% of the SSC threshold and will remain within this threshold throughout the crediting period.</p> <p>Please note that not all equipment and solutions may have been deployed at the CPA inclusion stage but the 1% threshold can however also be checked during verification, and in case of any participating household will be found not in line with the De-bundling requirements, those households will not be counted for in the emission reduction calculations.</p>	<p>The maximum thermal output of any equipment included in the program is defined as 50 kW in accordance with the eligibility criteria. As the SSC threshold is 45 MW, the threshold for exemption from performing a de-bundling check will be 450 kW. The threshold for exemption from performing the de-bundling check will not be reached, and De-Bundling check is therefore not required.</p>

12	CER ownership	<p>The CERs shall be the sole ownership of the CME, and the CME shall provide part of the income generated from the CERs to pay for subsidies of the equipment to be deployed in the CPA.</p> <p>Please note that loan agreements might be made so that the equipment will be financed by loans to be paid for with the income generated from the sales of the CERs.</p>	<p><b>Documentations:</b></p> <p>The contractual agreement between CME and the key partners or LPIP and distributors shall specify that part of the income from the carbon credits shall be used to subsidize the equipment deployed in the CPA.</p> <p>The end user agreement shall state that the carbon credits generated belong to CME.</p>
13	CPA crediting Period	CPA starting date of the crediting period of inclusion into registered PoA or any date thereafter and crediting period not to exceed the PoA end date.	<p><b>Documentations:</b></p> <p>The CPA starting date shall be clearly stated in the CPA. The crediting period shall not exceed the PoA end date.</p>
14	Approval of CPA by CME	CME approved each CPA to be included into the registered PoA	<p><b>Documentations:</b></p> <p>Statement of CME giving approval for the CPA to be included into its registered PoA.</p>
15	Legal requirements	CME has commissioned studies in each country included in the program to determine if there are any legal or policy requirements for households to use the equipment promoted by the PoA or that there are any law or policy against using such solutions.	<p><b>Documentation:</b></p> <p>Letter from 3rd party for each country included in the PoA.</p> <p>The study shall be no more than 2 years old at the time of the request for CPA inclusion. A copy of such documentation shall be enclosed as part of the request for CPA inclusion.</p>
16	Confirm that the project is not generating carbon credits from any other program or projects.	<p>The baseline survey will confirm that the solutions to be employed by the program of activities in the particular CPA have not been employed prior to the project registration.</p> <p>The end user contracts will confirm that the end user solutions provided as part of the CPA is not part of any other program that might generate carbon credits</p>	<p><b>Documentations:</b></p> <p>Baseline survey</p> <p>End user contract</p>



17	Exclusivity of boundary	No component of a project activity of one CPA shall be part of any other CPA. Every project participating household is exclusive to one CPA <sup>10</sup> .	<b>Documentations:</b> Confirmation from CME that no component of the CPA is part of any other CPA under the PoA.  "Unique id system for each household shall be defined at the time of CPA inclusion in order to avoid any double counting. This unique id shall be verified at the time of CPA inclusion. This unique id(code) shall be archived in CME database."  End user agreement.
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The PoA involves combinations of technologies / measures and the eligibility criteria relevant to each of them shall be proposed to demonstrate additionality in accordance with EB 65, annex 3, paragraph 12 and paragraph 29 b. Paragraph 29 b, applies for situations where a single methodology is consistently applied in each CPA of the PoA, but multiple technologies / measures might be used

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<sup>10</sup> Every project component, that is every project participating household, shall be exclusive to one CPA. When the small scale threshold of 45 MW is reached, a new CPA might be registered which might include the same geographical area as a previously registered CPA, but the project participant shall ensure that each project participating household is only part of one CPA so as to avoid double counting.

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

<b>Coordinating/managing entity and/or project participants</b>	<input checked="" type="checkbox"/> Coordinating/managing entity <input checked="" type="checkbox"/> Project participant
<b>Organization name</b>	Green Development AS
<b>Country</b>	Norway
<b>Address</b>	Wergelandsveien 27, 0167 Oslo
<b>Telephone</b>	+4793630730
<b>Fax</b>	Not available
<b>E-mail</b>	hn@greendevlopment.no
<b>Website</b>	www.greendevlopment.no
<b>Contact person</b>	Havard Norstebo

## Appendix 2. Affirmation regarding public funding

No public funding is provided for the proposed program.

## Appendix 3. Applicability of methodologies and standardized baselines

AMS I.E., Version 04, Sectoral Scope:01, EB 60, title "Switch from non-renewable biomass for thermal application by the end user".

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

CPA emission reductions will depend on the emission reduction per project participating household and the number of project participating households at the time of the annual monitoring. The number of project participating households will increase from year to year, hence the project emission is expected to increase over time.

## Appendix 5. Further background information on monitoring plan

The monitoring plan is described in detail in the Program Management Manual.

The following table might be used to provide information to verify if ethanol sources from sugar factories and other entities, that make ethanol as a by-product from their main business:

<b>Type of feedstock used for ethanol production:</b>			
	Yes	No	Explanation and reference
Is the feedstock waste or a by-product			
Will production of feedstock increase with increased demand for ethanol.			
Estimated emission from feedstock use			
Emission from feedstock use in % emission reduction from the use of the ethanol when ethanol is used as cooking fuel.			
Alternative use of the feedstock.			
Emission reduction from alternative use of feedstock in % of emission reduction from the use of the ethanol when ethanol is used as cooking fuel.			
<b>Type of energy used ethanol boiler</b>			
	Yes	No	Explanation and reference
Is the energy made from waste or a by-product			
Will production of feedstock increase with increased demand for ethanol.			
Estimated emission from feedstock use			
Emission from feedstock use in % emission reduction from the use of the ethanol when ethanol is used as cooking fuel.			
Alternative use of the feedstock.			
Emission reduction from alternative use of feedstock in % of emission reduction from the use of the ethanol when ethanol is used as cooking fuel.			
<b>Other types of energy used for ethanol production</b>			
	Yes	No	Explanation and reference
Is the energy produced from waste product or a by-product			
Will production of enegy used increase with increased demand for ethanol.			

Estimated emission from other energy used			
Emission from other energy used in % emission reduction from the use of the ethanol when ethanol is used as cooking fuel.			
Alternative use of the other energy used.			
Emission reduction from alternative use of other energy used, in % of emission reduction from the use of the ethanol when ethanol is used as cooking fuel.			
	Yes	No	Explanation and reference
Is emission from the production of ethanol negligible in accordance with General guidance on leakage in biomass projects”, EB 47, Annex 28, paragraph			

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

Not applicable.

## Appendix 7. Summary of post-registration changes

PRC to version 11 of the PoA DD

A number of corrections have been made to the CDM PoA to provide further clarify of issues that could be open for interpretation and to remove grammatical and editorial faults in the CDM PoA DD. These corrections include:

- Correction to the document version number and the date of the completion of the CDM PoA DD.
- Correct from Ethanol to Denatured Alcohol to clarify that ethanol which has not been denatured will not be included in the program. CDM PoA DD version 10 allowed could be understood to allow for un-denatured ethanol to be used by the program. Such un-denatured ethanol could be used for drinking, which could contribute to negative social impacts. By requiring that the liquid fuel used by the projects are to be denatured, the risk of negative social impacts are greatly reduced. CDM PoA DD version 11 and 12 has hence required that the liquid fuel must be denatured. It has been clarified that the chemical composition of the ethanol will not change in other ways than what is caused by adding a bittering agent at the rate of 1 to 100 000. Correct to clarify the geographical limitation of each CPA within the CDM PoA DD
- Correction of spellings including change from Kw to kW as a number of spelling mistakes have been found in CDM PoA DD version 10.
- Correction to clarify the required purified water standards. In the CDM PoA DD version 10 it was simply stating that the water shall meet WHO standards. A correction has been made to provided a specific WHO standard for drinking water and specified that national standards shall be used when available in accordance with the methodology.

- Correction with regards to end user agreements. In CDM PoA DD version 10 it was no specification with regards to the format of the end user agreement. The CDM PoA DD version 11 and 12 has clarified that the end user agreements could be a contract signed by each individual end user, it could be a contract generated by a smart phone application.
- Correction to the data management. In CDM PoA DD version 10 it was stated that the data should be stored. In CDM PoA DD version 11 and 12 it has been specified that the data might be stored electronically and that end user contracts might be submitted to the Project Participant through any means that technology will allow for that provide a safe and verifiable registration of end user households included in the program.
- Correction related to reference to Program Management Manual. In CDM PoA DD version 10 it was on several occasions referred to the Program Management Manual, but the issues which was previously referred to in this manual has been included in CDM PoA DD version 11 and 12 and the reference to the Program Management Manual has hence been removed.
- Correction related to the stakeholder consultation. In CDM PoA DD version 10 it was referred to Word Bank or other 3<sup>rd</sup> party to assist with the stakeholder consultation. This has been removed in CDM PoA DD version 11 and 12 as it is accepted that the Project Participant might conduct the stakeholder consultation on their own without the assistance from 3<sup>rd</sup> parties.
- Corrections to the baseline scenario. In CDM PoA DD version 10 it was simply assumed that all household boiled their water in the baseline scenario if that was the predominant solutions in the project area. A correction has been made in CDM PoA DD version 11 and 12 so that emission reductions will only be claimed for getting purified water, where it can be confirmed from the end user contracts that the household did boil their water in the baseline scenario
- Corrections have been made to Appendix 1 in the CDM PoA DD. Version 11 and 12 has been corrected to give the updated email address of contact person.
- Corrections have been made to annex 4 in the CDM PoA DD. Part of the annex has been removed as it is not correctly representing all CPAs in the CDM PoA.

#### **B: Versions of the monitoring plan**

- Changes of sampling process of the monitoring process. CDM PoA DD version 10 simply referred to a process in the Program Management Manual, that was an appendix to CDM PoA DD. The sampling process has now been included in the CDM PoA DD version 11 and 12. Furthermore corrections to the sampling process have been made based on new standards and guidelines from the Executive Board.
- Change of the confidence level of the sample size. In CDM PoA DD version 10 a confidence level of 90/10 was given. In CDM PoA DD version 11 and 12 it has been specified that a higher level of confidence level, namely 95/10 should be used when a group of several CPAs are included in the same monitoring process in accordance with new guidelines from the Executive board.
- Change have been made in the definition of  $ET_{usage,y}$ . In CDM PoA DD version 10 it was defined as consumption multiplied with the purify of the fuel. In CDM PoA DD version 11 and 12 it has been corrected to be defined as consumption of fuel multiplied with the purify of the fuel determined by the energy content of the fuel
- Change related to sample size. In the CDM PoA DD version 10 it was referred to a required sample size of 68. In CDM PoA DD version 11 and 12 it has been corrected to specify that the sample size of 68 only rely to the required sample size for the baseline study and not for the sample size for the annual monitoring.
- Change to the monitoring process. In CDM PoA DD version 10 the monitoring process was described in detail in the Program Management Manual. In CDM PoA DD version 11 and 12 the monitoring process has been included into the CDM PoA DD. The monitoring process have not been changed by including the description of the process to the CDM PoA DD.
- Change to the monitoring form. In CDM PoA DD version 10 the monitoring form was given in the Program Management Manual. In CDM PoA DD version 11 the monitoring form was

included in the CDM PoA DD. In CDM PoA DD version 12 the monitoring form was updated to include a confirmation that the households that get purified water as part of the program, no longer boil their water. This correction was done to avoid claiming emission reductions from households that continue to boil their water after receiving purified water by solutions provided by the program.

- Change has been made with regards to the representative sampling. In CDM PoA DD version 11 and 12 it has been updated to reflect new standards and guidelines by the executive board.

### **C: Changes:**

Two changes to the project design have been made to the CDM PoA DD. These two changes are:

A: Changes to Eligibility Criteria 17

This change is in accordance with paragraph 133 of projects cycle procedures.

B: Changes to Geographical boundary of the program.

This change is in accordance with paragraph 131 of project cycle procedures.

### **PRC to version 13**

Corrections includes:

1. Minor spelling and removing of space between words and paragraphs.
2. Change of fonts used in the document where different fonts was initially used.
3. Using the latest format of the CDM POA DD (Version 8.1 which is used for this document)
4. Correction to the document version number and the date of the completion of the PoA DD.
5. Moved the summary of the PRC that was done in version 13 of this document from the main text, to this appendix.
6. Included information in sections of the PoA DD form version 8.1, which was not part of the PoA DD form for used for version 13 of the PoA DD.
7. Clarified that denatured alcohol might also be sources from sugar factories and other entities, that make ethanol as a by-product from their main business, in addition to purchase from micro distilleries (does not change the requirement to document that the fuel is renewable).
8. Eligibility criteria 3 has been corrected with "The water purification system is using non-renewable energy source" to "The water purification system is using renewable energy sources. The corrections to the EC does not have any impact on additionality or any other requirements for eligibility criteria's, and does not impact ER calculations.
9. Updated the contact information.
10. Clarified the conditions for the credit facility that CME seek to provide to expand the program.
11. Included explanation that income from CER sales to pay for aftersales support to ensure that the system remain operational
12. Addition of text in footnote under section A.3 to state, "the most cost-efficient solutions most suitable for the local conditions might be used as long as they still remain within the framework described in this document and comply with the methodology. These shall include the use of membrane-based systems for household water purification systems Community based water purification systems using filtering technology".
13. Republic of Korea has been included as an Annex 1 party to the PoA in section A.5.
14. The statement "Due to the almost limitless potential supply of denatured alcohol, the ethanol stoves are expected to provide most of the emission reduction from the SSC-PoA", has been removed.
15. The technology deployed, based on local conditions, shall be identified and described at the time of CPA implementation and inclusion and shall also be described as part of the monitoring process, for each household selected for monitoring.
16. A table has been included in appendix 5, to provide guideline on how to determine if ethanol is considered renewable energy and to calculate potential leakage in accordance with General guidance on leakage in biomass project.

17. Section I.7.1 and section I.7.3 has been updated with regards to how to determine if ethanol is considered renewable energy and to calculate potential leakage in accordance with General guidance on leakage in biomass project.

#### Permanent changes to the registered monitoring plan

1. Revision in monitoring frequency of the ex-post parameters from Annual to at least biennial. (except for  $ET_{\text{stove, Capacity, y}}$  and  $BG_{\text{stove, Capacity, y}}$  which will be monitored annually).
2. Addition of text to indicate scanned (soft) copies of baseline survey forms might be provided to CME rather than sending the original survey forms by regular post.
3. Addition of provision to account for failure to reach required confidence/precision level at the time of verification in accordance with latest version of CDM rules and regulations available at the time of verification.
4. Addition of text to indicate that random selection of households to be monitored, could be done with the use of random selection in excel, from all project participating households in the CPA or batch of CPA included in the program at the time of selection of household to be monitored.
5. Addition of text to clarify that water test to confirm that drinking water supplied by the program meet the required WHO's interim performance targets on households water treatment, can additionally be done by a certified laboratory on-site during the monitoring process.
6. Deletion of text with reference to number (20) and volume (10 litre) of empty water containers for monitoring purpose to households that use purified water.
7. Change in personnel responsible for calculation of emission reductions for the CPA from Recording and Data Manager to CME.
8. Addition of a row to provide for the name of a person from the household that has been monitored in the Monitoring Form.
9. Change in measurement methods and procedures for parameter  $QDW_{p, y}$  to indicate that monitoring of random sample of project participating household will be done according to the monitoring process as described in the Monitoring Plan in place of Program management manual.
10. Inclusion of text to indicate that 95/5 confidence level shall be applied in case of biennial monitoring. Furthermore, sample size shall be sufficient to obtain 95/5 confidence level in case annual or biennial sampling is performed for group of CPAs under the PoA.

Any additional requirements in the Monitoring plan specified in the PoA DD after PRC, shall apply to all CPAs even if such additional requirements is not specified in CPAs that has been included in the program prior to the PRC.

The PRC does not change the calculation of the ER or the application of the additionality or eligibility of the program to the compliance with the deployed methodology or compliance with any CDM rules and regulations.

#### PRC to version 22

Correction include change of  $NCV_{\text{Biogas}}$  in section I.6.2 from  $0.000215 \text{ TJ/m}^3$  to  $0.0000215 \text{ TJ/m}^3$ . This correction is done because the CDM EB changed the reference value.

The PRC to the PoA DD apply to all the CPA DDs registered prior to the PRC for the PoA DD.

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## Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
09.0	31 May 2019	Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with version 02.0 of the “CDM project standard for programmes of activities” (CDM-EB93-A07-STAN);</li> <li>• Make editorial improvements.</li> </ul>
08.1	28 June 2017	Revision to: <ul style="list-style-type: none"> <li>• Remove a duplicated instruction;</li> <li>• Make editorial improvement.</li> </ul>
08.0	7 June 2017	Revision to: <ul style="list-style-type: none"> <li>• Improve consistency with the “CDM project standard for programmes of activities” and with the PDD and CPA-DD forms;</li> <li>• Make editorial improvement.</li> </ul>
07.0	25 May 2017	Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with the “CDM project standard for programmes of activities” (CDM-EB93-A07-STAN) (version 01.0);</li> <li>• Incorporate the “Programme design document form for small-scale CDM programmes of activities” (CDM-SSC-PoA-DD-FORM);</li> <li>• Make editorial improvement.</li> </ul>
06.0	15 April 2016	Revision to ensure consistency with the “Standard: Applicability of sectoral scopes” (CDM-EB88-A04-STAN) (version 01.0).
05.0	9 March 2015	Revision to: <ul style="list-style-type: none"> <li>• Include provisions related to choice of start date of PoA;</li> <li>• Include provisions related to delayed submission of a monitoring plan;</li> <li>• Provisions related to local stakeholder consultation;</li> <li>• Add exception for generic CPA where technology is under positive lists;</li> <li>• Make editorial improvement.</li> </ul>
04.1	5 August 2014	Editorial revision to correct the document information table.
04.0	25 June 2014	Revision to: <ul style="list-style-type: none"> <li>• Include the Attachment: Instructions for filling out the project design document form for CDM programme of activities (these instructions supersede the Guideline: Completing the programme design document form for CDM programme of activities (Version 04.0));</li> <li>• Include provisions related to standardized baselines;</li> <li>• Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the PoA in B.4 and Appendix 1;</li> <li>• Add general instructions on post-registration changes in paragraphs 2 and 3 of general instructions and Appendix 6;</li> <li>• Change the reference number from F-CDM-PoA-DD to CDM-PoA-DD-FORM;</li> <li>• Make editorial improvement.</li> </ul>



<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	3 December 2012	EB 70 Revision to reflect changes to the <i>Guideline: Completing the programme design document form for CDM programmes of activities</i> (EB 70, Annex 6).
02.0	13 March 2012	EB 66 Revision required to ensure consistency with the "Guidelines for completing the programme design document form for CDM programmes of activities" (EB 66, annex 12).
01.0	27 July 2007	EB 33, Annex 41 Initial publication.
Decision Class: Regulatory		
Document Type: Form		
Business Function: Registration		
Keywords: programme of activities, project design document		