COMPONENT PROJECT DESIGN DOCUMENT FORM FOR SMALL-SCALE COMPONENT PROJECT ACTIVITIES (F-CDM-SSC-CPA-DD) Version 02.0

COMPONENT PROJECT ACTIVITIES DESIGN DOCUMENT (CPA-DD)

SECTION A. General description of CPA

A.1. Title of the proposed or registered PoA

PoA 7359: PoA for the reduction of emission from non-renewable fuel from cooking at household level.

A.2. Title of the CPA

a) CPA-SA-001 East Cape PROVINCE

b) Version: 01

c) Date: 10/05/2013

A.3. Description of the CPA

Replace non-renewable fuel with renewable fuel for household cooking that voluntarily want to take part in the CPA project, through the lease or buying of an ethanol or biogas stove, household water purifying kit or buying water from community based water purification systems, from the project participant or from the project implementer. In total 4 000 households are expected to become project participants under the proposed CPA and each of these will have either;

- An ethanol stove or
- A Biogas stove
  And / or
- A household water purifying kit or
- Buy water from a community water purification system

The number of project participating households will be:

Year 1	1 000project participating households
Year 2	15 000 project participating households
Year 3	30 000 project participating households
Year 4	30 000 project participating households
Year 5	30 000 project participating households
Year 6	30 000 project participating households
Year 7	30 000 project participating households

The total number of appliances installed, may be higher than the total number of households to participate as combinations of stove and water purification system in one household will occur.

The total installed capacity is expected to be 44MW, which is under the project limitation of 45 MW as stated in the guidelines to the methodology

The installation of the devices combined is expected to result in average CO_2 emission reductions of **120 000** tCO_2 annually, resulting in a total emission reduction of **840 000**tCO_2 for the CPA during the first 7 years crediting period.

A.4. Entity/individual responsible for CPA

The CPA implementer will be Green Development AS, represented by Havard Norstebo.

A.5. Technical description of the CPA

The current practice, which is also the baseline scenario, is that households use non-renewable woody biomass for cooking. This practice is causing CO_2 emissions.

The CPA will reduce or eliminate the CO_2 emission from using non-renewable woody biomass for cooking. This will be achieved by providing the following solutions;

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 system is gravity based, and hence will require no external power consumption.

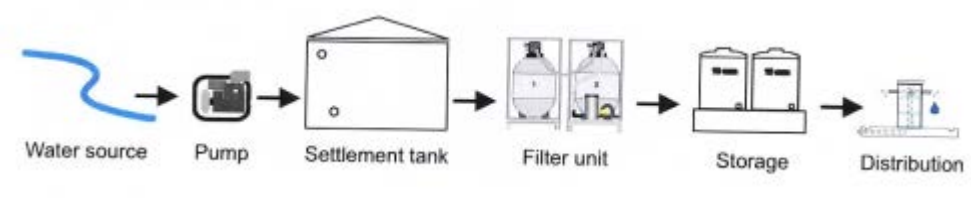
      The water purification technology to be installed may consist of the following process

      - Pouring of water into a raw water container
      - Filtering of the water through a water purification filter
      - Collection of the water in a safe drinking water container

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

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

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



      - Water source - local river, lake or similar.
      - Pump - pumping raw water to settlement tank adding flocculent.
      - Settlement tank - Flocculation/settlement of finer contaminants.

- Filter unit - Purification by sand- and active carbon filters.
- Storage tanks - for potable, safe water.
- Distribution - to water collection points.

The pump will use renewable ethanol as fuel, so that there will be no emission from the operation of the water purification systems.

Both of these water purification solutions will provide clean safe drinking water that meet WHO standards.

Neither of the water purification solutions relies 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 water through the filters, and to the distribution points. These pumps will use renewable ethanol as fuel.

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 ethanol, based on the fuel that is locally available.

a. Biogas stoves will be implemented as the first choice wherever biogas sources are available. 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 ethanol fuel is available.

Due to the almost limitless potential supply of ethanol, the ethanol stoves are expected to provide most of the emission reduction.

A.6. Party(ies)

Name of Party involved (host) indicates a host Party	**Private and/or public entity(ies) CPA implementer(s) (as applicable)**	**Indicate if the Party involved wishes to be considered as CPA implementer (Yes/No)**
Name A (host) DNA of Madagascar	Green Development AS – Private Entity	No
Name B DNA of Norway		No

A.7. Geographic reference or other means of identification

Parameters	Details
Name of area	East Cape Province
Latitude	
Longitude	
Country	South Africa
CPA Implementer	Green Development AS

Marks the location of the CPA

A.8. Duration of the CPA
A.8.1. Start date of the CPA

01/11/2013.

The date of expected start of implementation of project as per implementation schedule.

A.8.2. Expected operational lifetime of the CPA

The project will have a life span of 21 years. The individual ethanol stoves, biogas stoves and water purification filters will have to be changed many times during the life of the operational lifetime of the SSC-CPA.

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

Renewable crediting periods.

A.9.1. Start date of the crediting period

01/01/2014 or the date of inclusion which ever is later.

A.9.2. Length of the crediting period

7 years crediting period. 3crediting periods. Total 21 years.

A.10. Estimated amount of GHG emission reductions

Emission reductions during the crediting period	
Years	**Annual GHG emission reductions (in tonnes of CO_2e) for each year**
2013	**5 000**
2014	**75 000**
2015	**150 000**
2016	**150 000**
2017	**150 000**
2018	**150 000**
2019	**150 000**
Total number of crediting years	**7**
Annual average GHG emission reductions over the crediting period	**120 000**
Total estimated reductions (tonnes of CO_2e)	**840 000**

A.11. Public funding of the CPA

No public funding has been provided to the CPA.

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

In the CDM-EB 54meeting report annex 13, "GUIDELINES ON ASSESSMENT OF DEBUNDLING FOR SSC PROJECT ACTIVITIES(Version 03.1)". Para 7stipulatesthe following:

"If each of the independent subsystems/measures (e.g., biogas digesters, residential solar energy systems, kerosene or incandescent lighting replacements) included in one or more CDM project activities is no greater than 1% of the small scale thresholds defined by the applied methodology and the subsystems/measures are indicated in the PDDs to be each implemented at or in multiple locations (e.g., installed at or in multiple homes) then these CDM project activities are exempted from performing a de-bundling check, i.e., considered as being not a de-bundled component of a large scale activity."

As per de-bundling criteria, 1% of the small-scale threshold is 450 kW. As none of the components in the project will have a thermal output of more than 450 kW, each independent subsystem is below the threshold outlined.

Hence the project is considered as being not a de-bundled component of a larger scale activity.

A.13. Confirmation for CPA

The CPA is neither registered as an individual CDM project activity nor is it part of any other registered PoA.

SECTION B. Environmental analysis
B.1. Analysis of the environmental impacts

National Environmental Impact Assessment Study was carried out. A national environmental Impact Assessment Study may be carried out at a national level for the first CPA in each country in accordance with the PoA DD.

Environmental Impacts

- Air quality: Children and mothers will be exposed to fewer air pollutants through reduced emission of not only CO_2, but also carbon monoxide and particulate matter. Air pollution from cooking with solid fuel is a key risk factor for childhood pneumonia as well as many other respiratory, cardiovascular and ocular diseases. Nearly 2 million people die annually from such indoor pollution1.
- Biodiversity: Will be improved as the program reduces pressure on remaining forest reserves.
- Drought and deforestation: Challenges related to deforestation and desertification will be reduced, as forests will be saved.

No major negative environmental impacts from the proposed solutions to be deployed by the CPA can be identified.

The environmental Assessment report has been submitted to DOE.

[1]http://www.who.int/mediacentre/factsheets/fs292/en/

SECTION C. Local stakeholder comments
C.1. Solicitation of comments from local stakeholders

Stakeholders have been invited to comment on the program on a provincial level for East Cape.

C.2. Summary of comments received

No negative comments on the program have been received.

C.3. Report on consideration of comments received

Most of the issues that were addressed by the stakeholders had been addressed by the World Bank in the comprehensive study that had been undertaken prior to program design. As such, the program had taken many of these concerns into consideration in the program plan prior to the stakeholder consultation.

The program has put particular emphasis on the comments related to;

- Fuel safety
- The consumer cost of the stoves and water filters
- The production of ethanol fuel
- Maintenance of the community water purification systems

SECTION D. Eligibility of CPA and Estimation of emissions reductions
D.1. Title and reference of the approved baseline and monitoring methodology(ies) selected:

The approved baseline and monitoring methodology selected is: AMS I.E., sectoral scope01, EB 60,Switch from non-renewable biomass for thermal application by the user" (Version 04)
http://cdm.unfccc.int/methodologies/DB/I1DGDUD1D5J0KMLSZFWMD3W9Z47OZZ

D.2. Application of methodology(ies)

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 31/12/1989.
    a) Confirmed by baseline survey. See eligibility criteria.
    b) Default values for portion of woody biomass that is considered non-renewable. See CDM-SSC EB thirty-fifth meeting report, annex 20. http://cdm.unfccc.int/Panels/ssc_wg/meetings/035/ssc_035_an20.pdf
- The CPA is small scale as the thermal capacity of all the ethanol stoves installed in a CPA is less than 45 MW.
    a) The installed thermal capacity is calculated within the spread sheet used to calculate emission reductions. If the installed thermal capacity in the CPA exceeds 45 MW, the emission reductions shall be capped to the emission reduction achieved from households that has a total installed thermal capacity of 45 MW from the equipment deployed by the program.

- The methodology is approved for application to CPAs under PoAs
    a) See methodology.

D.3. Sources and GHGs

The proposed CDM project will adapt ethanol and biogas stoves and use ethanol or biogas as fuel for cooking at participating household, replacing the combustion of non-renewable woody biomass that is used as fuel for cooking in the baseline. The proposed CDM project will also adapt water purification at a household or community level, reducing the need to cook for the purpose of sterilizing the water, thus replacing the combustion of non-renewable woody biomass that is used as fuel for cooking in the baseline. Only CO_2 emission from burning the non-renewable woody biomass is included in calculating the project GHG emission reductions. In case of community water systems the auxiliary load shall be fuelled by renewable ethanol and hence no emission. Emission sources and gasses included in the project boundary are listed in the table below;

Table. Emission Sources within CPA boundary that are considered

Baseline emission	Emission from combusting non-renewable woody biomass	CO_2	Included	Main emission source.
		N_2O	Excluded	Excluded for simplification. The emission source is assumed to be very small.
		CH_4	Excluded	Excluded for simplification. The emission source is assumed to be very small.
Project emission	Emission from combustion of renewable fuel	CO_2	Excluded	No net CO_2 emission from renewable fuel.
		N_2O	Excluded	Excluded for simplification. The emission source is assumed to be very small.
		CH_4	Excluded	Excluded for simplification. The net emission source is assumed to be very small.
Leakage emission	Possible increase in use of non-renewable woody biomass from non project participants	CO_2	Included	A standard adjustment factor of 0.95 has been used in accordance with AMS I.E.
		N_2O	Excluded	Excluded for simplification. The emission source is assumed to be very small.
		CH_4	Excluded	Excluded for simplification. The emission source is assumed to be very small.

According to the methodology, leakage shall be considered if the equipment currently being utilized is transferred from outside the boundary to the project boundary. As no equipment currently being utilized is to be transferred to the project boundary, no such leakage applies.

D.4. Description of the baseline scenario

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
   - η_{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.

b) Default values from the methodology
   - $EF_{projected\_fossilfuel}$
   - $NCV_{biomass}$
   - LF

c) IPCC default values
   - $NCV_{ethanol}$
   - NCV_{biogas}
   - $NCV_{Charcoal}$

d) Independent 3rd party reports
   - $f_{NRB,y}$(UNFCCC'sdefault value)
   - WB_{LB}
   - $WB_{LBCharcoal}$.
   - C_{CF}

D.5. Demonstration of eligibility for a CPA

Nr.	Eligibility criteria		Compliance		Means of proof
	Category	Description	Yes	No	
1	Boundary and Location of the CPA	The CPA is located within geographical areas included in the PoA. 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.	☑	☐	The boundary of the CPA is the same as the boundary of East Cape Province. **Document:** CME confirms that the boundary of the CPA is within East Cape Province.
2	No double counting.	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 the CPA. A contract with all the participating households confirms that the households are not part of any other system that generates carbon credits. The Reporting and Data Recording Department shall implement a system where it will be automatically registered if two project participating households has: 1. The same contact phone number, or, 2. The same ID number	☑ ☑	☐ ☐	The specific numbering or identification regime is included in the specific CPA-DD Document: a) CPA numbering according to PoA. CPA unique identification number is SA-001. SA refers to South Africa and 001 refers to the CPA number in South Africa. b) The numbering system for each project participating households within the CPA is a number from 1 to 30 000. c) End user agreement template in Program Management Manual
3	Technological requirements	The CPA consists of solutions to reduce emission from burning non-renewable woody biomass for cooking. The	☑	☐	The thermal output and thermal efficiency of the biogas stoves and the ethanol stoves used in

		solutions include: 1. Biogas stoves. The type of biogas stove shall have a thermal output of no more than 10 kW and thermal efficiency of no less than 50%. 2. Ethanol stove that shall have a thermal output of no more than 10 kWand a thermal efficiency of no less than 50%. 3. The community water purification systems shall provide water that meet WHO standards for safe drinking water, and have energy output of less than 10 kW. 4. The Household water purification systems shall provide water that meet WHO standards for safe drinking water. As the system does not have a measurable energy output, the energy output will be estimated based on the energy output per household in the community water purification system. 5. The water purification system is using non-renewable energy sources.			the CPA shall be determined by product specification provided by the equipment (stove) supplier. In cases where such documentation is unavailable the thermal output and thermal efficiency shall be determined by a qualified laboratory. The equipment listed below has been preapproved for CPA inclusion. Further products to be included in the CPA will be included according to the process described in the Program Management Manual. **Documentation;** a) Biogas stove: http://www.alibaba.com/product-gs/320340757/Biogas_stove.html b) Ethanol stove: http://stoves.projectgaia.com/files/DometicCleanCookBROCH2010.pdf c) Community based water purification systems http://s3.amazonaws.com/challengepost/zip_files/production/1457/zip_files/HADR_Proposal_OHanley.pdf?1313162779 d) Households water purification system http://www.scan-water.com/products.

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4	CPA start date	CPA start date shall not be before PoA registration date and not before the CPA baseline study has been conducted. The start date is; A. From the date in which the first households within the CPA is registered as a project participant or B. The start date of the CPA according to the start date in the CPA DD. The start date is the date that is latest of the two dates. 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.	☑ ☑	☐ ☐	The starting date of the program is the 30/11/2012. The expected start date of CPA is 01/05/2013 **Documentations;** 1. Baseline survey, 2. This CPA-DD.
5	Conditions that ensure compliance with methodology	Households have been using woody biomass since 1989.	☑	☐	**Documentations:** Baseline survey from April 2013.
6	Additionality by CPAs	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)	☑ ☑	☐ ☐	**Documents:** **CPA-DD**

		and where the size of each unit is no larger than 5% of the small-scale CDM threshold. 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.	☑	☐	
7	Stakeholder consultation and Environmental Impact Assessment	Stakeholder consultation and environmental impact assessment will be done for each CPA. 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.	☑ ☑	☐	**Documentations:** a) Stakeholder consultation report, 2013based on the stakeholder consultation from 2013, which was carried out on a Provincial level.. b) Environmental Assessment report, which was carried out on a national level in accordance with the PoA.
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.	☑	☐	**Documentation:** CME confirm that the project has not received any public funding.
9	Sampling requirements	Sampling will be done for;			**Documentations:** Baseline survey,

		1. The baseline survey and 2. To determine the emission reduction during the monitoring process. For both of these processes the project will comply with the requirement of a 90% confidence interval and a 10% margin of error. To achieve this, a sample of 68 is needed for unlimited large populations. A smaller sample will be needed for smaller populations, but to ensure that confidence level that is at least 90% and a margin of error that is less than 10%, a sample size of 68 will be used regardless of population size. Annual inspections shall be performed for the projects to determine the emission reductions. For such emissions a random sample shall be monitored, and such a sample shall be 68 households, to comply with the 90% confidence interval and 10% margin of error. The emission reductions shall be based on a sample of exactly 68 households. The baseline survey shall be done on a sample size of at least 68 households.	☑ ☑	☐ ☐	Monitoring procedures; see project management manual.
10	SSC Limit for CPAs	The CPA will remain under the thermal threshold of 45 MW throughout the crediting period of the CPA. Please note that not all equipment necessarily have been deployed at CPA inclusion date, the SSC limit for CPAs shall be checked	☑	☐	**Documentation:** CME confirm that the total installed capacity of the deployed equipment will remain under 45 MW. The excel spread sheet confirms the thermal

		during verification, and in case any deployed solution will be found to be not in line with CPA SSC limit for CPAs requirement, those equipments will not be counted for in the emission reduction calculations. Thermal output is determined to be 0.5 kWfor each household that get purified water as part of the project.			capacity of the equipment that is expected to be installed. According to these estimations the installed capacity will be no more than 44 MW.
11	De-bundling	The CPA is exempted from performing the de-bundling check since each individual sub-system and each participating household has thermal energy savings of less than 1% of the SSC threshold and will remain within this threshold throughout the crediting period. 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.	☑	☐	**Documentation:** PoADD defines that the maximum thermal output of any equipment included in the program is defined as 50 kWin 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.
12	CER ownership	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. 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.	☑	☐	**Documentations:** a) End user agreements. See program management manual b) The contractual agreement between CME and the project partners and distributors. See program management manual.

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.	☑	☐	**Documentations:** The CPA starting date of the crediting period will be from01/01/2014. The starting date of the project will be from 01/11/2013.
14	Approval of CPA by CME	CME approves the inclusion of this project in the SSC PoA	☑	☐	**Documentations:** CME confirm that the CPA can be included in the PoA.
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.	☑	☐	**Documentation:** • Documents provided as part of PoA DD validation
16	Confirm that the project is not registered with another CPA or CDM project	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. 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	☑	☐	**Documentations:** End user agreement. See project management manual.
17	Exclusive geographical boundary	No part of the geographical area included in the CPA shall be part of any other CPA that has been registered under the PoA. Other PoAs might implement similar CPAs in the same region; this shall not exclude the registration of the CPA. A household might however not be part of another CPA in which carbon credits is generated from the same solutions as provided by this	☑ ☑	☐ ☐	**Documentations:** The geographical boundary of CPA is exclusive and it is East Cape province. End user agreement from Program Management Manual.

		PoA. This is stated in the contract that will be signed between the project participating household and the EMS.			

D.6. Estimation of emission reductions
D.6.1. Explanation of methodological choices

The methodology I.E version 04, requires methodological choices to be made: The SSC-CPA used the following choices;

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

B_y is determined by using one of the following options:

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:
$B_y = H_{Gp,y} / (NCV_{biomass} * \eta_{old})$

Option b) will be used by the SSC-CPA.

Determination of η_{old} (Efficiency of systems being replaced).

η_{old} is determined by using one of the following options:

a) Measured using representative sampling methods or based on referenced literature values as weighted average values if more than one type of systems is replaced, or;
b) 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 b, is used.

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 theirs 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 an increase in the use of non-renewable woody biomass used by the non-project households/users, that is attributable to the project activity, then By is adjusted to account for the quantified leakage. Alternatively, By 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.

According to the methodology, leakage shall be considered if the equipment currently being utilized is transferred from outside the boundary to the project boundary. As no equipment currently being utilized is to be transferred to the project boundary, no such leakage applies.

D.6.2. Data and parameters that are to be reported ex-ante
(Copy this table for each data and parameter.)

Data / Parameter	$f_{NRB,y}$
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	
Value(s) applied	0.90
Choice of data or Measurement methods and procedures	
Purpose of data	To calculate emission reductions.
Additional comment	Not applicable.

Data / Parameter	$EF_{projected\_fossilfuel}$
Unit	tCO_2/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.

Data / Parameter	$NCV_{biomass}$
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	$NCV_{ethanol}$
Unit	TJ / m^3
Description	Energy Content of ethanol.
Source of data	2006 IPCC Guidelines for National Greenhouse Gas inventories combined with default density of ethanol.
Value(s) applied	0.0213 TJ /m^3
Choice of data or Measurement methods and procedures	NVC 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 2.1 "Default Net Calorific Values (NCVs)". Density of ethanol is 0.789 g/cm_3 http://en.wikipedia.org/wiki/Ethanol NCV for ethanol is hence calculated as (27.0 * 0.789 / 1000) = 0.0213 TJ / m^3
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.

Data / Parameter	NCV_{biogas}
Unit	TJ/m^3
Description	Energy content of the biogas.
Source of data	IPCC default value.
Value(s) applied	0.000215
Choice of data or Measurement methods and procedures	Default energy value of biogas is used in other methodologies. AMS-I.I "Biogas/biomass thermal application for households/small users" version 02. The default value is described as: "Net calorific value of the biomass (GJ/unit mass or volume, dry basis). For biogas, use default value: 0.215 GJ/m3 biogas (assuming NCV of the methane: 0.359 GJ/m3, default methane content in biogas: 60%)" 0.215 GJ/m^3 equals 0.000215 TJ/m^3 http://cdm.unfccc.int/methodologies/SSCmethodologies/approved
Purpose of data	Calculation of baseline emissions.
Additional comment	Not applicable.

Data / Parameter	$NCV_{Charcoal}$
Unit	TJ/Tonne
Description	Energy content of Charcoal.
Source of data	IPCC default value.
Value(s) applied	0.0295
Choice of data or Measurement methods and procedures	Default value from Table 2.1 in the 2006 IPCC Guidelines for National Greenhouse gas Inventory, Volume 2 Energy. http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf The value is given as 29.5 TJ/Gg. This equal to 0.0295 TJ/Tonne.
Purpose of data	Calculation of baseline emissions.
Additional comment	Not applicable.

Data / Parameter	η_{old}
Unit	Fraction.
Description	Efficiency of system being replaced.
Source of data	Baseline survey.
Value(s) applied	0.1
Choice of data or Measurement methods and procedures	All the stoves for households in the baselines survey were found as inefficient stove (without improved combustion air supply or flue gas ventilation system) as per the definition provided in the applied methodology
Purpose of data	Calculation of baseline emissions.
Additional comment	Average value was hence determined as ((0.1 * (1-0)) + (0.2 * 0) = 0.1

<table>
<tr><td>Data / Parameter</td><td>WB_{LB}</td></tr>
<tr><td>Unit</td><td>Kg/litre</td></tr>
<tr><td>Description</td><td>Mass of woody biomass that would have been required to boil one litre of water.</td></tr>
<tr><td>Source of data</td><td>Laboratory test.</td></tr>
<tr><td>Value(s) applied</td><td>0.416</td></tr>
<tr><td>Choice of data or Measurement methods and procedures</td><td>SUMMARY OF THE TEST RESULTS
The boilingwatertestsinthe Energy DepartmentLaboratory at the Centre National de Recherches Industrielle et Technologique (CNRIT)ledtothe resultin thesummarizedtablebelow.
<table>
<tr><th>Stoves</th><th>Fuelusedduringboilingtest</th><th>Average volumeofwaterboiled (ml)</th><th>Averagefuelconsumption (g)</th><th>Average fuelconsumptionper literofwater (kg /liter)</th></tr>
<tr><td>Improved stove (CNRIT model)</td><td>CHW</td><td>2120</td><td>123.6</td><td>0.058</td></tr>
<tr><td>Open metallic stove</td><td>CHW</td><td>1930</td><td>184</td><td>0.096</td></tr>
<tr><td>Improved stove (CNRIT model)</td><td>WFI</td><td>1992.4</td><td>585.2</td><td>0.925</td></tr>
<tr><td>Open metallic stove</td><td>WFI</td><td>1770.4</td><td>1001.6</td><td>0.566</td></tr>
<tr><td>Open stove (3 stones)</td><td>WFI</td><td>2016.6</td><td>698.6</td><td>0.416</td></tr>
<tr><td colspan="4">Average for Wood</td><td>0.636</td></tr>
</table></td></tr>
<tr><td>Purpose of data</td><td>Calculation of baseline emissions.</td></tr>
<tr><td>Additional comment</td><td></td></tr>
</table>

<table>
<tr><td>Data / Parameter</td><td>$WB_{LB,Charcoal}$</td></tr>
<tr><td>Unit</td><td>Kg/litre</td></tr>
<tr><td>Description</td><td>Mass of woody biomass that would have been required to boil one litre of water.</td></tr>
<tr><td>Source of data</td><td>Laboratory test.</td></tr>
<tr><td>Value(s) applied</td><td>0.058</td></tr>
<tr><td>Choice of data or Measurement methods and procedures</td><td>SUMMARY OF THE TEST RESULTS
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<tr><td>Open stove (3 stones)</td><td>WFI</td><td>2016.6</td><td>698.6</td><td>0.416</td></tr>
<tr><td colspan="4">Average for Wood</td><td>0.077</td></tr>
</table></td></tr>
<tr><td>Purpose of data</td><td>Calculation of baseline emissions.</td></tr>
<tr><td>Additional comment</td><td></td></tr>
</table>

Data / Parameter	C_{CF}
Unit	Number
Description	Charcoal conversion factor.
Source of data	Default value.
Value(s) applied	10.0
Choice of data or Measurement methods and procedures	10 kg of wood is used to produce 1 kg of charcoal, manufactured with traditional kilns. Reference: Protecting and restoring forest carbon in tropical Africa *Chapter 6: Woodfuels and forests in tropical Africa* Format PDF/ p.10
Purpose of data	Calculation of baseline emissions.
Additional comment	Not applicable.

Data / Parameter	C_P
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	0.64
Choice of data or Measurement methods and procedures	Not applicable.
Purpose of data	Calculation of baseline emissions
Additional comment	Not applicable.

Data / Parameter	LF
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.

Data / Parameter	Thermal output of water purification systems
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 kWis based on the thermal output of the equipment used to boil the water, e.g. a default value for the baseline stoves.
Purpose of data	Calculate the CPA thermal output to ensure that it is within the 45 MW limit for small-scale projects.
Additional comment	

D.6.3. Ex-ante calculation of emission reductions

Emission reductions have been determined as:

$ER_y = ER_{y,\ Ethanol} + ER_{y,\ Biogas} + ER_{y,\ Water}$

Where

$ER_{y,\ Ethanol} = B_{y,\ Ethanol} * f NRB,y * NCV_{biomass} * EF_{projected\_fossilfuel}$

$ER_{y,\ Biogas} = B_{y,\ Biogas} * f NRB,y * NCV_{biomass} * EF_{projected\_fossilfuel}$

$ER_{y,\ Water} = B_{y,\ Water} * f NRB,y * NCV_{biomass} * EF_{projected\_fossilfuel}$

ER_y = Emission reductions during the year y, in tCO_2e

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.

$NCV_{biomass}$ = Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonnes)

$EF_{projected\_fossil\ fuel}$ = Emission factor for the substitution on non-renewable biomass by similar consumers. Use a default value of 81.6 tCO_2/TJ

Step 1: $B_y$was determined:

B_y, is determined separately for the stoves (ethanol and biogas) and for the purified water consumed (drinking water from household water purification systems plus the water from the community water systems).

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

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

$B_{y,Ethanol} =$

$(((HG_{p.y,Ethanol} / (NCV_{Biomass} * \eta_{old})) * (1-C_P)) + ((HG_{p.y,Ethanol} / (NCV_{Charcoal} * \eta_{old})) * (C_P * C_{CF}))) * LF$

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

Where

$B_{y,\ Biogas}$ = Quantity of woody biomass that is substituted or displaced in ton as a result of the biogas used by the project in year y.

$HG_{p,yBiogas}$ = Quantity of thermal energy generated by the biogas used the project participating households in year y measured in TJ.

$NCV_{Biomass}$ = Net Calorific Value of the non-renewable woody biomass that is substituted.

$NCV_{charcoal}$ = Net Calorific Value of Charcoal.

η_{old} = Efficiency of the old stoves that has been replaced by the project.

$B_{y\ Ethanol}$ = Quantity of woody biomass that is substituted or displaced in ton as a result of the ethanol used by the project in year y.

$HG_{p,yEthanol}$ = Quantity of thermal energy generated by the ethanol used by the project participating households in year y, measured in TJ.

$B_{y,purifiedWater}$ = 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 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 in the form of charcoal that would have 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 meet national 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.

Step 3. $QDW_{py}$is determined from annual monitoring.

Step 4. $HG_{p,\ y}$is determined.

HG_{py}calculations;

$HG_{p,y,Biogas}$ = $NCV_{Biogas} * BG_{Usage,y} * BG_{Stoves,\ Units,y} * (BG_{stove,effiency}/ 100) * 365$

$HG_{p,y,ethanol}$ $NCV_{Ethanol} * ET_{Usage,y}/ 1000 * ET_{Stoves,Units,y} * (ET_{stove,\ efficiency}/ 100) * 365$

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.
$NCV_{Ethanol}$ = Net Calorific Value of Ethanol. Based on default value.
$ET_{Usage,y}$ = Average ethanol usage per litre per households in year y. Divided by 1000 to get value in m^3.
$ET_{Stoves, Units,y}$ = Ethanol stoves in use in the project area in year y.

Step 5. η_{old} is determined by:
η_{old} = Thermal efficiency of stoves being replaced.

η_{old} was determined from data from the baseline survey conduced prior to project implementation. None of the stoves in baseline survey were found to be improved cook stoves.

Step 6. $f_{NRB, y}$ was determined by:
Was determined based on default values.

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 ex-ante emission reduction was based on estimated values used by 68 imaginary project participating households. The sum of the values from these 68 project participating households were then divided by 68 in order to determine the average emission reduction per project participating households.

Step 8. Determine total CPA emission reduction.

Total ex-ante emission reduction from CPA was determined by multiplying the average expected emission reduction per project participating household with the total number of project participating households at the time of the monitoring. For the ex-ante calculations the number of project participating households in each year was estimated.

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

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
Year 2013	**5 000**	0	0	**5 000**
Year 2014	**75 000**	0	0	**75 000**
Year 2015	**150 000**	0	0	**150 000**
Year 2016	**150 000**	0	0	**150 000**
Year 2017	**150 000**	0	0	**150 000**
Year 2018	**150 000**	0	0	**150 000**
Year 2019	**150 000**	0	0	**150 000**
Total	**840 000**	0	0	**840 000**
Total number of crediting years	7			
Annual average over the crediting period	**120 000**	0	0	**120 000**

Default leakage factor of 0.95

D.7. Application of the monitoring methodology and description of the monitoring plan
D.7.1. Data and parameters to be monitored
(Copy this table for each data and parameter.)

Data / Parameter	$ET_{stoves,\ units,y}$
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	0.8971
Measurement methods and procedures	Monitoring of no less than 68 randomly selected project participating households. This will be done according to the monitoring process as described in the Program Management Manual.
Monitoring frequency	Annually.
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 households 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	$ET_{usage,y}$
Unit	Litres
Description	Average daily ethanol usage by project participating households in year y.
Source of data	Monitoring of random sample of no less than 68 project participating households.
Value(s) applied	0,6412
Measurement methods and procedures	The usage of ethanol 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 ethanol consumption per household that use ethanol stoves.
Monitoring frequency	Annually.
QA/QC procedures	The ethanol consumption will be based on pure ethanol. Hence the ethanol used by the household will be measured to determine its purity. If the ethanol has a purity of 60%, the volume of ethanol used will be multiplied with 60% to reflect the equivalent volume of pure ethanol.
Purpose of data	Calculations of baseline emissions.
Additional comments	Not applicable.

Data / Parameter	$ET_{stove, Capacity,y}$
Unit	kW
Description	Average thermal capacity of ethanol stove used by the project participating households.
Source of data	Monitoring of random sample of project participating households.
Value(s) applied	1.3456
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	See Project Management Manual.
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.

Data / Parameter	$ET_{stove,Efficiency,y}$
Unit	Percentage
Description	Average thermal efficiency of ethanol stove used by the project participating household.
Source of data	Monitoring of random sample of project participating households.
Value(s) applied	53.82
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	Annually.
QA/QC procedures	See Project Management Manual.
Purpose of data	Calculation of baseline emissions.
Additional comments	Not applicable.

Data / Parameter	$BG_{Stoves,\ units,y}$
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.
Value(s) applied	0.1029
Measurement methods and procedures	Monitoring of no less than 68 randomly selected project participating household. This will be done according to the monitoring process as described in the Program Management Manual.
Monitoring frequency	Annually.
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.

Data / Parameter	$BG_{usage,y}$
Unit	m^3
Description	Average daily biogas usage per project participating household in year y
Source of data	Monitoring of random sample of no less than 68 project participating households.
Value(s) applied	0.0103
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	Annually.
QA/QC procedures	Biogas meters will be calibrated annually, in accordance with the Program Management Manual.
Purpose of data	Calculation of baseline emissions.
Additional comments	The biogas value is very low due to the risk associated with the biogas production.

Data / Parameter	$BG_{stove, Capacity,y}$
Unit	kW
Description	Average thermal capacity of biogas stove used by the project participating households
Source of data	Monitoring of random sample of project participating households.
Value(s) applied	0.2882
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.

Data / Parameter	$BG_{stove,Efficiency,y}$
Unit	Percentage
Description	Average thermal efficiency of biogas stove used by the project participating households.
Source of data	Monitoring of random sample of project participating households.
Value(s) applied	6.7059
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	Annually.
QA/QC procedures	Not applicable.
Purpose of data	Calculation of baseline emissions.
Additional comments	Not applicable.

Data / Parameter	$N_{p,y}$
Unit	Number
Description	Average number of people in project participating households 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	0.1324
Measurement methods and procedures	Monitoring of no less than 68 randomly selected project participating household. This will be done according the monitoring process as described in the Program Management Manual.
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	The value applied refers to the average value per person and is low because only a limited number of people in the project will get access to purified water through the project.

Data / Parameter	$QDW_{p,y}$
Unit	Litre/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.
Value(s) applied	0.1176
Measurement methods and procedures	Monitoring of no less than 68 randomly selected project participating household. This will be done according the monitoring process as described in the Program Management Manual. The households will be monitored for one week to determine the total drinking water consumption 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 water consumption per person.
Monitoring frequency	Annually.
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 value applied refers to the average value per person and is low because only a limited number of people in the project will get access to purified water through the project.

Data / Parameter	$W_{Quality,y}$
Unit	Yes or No
Description	Water Quality – to conform that purified water meet WHO standards for drinking water in year y.
Source of data	Laboratory test
Value(s) applied	1.0
Measurement methods and procedures	Yes will be registered as 1.0 No will be registered as 0
Monitoring frequency	Annually.
QA/QC procedures	Laboratory test will be made of at least 10 random samples from the households that have been monitored.
Purpose of data	Calculation of baseline emissions.
Additional comments	Not applicable.

D.7.2. Description of the monitoring plan

The monitoring plan sets out to quantify the emission reduction at each SSC-CPA. The required data will be obtained by monitoring a random sample of no less than 68 households each year from each CPA.

- The number of project participating households in each CPA will be determined from the CPA database. This database will have assigned a unique number for each participating households within the CPA and a means of identifying this household.
- No less than 68 participating households will be randomly selected for monitoring to determine their emission reduction.

- The monitoring of the households selected for monitoring will be monitored under the supervision of a person employed by the Survey and Data Collection Department and which has been trained in conducting the monitoring.
- The Survey and Data Collection Department representative that will be responsible for the monitoring will forward all the data to the CME "Recording and Data Department" for processing and storing.

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 in both electronic and hard copy. A hard copy will also be stored by the Survey and Data Collection 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 at the time of the monitoring, to determine the total emission reduction achieved in the CPA.

The monitoring plan will also include identification of suppliers of ethanol, biogas and purified water to the project participating household. Potential emission from the supply of purified water, biogas and ethanol shall be identified and quantified. If emissions from the supply of the purified water, the biogas and ethanol are not negligible, then such emission shall be excluded from the project or alternatively the households that receive the purified water, biogas or ethanol from such suppliers shall be excluded from the program and no emission reductions shall be calculated from such households.

The monitoring process is described in details in the Program Management Manual.

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 as ample 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.

$ER_{i,\,adjusted} = ER_{i,\,reported} \times F_{adj}$

$F_{adj} = (\sum ER_{j,\,verified} / \sum_{j,\,reported})$

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 documentations 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.
As the project will conduct monitoring annually, the precision of the sample means is 95/10 to estimate emission reductions. A random sample of households will 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 ”Standard for Sampling and surveys for CDM Project Activities and Programme of Activities” as provided by the CDM EB 69, Annex 4.[2].

The number of samples required to achieve a 90/10 confidence level shall be used. In case verification is done at PoA lever and the verification include several CPAs, then the confidence level of 95/10 shall be achieved.. The total number of households sampled for the verification process shall however never be less than 68. The process of determining the minimum sample size for the annual monitoring is described in further details in the Program Management Manual.

Annual monitoring - Timing
The annual monitoring will determine the emission reduction for the year in which the monitoring is done. The emission reduction calculations will be based on number of project participating households at the time of the monitoring.

The annual monitoring in each CPA will be done at different times of the year, and the annual monitoring of each CPA shall be done in a different month for each year of the crediting period. This will ensure that the monitoring is not only done at the end of the year, when the number of participating households might be higher than the average number of participating households during the year.

This process will also enable monitoring managers to conduct annual monitoring in different CPAs throughout the year and hence reduce the number of people that needs to be trained to perform the annual monitoring of CPAs.

SECTION E. Approval and authorization

Letter of approval from all parties has been submitted to DOE.

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[2] http://cdm.unfccc.int/filestorage/1/h/9XRKLGIFD0AMP4O6QCUVS5N1ZH7B3W.pdf/eb69_repan04.pdf?t=TVh8bWt4dXNhfDBw9tZWuip1zr3mxl0hm_mJ

Appendix 1: Contact information on entity/individual responsible for the CPA

Organization	Green Development AS
Street/P.O. Box	Trosviksodden 8
Building	
City	Vettre
State/Region	
Postcode	1392
Country	Norway
Telephone	+4793630730
Fax	
E-mail	hn@greendevelopment.no
Website	www.greendevelopment.no
Contact person	
Title	General Manager
Salutation	Mr.
Last name	Norstebo
Middle name	
First name	Havard
Department	CDM
Mobile	+254 705323314
Direct fax	
Direct tel.	
Personal e-mail	Havard.Norstebo@gmail.com

Appendix 2: Affirmation regarding public funding

No public funding is provided for the proposed CPA

Appendix 3: Applicability of the selected methodology(ies)

AMS I.E is applicable for the following reasons:

a) The programme activity involves displacing the use of non-renewable biomass by introducing renewable energy technology.

b) The project participants have been using non-renewable biomass since before 31/12/1989.

c) The CPA is small scale as the thermal capacity of all the ethanol stoves installed in a CPA is less than 45 MW.

d) The methodology is approved for application to CPAs under PoAs

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

Appendix 5: 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. **Further background information on monitoring plan**

Please see the Program Management Manual

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History of the document

Version	Date	Nature of revision(s)
02.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the component project design document form for small-scale component project activities" (EB 66, Annex 17).
01	EB33, Annex44 27 July 2007	Initial adoption.
Decision Class: Regulatory **Document Type:** Form **Business Function:** Registration		