CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAM ACTIVITY DESIGN DOCUMENT FORM (CDM-SSC-CPA-DD)
Version 01

CONTENTS

Annexes

NOTE:

(i) This form is for submission of CPAs that apply a small scale approved methodology using the provision of the proposed small scale CDM PoA.

(ii) The coordinating/managing entity shall prepare a CDM Small Scale Programme Activity Design Document (CDM-SSC-CPA-DD)[1,2] that is specified to the proposed PoA by using the provisions stated in the SSC PoA DD. At the time of requesting registration the SSC PoA DD must be accompanied by a CDM-SSC CPA-DD form that has been specified for the proposed SSC PoA, as well as by one completed CDM-SSC CPA-DD (using a real case). After the first CPA, every CPA that is added over time to the SSC PoA must submit a completed CDM-SSC CPA-DD.

[1] The latest version of the template form CDM-CPA-DD is available on the UNFCCC CDM web site in the reference/document section.

[2] At the time of requesting validation/registration, the coordinating managing entity is required to submit a completed CDM-POA-DD, the PoA specific CDM-CPA-DD, as well as one of such CDM-CPA-DD completed (using a real case).

SECTION A. General description of small scale CDM programme activity (CPA)

A.1. Title of the small-scale CPA:

KENDBIP CPA 1 (CPA-001)

Version 01
Date: 28/10/2011

A.2. Description of the small-scale CPA:

The Kenya National Federation of Agricultural Producers (KENFAP) is the national implementing agency for the Kenya National Domestic Biogas Programme (KENDBIP). KENDBIP (referred to below as the SSC-CPA) is a component of the Africa Biogas Partnership Programme (ABPP).

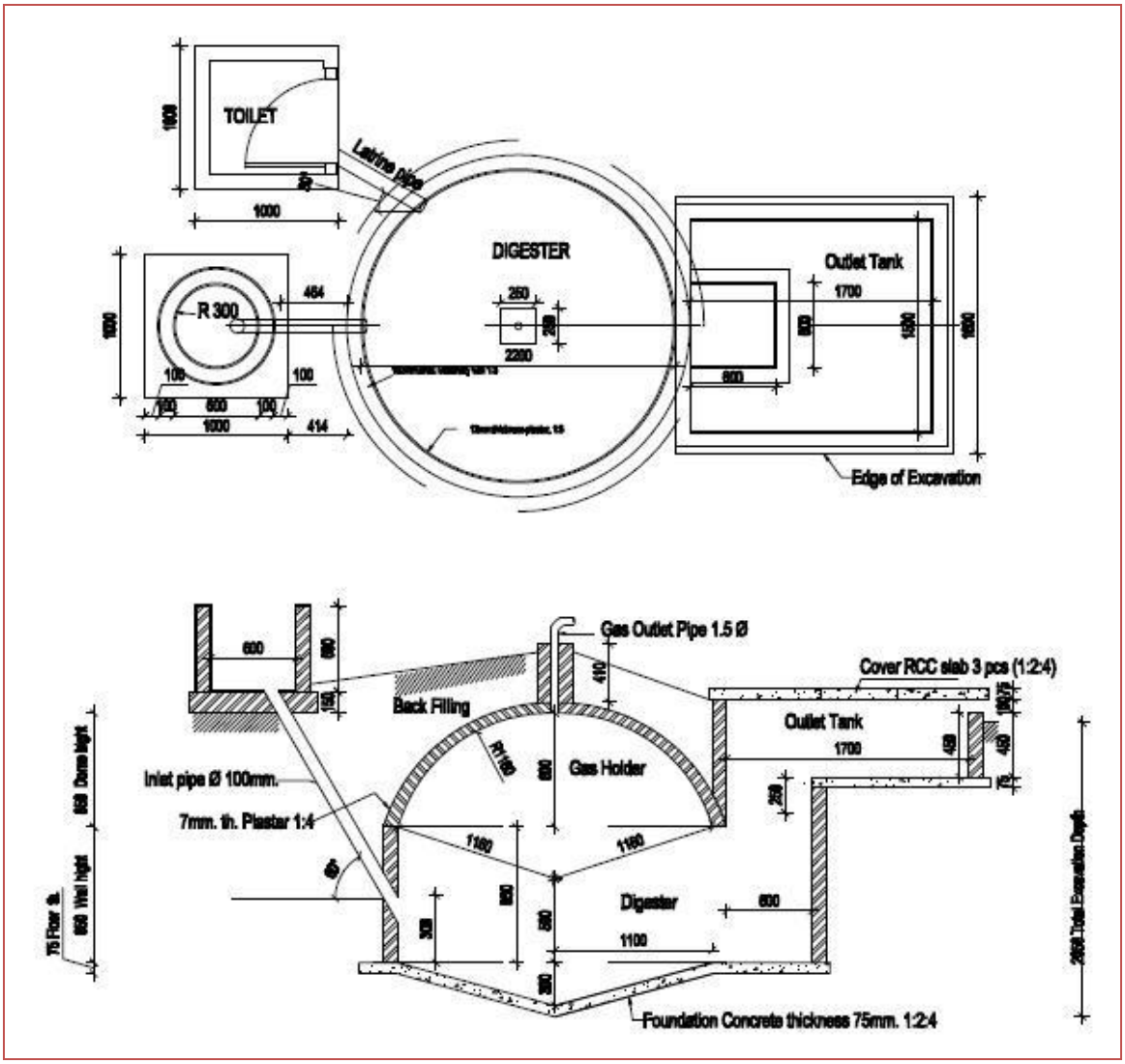
The overall objective of the SSC-CPA is to contribute to the achievement of the Millennium Development Goals (MDGs) through the dissemination of domestic biogas systems as a local, sustainable energy source through the development of a commercially viable, market-oriented biogas sector. By encouraging the switch from traditional non-renewable biomass (NRB) fuels to renewable biogas the SSC-CPA is reducing greenhouse gas emissions.

KENDBIP is the sector leader with the responsibility of coordinating, facilitating and monitoring sector functions and supporting the technical, financial and institutional architecture necessary for development of the domestic biogas sector in Kenya.

The SSC-CPA is to be implemented based on private sector market oriented principles, but relying on governmental support for a favourable regulatory and policy environment, as well as general buy-in promotion and extension.

The SSC-CPA will stimulate the installation of domestic biogas systems country wide, of $4m^3$ to $12m^3$ capacity. It will install and maintain biogas systems through over 100 biogas-related enterprises engaged in construction, appliances and parts. A subsidy will be provided by KENDBIP to each individual household to reduce the high initial cost of the biogas system installation.

KENDBIP selected the appropriate biogas technology to be implemented through engagement with a wide range of stakeholders. They agreed on a fixed dome digester design to be known as the Kenya National Biogas Model (KENBIM). A drawing of the KENBIM model is shown below:



The biogas system is made up of several interconnected parts. The specific role of each component is summarised below:

Inlet – The main purpose of the inlet is to mix organic material and water into a semi solid state. This mixture is fed into the digester via an inlet pipe.

Digester – The digester holds the mixture of manure and water, creating a conducive environment for anaerobic digestion where microorganisms produce biogas. The digester is cylindrical in shape and is usually made of brick masonry with a concave concrete cover, or dome. Typically the digester is built underground with only the plumbing, inlet and outlets visible.

Dome - The purpose of the dome is to collect the gas produced in the digester. This is typically plastered

in several layers and painted with a special paint in order to minimise gas leakage. Gas accumulates under the dome creating pressure and pushing down the level of the slurry and increasing the slurry level in the connected slurry tank. It is the difference in slurry levels between the slurry tank and the inside of the dome that maintains the pressure to push the gas into the outlet pipe.

Outlet - The outlet valve releases the collected gas under the dome to biogas appliances such as stoves or lamps.

Slurry Tank - The slurry tank holds the slurry that the gas pressure from under the dome displaces. This slurry overflows into a composting tank as more manure is fed into the digester. This slurry can then be used as a fertiliser.

KENBIM is a hybrid of the modified CAMARTEC and AKUT biogas models. The design incorporates the positive aspects of the modified CAMARTEC and AKUT biogas models and includes the following modifications:

- KENBIM has a conical floor for areas having weak soil conditions and a flat floor for relatively strong areas.
- There is no manhole on the top of the gas holder, instead the manhole is from the expansion chamber.
- The shape of expansion chamber is rectangular.
- The outlet passage is designed in such a way that it allows easy entrance inside the digester.
- The gas holder is designed to store at least 60% of the daily gas production.
- The overflow level in the expansion chamber is arranged in such a way that gravity assists the flow of slurry from the inlet to the slurry pit.
- The design incorporates options for direct feeding of dung from the cattle shed as well as separate mixing tank depending upon the site condition and user's demand/need.

A.3. Entity/individual responsible for the small-scale CPA:

Kenya National Federation of Agricultural Producers (KENFAP), Kenya

Contact details of the implementer are provided in Annex I.

A.4. Technical description of the small-scale CPA:

A.4.1. Identification of the small-scale CPA:

A.4.1.1. Host Party:

Kenya

A.4.1.2. Geographic reference or other means of identification allowing the unique identification of the small-scale CPA (maximum one page):

This SSC-CPA will disseminate biogas systems over the entire territory of Kenya. The primary means to uniquely identify the activities under the SSC-CPA is by means of buyer information collected through Sales Agreements. This will at least include serial number, customer name, address, date of sale, and also GPS coordinates.

The unique identification of the SSC-CPA is the code (CPA-001) for KENDBIP CPA 1.

A.4.2. Duration of the small-scale CPA:

A.4.2.1. Starting date of the small-scale CPA:

The starting date of this CDM programme activity is the date at which the sale of the biogas systems with specific Sales Agreements and the recording of such sales begin. This is the 01/01/2012. The starting date of this SSC-CPA is after the commencement of validation of the Programme of Activities, i.e. the date on which the SSC-PoA-DD was published for global stakeholder consultation.

A.4.2.2. Expected operational lifetime of the small-scale CPA:

21 years

A.4.3. Choice of the crediting period and related information:

Renewable crediting period

A.4.3.1. Starting date of the crediting period:

Same as that of the SSC-PoA under which this first SSC-CPA is registered.

A.4.3.2. Length of the crediting period, first crediting period if the choice is renewable CP:

The first crediting period is 7 years.

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

Year	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
Year 1	0	21,161	0	21,161
Year 2	0	44,150	0	44,150
Year 3	0	62,509	0	62,509
Year 4	0	66,228	0	66,228
Year 5	0	64,241	0	64,241
Year 6	0	62,314	0	62,314
Year 7	0	60,445	0	60,445
Total	0	381,049	0	381,049

Average emission reductions in metric tonnes of CO_2 equivalent per annum: 54,436

A.4.5. Public funding of the CPA:

The Directorate General for International Cooperation (DGIS) under the Netherlands Ministry of Foreign Affairs provides public funding. The SSC-CPA is being supported by DGIS through two Dutch development NGOs, the Humanist Institute for Cooperation with Developing Countries (Hivos) and the Netherlands Development Organisation (SNV). There has been no diversion of Official Development Assistance (ODA).

A.4.6. Information to confirm that the proposed small-scale CPA is not a de-bundled component

According to the Guidelines on assessment of de-bundling for SSC project activities (version 03) published as annex 13 of the meeting report of EB 54[3] the CPA is exempted from performing a de-bundling check i.e. considered as being not a de-bundled component of a large scale activity if the following condition applies:

10. If each of the independent subsystems/measures (e.g. biogas digester, solar home system) included in

[3] EB 54 Annex 13

the CPA of a PoA is no greater than 1% of the small scale thresholds defined by the methodology applied[4]*, then that CPA of PoA is exempted from performing de-bundling check i.e. considered as not being a de-bundled component of a large scale activity.*

Each of the biogas systems included in the CPA is not greater than 1% of the small scale threshold which is 450 kW for thermal energy as follows:

Size of digester	Maximum daily feed (kg)	Maximum daily gas production (m^3)	Maximum capacity of digester (kW)
4	30	1.2	0.88
6	45	1.8	1.33
8	60	2.4	1.77
10	90	3.6	2.65
12	100	4	2.95

Typical burner efficiency is 60% and typical usage assuming exclusive cooking at five hours per day.

A.4.7. Confirmation that small-scale CPA is neither registered as an individual CDM project activity or is part of another Registered PoA:

This SSC-CPA is neither registered as an individual CDM project activity or is part of another registered PoA.

SECTION B. Eligibility of small-scale CPA and Estimation of emissions reductions

B.1. Title and reference of the Registered PoA to which small-scale CPA is added:

African Clean Energy Switch - Biogas (ACES-Biogas)

B.2. Justification of the why the small-scale CPA is eligible to be included in the Registered PoA:

This SSC-CPA follows the stated goal of the PoA and eligibility criteria for inclusion in the PoA as determined in chapter A.4.2.2. of the PoA-DD:

- The SSC-CPA will be involved in the dissemination of biogas systems within the geographical region of the PoA.
- Each SSC-CPA will be limited to 45MW installed capacity/year based on sales records. Any additional fuel switch will not be counted towards ERs.
- The CPA implementer has signed contractual agreements with the CME to participate in the PoA. Those agreements include the respective rights and responsibilities of both parties, e.g. approval procedures by the CME and monitoring requirements.
- The SSC-CPA is validated in order to be included in the PoA.

[4] i.e. 150 kW installed capacity or 0.6 GWh annual energy savings or 0.6 $ktCO_2e$ annual emission reductions.

- The proposed SSC-CPA is a voluntary action by the CPA implementer.
- The CPA complies with baselines and monitoring methodology requirements (AMS-I.E version 04).
- The CPA is additional as demonstrated in the additionality criteria in section E.5.2 of the PoA-DD.
- The CPA is not a de-bundled component of another CPA or CDM project activity and follows the de-bundling criteria as described in A.4.4.1 of the PoA-DD.
- The CPA does not double-count any of its appliances for the ERs.
- No public Official Development Assistance funding has been used for the implementation or operation of the CPA, which requires the purchase of CERs from this CPA.
- The CPA complies with the host country approval stipulations.

B.3. Assessment and demonstration of additionality of the small-scale CPA , as per eligibility criteria listed in the Registered PoA:

The SSC-CPA faces a number of barriers to overcome as outlined in sections A.4.3. and E.5.1. of the SSC-PoA-DD.

As per section E.5.2. of the SSC-PoA, this SSC-CPA meets the additionality criteria of the first approach, as follows:

The number of domestic biogas systems currently installed in Kenya can be estimated at 5,500, the number of potential viable households is estimated at 172,312[5]. This means that the market penetration of biogas systems is only around 3.2% far below the 20% required to be considered common practice and low enough that it can be seen the barriers due to lack of prevailing practice are significant. The only sustainable way to overcome these barriers is the extra revenue from carbon finance.

B.4. Description of the sources and gases included in the project boundary and proof that the small-scale CPA is located within the geographical boundary of the registered PoA.

The gas included is carbon dioxide in the project boundary that is the physical, geographical site of the biogas system.

Source		Gas	Included ?	Justification / Explanation
Baseline	Combustion of charcoal or firewood	CO_2	yes	Source of baseline emissions
		CH_4	no	Excluded as per methodology
		N_2O	no	Excluded as per methodology
Project Activity	Operation of biogas system	CO_2	no	Excluded as per methodology

[5] ETC Group, Promoting Biogas Systems in Kenya, A feasibility study, Final Draft, 20 August 2007

		CH_4	no	Excluded as per methodology
		N_2O	no	Excluded as per methodology

The CPA will disseminate biogas systems over the entire territory of Kenya. Kenya is one of the East African states that form the geographical boundary of the PoA.

B.5. Emission reductions:

B.5.1. Data and parameters that are available at validation:

Data / Parameter:	**$NCV_{biomass}$**
Data unit:	TJ/tonne
Description:	Net calorific value of the non-renewable woody biomass that is substituted
Source of data used:	IPCC as quoted in AMS I.E.
Value applied:	0.015
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value that is provided in AMS I.E.
Any comment:	

Data / Parameter:	**$EF_{projected\text{-}fossilfuel}$**
Data unit:	tCO_2/TJ
Description:	Emission factor for the substitution of non-renewable woody biomass by similar consumers.
Source of data used:	AMS I.E.
Value applied:	81.6
Justification of the choice of data or description of measurement methods and procedures actually applied :	Stipulated in AMS I.E.: This value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis.
Any comment:	

Data / Parameter:	$\mathbf{f_{NRB,y}}$
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 using survey methods
Source of data used:	FAO, national forestry agencies and environmental authorities
Value applied:	0.981
Justification of the choice of data or description of measurement methods and procedures actually applied :	The $f_{NRB,y}$ was determined based on the most recent national approved study.
Any comment:	see Annex 3 Baseline Information for further details

Data / Parameter:	**L**
Data unit:	Fraction
Description:	Net to gross adjustment factor to account for leakages
Source of data used:	AMS-I.E.
Value applied:	0.95
Justification of the choice of data or description of measurement methods and procedures actually applied :	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
Any comment:	

Data / Parameter:	C_y
Data unit:	Tonnes/year
Description:	Estimate of average annual consumption of woody biomass per old appliance
Source of data used:	Ministry of Energy, Study on Kenya's Energy Demand, 2002
Value applied:	4.51
Justification of the choice of data or description of measurement methods and procedures actually applied :	This study was commissioned and approved by the Kenyan Ministry of Environment.
Any comment:	

B.5.2. Ex-ante calculation of emission reductions:

According to the applied methodology, emission reductions would be calculated as follows:

$ER_y = B_y \cdot f_{NRB,y} \cdot NCV_{biomass} \cdot EF_{projected\text{-}fossilfuel}$

Where:

ER_y	Emission reductions during the year y in tCO_2e
B_y	Quantity of woody biomass that is substituted or displaced in tonnes ($B_{y\ before} - B_{y\ after}$)
$f_{NRB,y}$	Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass using survey methods
$NCV_{biomass}$	Net calorific value of the non-renewable woody biomass that is substituted. The IPCC default for wood fuel, 0.015 TJ/tonne is applied
$EF_{projected\text{-}fossilfuel}$	Emission factor for the substitution of non-renewable woody biomass by similar consumers. As per methodology, a value of 81.6 tCO_2/TJ is employed

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:

$B_y = HG_{p,y} / (NCV_{biomass} * \eta_{old})$

Where:

$HG_{p,y}$	I. Quantity of thermal energy generated by the new renewable energy technology in the project in year *y* (TJ)
η_{old}	1. Efficiency of the system being replaced, measured using representative sampling methods or based on referenced literature values (fraction), use weighted average values if more than one type of system is being replaced; 2. A default value of 0.10 may be optionally used 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 may be optionally used

The option (a) was chosen to calculate the By of the biogas system:

$B_y = N \times C_y \times f_{dis} \times L$

Where:

N	Number of biogas systems operational
C_y	Estimate of average annual consumption of woody biomass per old appliance (tonnes/year)
f_{dis}	Displacement rate of the average annual consumption of woody biomass per old appliance
L	The fraction by which emission reductions are multiplied to obtain an assessment adjusted for leakage risks. As per methodology, a value of 0.95 is employed.

The number of biogas systems (N) is determined as the fraction of days in a year for each installed biogas system ($t_{fraction,y}$) multiplied by the fraction of these biogas systems to be still in use.

$N = U \times \sum_{1}^{n} t_{fraction,\,y}$

Where:

U	Usage, the fraction to adjust for drop off of biogas systems
$t_{fraction,y}$	Fraction of days in a year for each installed biogas system
n	Number of biogas systems in the records

Replacing the variables in the formula above by the values listed in chapter B.5.1. and B.6 the calculation of the estimated ER_y is presented next.

B.5.3. Summary of the ex-ante estimation of emission reductions:

Year	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
Year 1	0	21,161	0	21,161
Year 2	0	44,150	0	44,150
Year 3	0	62,509	0	62,509
Year 4	0	66,228	0	66,228
Year 5	0	64,241	0	64,241
Year 6	0	62,314	0	62,314
Year 7	0	60,445	0	60,445
Total	0	381,049	0	381,049

B.6. Application of the monitoring methodology and description of the monitoring plan:

B.6.1. Description of the monitoring plan:

The monitoring plan describes how to collect, assess and archive all relevant data to be monitored according to the methodology. Data from the monitoring procedures will be recorded in the electronic project database and summarised in the Monitoring Report. The data collection will follow the "General guidelines for sampling and surveys for small-scale CDM project activities (version 01)"[6], will comply with the requirements for the verification stated in SSC-PoA-DD A.4.4.2 of transparency and double-counting avoidance, and will check the required parameters in the methodology AMS I.E in an unbiased and reliable way.

The monitoring plan consists of:

- Monitoring concept
- Requirements for replacement of NRB
- Data collection
- Data archiving
- Training
- Quality Assurance/Quality Control Procedures
- Monitoring Report
- Monitoring responsibilities

Monitoring concept

The CME will be responsible for the collection of all Sales Agreement data, for internally verifying the information in the Sales Agreements, and creation of the Monitoring Report at the end of each Monitoring Period. The CPA implementer will be responsible for data entry into an electronic database and for ensuring that the information in the Sales Agreements is complete and correct. The total amount of Sales Agreements will reveal the quantity of biogas systems sold at the end of a Monitoring Period. The electronic database will record the start and end dates of each selling year *y* for each biogas system (t fraction), and calculate the emission reductions attributable to each Monitoring Period. Appropriate record keeping procedures will be implemented to ensure that each Monitoring Period dataset can be transparently attributed to its corresponding CPA, preventing any occurrences of double-counting. Hence, the project database will keep records to determine the current status of each CPA, the duration of previous Monitoring Periods, the household surveys, and verification activities. The monitoring sampling will be tracked through the electronic database that consolidates the Sales Records from all CPAs.

To account for drop-off in use (U), the biogas systems deployed by the CPA implementer will be monitored in "cohorts" for each selling or maintenance year in the usage survey. That is, all biogas systems sold in a selling year or gone through maintenance will be monitored and treated as a cohort. A representative sampling will be applied to count for drop-off of biogas systems for every cohort.

[6] EB 50 Report, Annex 30

Sampling size will be chosen to achieve a 90/10 precision when annual sampling is chosen or 95/5 precision if it is biennial. In cases where survey results indicate that the precision level is not achieved the lower bound of the confidence interval may be chosen instead of repeating the survey effort. In order to avoid this situation, oversampling will be encouraged.

Requirements for replacement of NRB
Monitoring shall be required to determine the mass of NRB replaced by the biogas systems.
As option (a) of the methodology is used to determine B_y confirmation of the continued use of the biogas system will be checked, including recording the number of hours of daily use.

Data collection
The CME will collect the data necessary for the monitoring and for the emission reductions calculation. Data will be managed through an electronic database that can directly attribute the data to the CPA, thereby allowing unambiguous determination of the emission reductions attributable to each CPA.

Data archiving
Sales Agreements will be stored by the CPA with copies sent to the CME. A back-up of the project database will also be stored on an electronic medium by the CME. All data monitored and required for verification and issuance will be kept for at least two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever is later.

Training
The CME will provide the necessary training to the CPA implementers and the parties involved in the monitoring to ensure that the data recorded is complete and accurate. This monitoring training will be provided by the CME to the CPA implementers before the inclusion of their CPAs, and also to the monitoring group before the Monitoring Period exercises start.

Quality Assurance/Quality Control Procedures
Different quality control and quality assurance measures will be put in place by the CME to ensure that all emission reductions are real. Surveys will be carried out and the CME will check the consistency of the results. The CME will ensure that the studies are accurate and that a conservative approach has been taken.

Sales Records will be scrutinised by the CPA implementer to avoid double-counting and the CME will also conduct spot-checks to verify the legitimacy of such records. Sales Agreements will be checked at three levels, by the vendor, the CPA implementer and the CME, and missing or wrong data will be corrected wherever possible. In cases where it is not possible, any missing mandatory data will automatically invalidate that biogas systems and the *t fraction* will be counted as zero for the respective Monitoring Period resulting in no emission reductions being generated by that appliance. Wrong data entered in the Sales Agreement that lead to an inability to track biogas systems during monitoring will result in a lower usage rate. However in cases where the biogas systems can be traced, and missing information can be corrected, the new data will be updated in the Sales Agreement and the electronic Sales Record.

Monitoring Report

The CME will assess all monitoring data and produce Monitoring Reports corresponding to the preceding Monitoring Period of the CPAs for the DOE to verify. This reports will present the data relating to the emission reductions generated by CPAs during the Monitoring Period. The Monitoring Reports will also include, as required by the sampling plan:

- Unbiased and reliable estimates of the mean value of parameters used in the calculation of greenhouse gas emission reductions.
- Necessary precision of estimated parameters if required, or the lower bound of the confidence interval and the necessary sampling requirements.
- Formulas used in calculating and reporting parameters.

Generally, the Monitoring Reports will use the current CDM Monitoring Report Form and follow the current "Guidelines for completing the Monitoring Report Form (CDM-MR)"[7].

Monitoring Responsibilities

The CME is in charge of supervising all the monitoring activities, including data collection, data monitoring, and writing the Monitoring Report. The CPA implementers and their CPAs will support the CME in all the monitoring activities by collecting the Sales Agreements and facilitating the tracking of the biogas digesters and helping the monitoring and testing groups. The monitoring and testing groups will conduct their respective tasks for monitoring the required parameters, but the final responsibility for the data contained in the Monitoring Report belongs to the CME.

Data and parameters monitored

Data / Parameter:	$t_{fraction,,y}$
Data unit:	Fraction of 365
Description:	Fraction of days in a year for each installed system
Source of data to be used:	Derived from records
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.5 for the year of installations, 1 for the following years
Description of measurement methods and procedures to be applied:	The CPA implementer keeps a record of the installation date, and the stove is considered to be in use from the day of installation. This factor will be calculated through the database.
QA/QC procedures to be applied:	Records will be scrutinised by the CPA implementer to avoid double-counting and the CME will also conduct spot-checks to verify the legitimacy of such records.
Any comment:	

[7] EB 54 Report, Annex 34

Data / Parameter:	n
Data unit:	Number
Description:	Number of installed systems in the records per year
Source of data to be used:	Derived from records
Value of data applied for the purpose of calculating expected emission reductions in section B.5	5600 average per year
Description of measurement methods and procedures to be applied:	The CPA implementer keeps a record of the installed biogas systems.
QA/QC procedures to be applied:	Records will be scrutinised by the CPA implementer to avoid double-counting and the CME will also conduct spot-checks to verify the legitimacy of such records.
Any comment:	

Data / Parameter:	U_y
Data unit:	Fraction
Description:	The fraction by which emission reductions are multiplied to obtain an assessment adjust for drop-off of biogas systems in use per cohort year. A cohort is defined as the biogas system sold in the same year y.
Source of data to be used:	Survey of biogas system users per cohort using sampling methods.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.97
Description of measurement methods and procedures to be applied:	The CPA implementer keeps a record and a survey is done at least biennial in order to check if the biogas systems are in operation
QA/QC procedures to be applied:	Usage monitoring will be performed by the CME and/or by an authorised organisation designated by the CME following sampling guidelines.[8]
Any comment:	

[8] EB 50, Annex 30, General Guidelines for Sampling and Surveys for Small-Scale CDM Project Activities

Data / Parameter:	f_{dis}
Data unit:	Fraction
Description:	Displacement rate of the average annual consumption of woody biomass per old appliance
Source of data to be used:	Surveys in United Republic of Tanzania and Ethiopia
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.64
Description of measurement methods and procedures to be applied:	The displacement rate of consumption of woody biomass per old appliance will be determined at least once every tow years as follows: A representative sampling method for the survey of number of hours/day cooking with biogas per burner will be used. The survey will consists of questionnaires related to the displacement of woody biomass by 1 hour cooking with biogas.
QA/QC procedures to be applied:	The survey follows the representative sampling methods as described in paragraph 17 of AMS I.E.
Any comment:	

C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

☐ Please tick if this information is provided at the PoA level. In this case sections C.2. and C.3. need not be completed in this form.

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

The primary negative environmental impacts of the CPA are related to the production of the biogas systems.

The main expected impact on the production of biogas systems is the extracting of clay to manufacture bricks. The scale of this programme is minor compared to the total brick manufacturing industry in Kenya and this activity does not have potential significant environmental impacts that would affect the hydrology and ecology of the wetland and the surrounding environment. The programme is dispersed across the country and therefore bricks would be taken from a number of different suppliers.

Operation:

It is not anticipated there will be any leakage from the biogas systems into ground water or surrounding environment due to the quality control procedures put in place by KENDBIP. The only other possible negative environmental impact is the disposal of old appliances once newer technologies are adopted because of economic development. These impacts are likely to be minor.

Transboundary impacts:
The CPA places a boundary on the country of Kenya, thus no transboundary issues arise.

Environmental benefits:

- Human health: 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.
- Biodiversity: will be improved as the programme reduces pressure on remaining forest reserves in Kenya, increasing not only the amount of biomass stocks, but preserving the otherwise deforested woody ecosystems. This will have positive effects on both the fauna and flora biodiversity of the wood collection areas.

C.3. Please state whether an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA), in accordance with the host Party laws/regulations:

An environmental impact assessment is not a mandatory requirement on CPA level in Kenya for small-scale biogas programmes.

SECTION D. Stakeholders' comments

D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

☐ Please tick if this information is provided at the PoA level. In this case sections D.2. to D.4. need not be completed in this form.

It has been decided to do the stakeholder consultation at the CPA level, due to the different nature of the CPA implementers and multiple host countries in the PoA.

D.2. Brief description how comments by local stakeholders have been invited and compiled:

Stakeholders were invited to attend a public meeting about environmental concerns and solutions in Kenya. The meeting was held on 19 October 2011 at 09:00 AM, at Panafric Hotel, Nairobi. 38 people who represent a wide range of stakeholders attended the meeting. Women were well represented and were outspoken in the meeting, making up 39% of the attendees.

Stakeholders included representatives from government ministries, non-governmental organisations, private businesses, financiers and farmers including some that had already installed biogas systems.

Participants were briefed on the background to the CDM and the SSC-PoA-DD with questions and answer sessions for each topic. Participants were then presented with the specifics of the SSC-CPA and invited to make comments and ask any questions. The participants then engaged in an exercise to examine the sustainability of the SSC-CPA. Participants were also invited to provide written feedback, evaluation forms were received in English.

The Local Stakeholder Consultation Report provides a detailed description of the consultation and the results.[9]

D.3. Summary of the comments received:

The comments received were very positive and only a small fraction of respondents offered any non-positive responses. Their responses mainly called for KENDBIP to be expanded beyond domestic fixed dome installations. A summary of the action items raised and KENDBIP's response to these actions appear below:

Issue	KENDBIP response
The project only covers domestic biogas installations	In the long term KENDBIP and its implementer KENFAP are interested in expanding its programme to larger and institutional digesters however at the moment the decision has been made to focus on domestic installations.
The project only covers fixed digesters	Through a stakeholder consultation process in 2009 it was decided that the fixed dome digester was the most suitable technology for the target population of KENDBIP.
Farmers may not yet be aware of the technology and project	KENDBIP is actively engaged in raising awareness about the technology.
The cost of the biogas systems with subsidy	KENDBIP is working actively with a number of financing organisations to be able to provide finance for individual households.

Details on comments that have been received during the stakeholder consultation process are contained in the Local Stakeholder Consultation Report.

D.4. Report on how due account was taken of any comments received:

All comments received during the Local Stakeholder Consultation were reviewed and wherever possible were incorporated into the design of the CPA.

[9] KENDBIP Local Stakeholder Consultation Report

Annex 1

CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE SMALL-SCALE CPA

Organisation:	Kenya National Federation of Agricultural Producers (KENFAP)
Street/P.O.Box:	Langata/Mai Mahiu Road, P.O. Box 43148-00100
Building:	Family Health Plaza
City:	Nairobi
State/Region:	
Postfix/ZIP:	
Country:	Kenya
Telephone:	+254206008324
FAX:	
E-Mail:	
URL:	www.kenfapbiogas.org
Represented by:	
Title:	Kenya National Domestic Biogas Programme National Coordinator
Salutation:	Mr
Last Name:	Nyamu
Middle Name:	
First Name:	George
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	nyamu@kenfap.org

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Annex 3

BASELINE INFORMATION

Determination of the share of non-renewable biomass ($fNRB_{,y}$)

The determination of the share of non-renewable biomass ($fNRB_{,y}$) in the project area is based on FAO data[10] following the indications of the methodology AMS I.E., version 04 and baseline survey results done for the purpose.

The methodology describes the $fNRB_{,y}$ as the fraction of woody biomass saved by the project activity in the specific monitoring period that can be established as non-renewable, therefore:

$fNRB_{,y} = NRB/NRB + DRB$

Where:

DRB - Demonstrably Renewable woody biomass is woody biomass which satisfies one of the following two conditions:

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

NRB - Non-renewable biomass is the quantity of woody biomass used in the absence of the project activity minus the DRB component, so long as at least two of the following supporting indicators are shown to exist:

- Trend showing increase in time spent or distance travelled by users (or fuel-wood suppliers) for gathering fuel wood or alternatively trend showing increase in transportation distance for the fuel wood transported into the project area;
- Survey results, national or local statistics, studies, maps or other sources of information such as remote sensing data that show that carbon stocks are depleting in the project area;

[10]FAO, Global Forest Resources Assessment 2010 Kenya, 2010

- Increasing trends in fuel wood price indicating scarcity;
- Trends in the type of cooking fuel collected by users, suggesting scarcity of woody biomass.

Calculation of fNRB

In Kenya, "*fuelwood, charcoal production and agriculture contribute to woodland degradation and deforestation"* (Practical Action 2010). Other sources from the Ministry of Environment show that "*among the components of the biomass energy, charcoal is an important fuel, particularly for urban dwellers. Since charcoal production depends on woody biomass, its rising demand is associated with the increasing levels of deforestation*" (NEMA 2004).

According to the latest report from FAO on Forest Resources Assessment for Kenya 2010, there are 197,000 ha of forest in Kenya under sustainable management practises. This figure has been decreasing over the last 20 years from 238,000 ha in 1990 to the actual figure as it can be seen in the table below:

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Area of permanent forest estate	1 490	1 404	1 364	1 364
Forest area within protected areas	n/a	n/a	n/a	n/a
Forest area under sustainable forest management	238	212	202	197
Forest area with management plan	n/a	n/a	149	824

The study assumes that only forest plantation areas, both private and public, can be considered as areas under sustainable forest management as it can be seen below[11]:

Forest area under sustainable forest management	All forest plantations both state and private are assumed to be under sustainable forest management.

Following the guidelines in the methodology, it can be seen that only the requirements for woody biomass originated from forest areas are satisfied if considered that in those areas national or regional forestry and nature conservation regulations are complied with, and that although land areas as plantations are decreasing, the remaining area can be considered as not decreasing. Requirements for woody biomass originated from non-forest areas are therefore not satisfied as there is no sustainable management practises in non-forest areas.

To consider all the plantation forests biomass as DRB is a conservative approach as it is possible this area will not remain as plantations, as is the case in reality demonstrated by the decreasing area in the table above. Most products from plantations go for timber and not for woodfuel, most woodfuel comes from farmland (84%)[12]. It is also conservatively assumed that national or regional forestry and nature

[11] FAO, Forest Resources Assessment, 2010

[12] Ministry of Energy, Study on Kenya's Energy Demand, Supply and Policy Strategy for Households, Small Scale Industries and Service Establishments, 2002

conservation regulations are complied with, which is not necessary the case particularly in private plantation forests.

The production of biomass from plantations is 2,717,972m^3, mainly from eucalyptus. This biomass has multiple uses however and only 35% is used for energy. This therefore means only 951,290m^3 are used as woodfuel. Eucalyptus is the main species in these plantations, which has a density of 0.7 tonnes/m^3, this implies 665,903 tonnes per year of fuelwood is available.

Therefore 665,903 tonnes/year are considered as demonstrably renewable woody biomass (DRB).

The notion of non-renewable in the context of biomass for fuel consumption is understood as the fuel biomass consumption that contributes to deforestation or degradation. The critical factor is whether the consumption is greater than the increase in sustainable biomass growth. Biomass would be reduced in absolute terms beginning at the point where the consumption exceeds the rate of growth, as shown below:

Non-renewable biomass is the quantity of woody biomass used in the absence of the project activity (B_y) minus the DRB component as long as at least two of the following supporting indicators are shown to exists:

This approach is confirmed as the two necessary indicators to demonstrate the existence of NRB are present:

1. In Kenya, according to Global Forest Resource Assessment 2010, biomass stock from forests (above-ground biomass) decreased from 901.3Mt to 817.1Mt between 1990 – 2010. There was also a decrease in the mass of biomass in other wooded areas in this period from 605.1Mt to 595.9Mt.[13]
2. The cost of charcoal has increased 60% between over the past decades while the price of firewood has gone up from 9 to 61 KSh (Kenya Shillings).[14]

As the two indicators are shown to exist, NRB is calculated as:

$NRB = B_y - DRB$

B_y is the demand for woodfuel (35,119,616 tonnes/year)[15]

NRB = 35,119,616 – 665,903 = 34,453,713 tonnes/year

[13] FAO, Kenya Global Forest Resource Assessment 2010

[14] Ministry of Energy, Study on Kenya's Energy Demand, Supply and Policy Strategy for Households, Small Scale Industries and Service Establishments, 2002

[15] Ministry of Energy, Study on Kenya's Energy Demand, Supply and Policy Strategy for Households, Small Scale Industries and Service Establishments, 2002

Thus the fraction of woody biomass saved by the project activity that can be established as non-renewable is:

fNRB = NRB/(NRB+DRB)

fNRB = 34,453,713/35,119,616

fNRB = 0.981

Through this calculation, it can be assumed that 98.1% of the biomass consumed can create carbon dioxide emissions reductions, whereas 1.9% of the consumption is covered by the natural growth of the forest biomass.

Annex 4

MONITORING INFORMATION

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