CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAMME OF ACTIVITIES DESIGN DOCUMENT FORM
(CDM-SSC-PoA-DD) Version 01

CONTENTS

Annexes

NOTE:

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

(ii) At the time of requesting registration this form must be accompanied by a CDM-SSC-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-SSC-CPA-DD (using a real case).

SECTION A. General description of small-scale programme of activities (PoA)

A.1 Title of the small-scale programme of activities (PoA):

African Clean Energy Switch – Biogas (ACES-Biogas)

Version 01
Date: 28/10/2011

A.2. Description of the small-scale programme of activities (PoA):

1. General operating and implementing framework of PoA

The purpose of this small-scale Programme of Activities (PoA) is to stimulate the installation of biogas systems in East Africa to replace traditional thermal energy generation methods. The PoA will be able to encompass all types of biogas systems, depending on the supplier and the user of the biogas, serving both domestic and institutional users.

Biogas digesters produce biogas from human, animal or plant waste products that can be used in cooking and heating replacing the use of non-renewable biomass (NRB), either firewood or charcoal. By switching from NRB to biogas, which is a renewable fuel, the PoA reduces greenhouse gas emissions.

African Clean Energy Switch - Biogas (ACES-Biogas) Limited is the Coordinating/Managing Entity (CME) for this PoA. As such, it will coordinate the efforts from different CPA implementers to install biogas systems in East Africa and comply with the requirements of this PoA. The CPA implementers will not be Project Participants to this PoA.

During implementation, the CME for this PoA will:

- Issue and revoke the authorisation of included CPAs
- Organise audits of CPA activities on an on-going basis
- Provide technical and administrative support to CPAs to guarantee the compliance of their activities and their record keeping with the PoA's requirements
- Oversee all communications required under the PoA
- Mediate CER agreements between the CPAs and respective biogas system users on the one hand, and CER buyers on the other
- May manage the execution of CER sales agreements and the distribution of the benefits if requested by individual CPAs
- Be responsible for the monitoring activities and data management required during the lifetime of the PoA
- Maintain a database of sales records used to compute CERs and ensure that no double-counting of systems occurs
- Be the focal point for CER verification and issuance

Each CPA implementer will act individually, requesting authorisation for its CPA(s) to the CME and running the project in accordance with the demands of the local market. CPA implementers will be involved with the dissemination of biogas systems that are sold on a commercial or a non-commercial basis. CPA implementers will have the necessary technical and administrative resources to ensure

technical compliance to the PoA requirements of the biogas systems sold, as well as accurate and complete record keeping.

During implementation, each CPA implementer for this PoA will:

- Comply with PoA requirements to become an authorised CPA implementer
- Be involved with the dissemination of biogas systems
- Ensure all the participants in the distribution chain are aware that the sales are subscribed to the PoA and are trained to comply with the requirements
- Keep records of sales and users as per the monitoring plan and provide them to the CME regularly
- Keep current with regards to the UNFCCC requirements, as enforced by the CME
- Receive audits and inspections to maintain authorisation status issued by the CME

CPA implementers will be involved with the dissemination of biogas systems, and are encouraged by the CME to make biogas more affordable to users. This affordability will be further stimulated as an increasing number of CPA implementers become a part of this PoA and compete in the market for customer choice. The end users of the biogas will benefit from having a choice of high-quality biogas systems, added investment in marketing (awareness) and research and development of products that reduce deforestation and improve health by reducing indoor air pollution.

When purchasing the biogas system, the buyer will fill an agreement with the CPA implementer that may contain, among others, information about the biogas system, model, price and payment, the name, location/address and phone number of the user (the Sales Agreement). This information will allow the identification and the monitoring of the system and its usage. Additional measures such as keeping close contact with the buyer through guarantee schemes on the biogas system will confirm that the biogas is in use.

Accordingly, the CPA implementer will use the CER proceeds to reduce the costs of biogas systems by providing a subsidy to customers, providing free or subsidised maintenance of the biogas systems and to recoup the CPA implementer's incurred associated costs, such as research & development, training and marketing.

2. Policy/measure or stated goal of the PoA

The mission of this PoA is to make biogas systems affordable and available to households and institutions across East Africa, especially for low and medium income households. Achieving this mission will result in:

- Reduced deforestation
- Reduced greenhouse gas (GHG) emissions
- Reduction of respiratory illness caused by indoor-air-pollution
- Reduction of injuries occurring in unsafe kitchen environments
- Reduction of time/money spent obtaining fuel wood
- Employment opportunities in the biogas industry
- Reduction in time spent cleaning pots
- Improvement of hygiene through toilet attachment reducing bad odours of manure, decreasing environmental pollution
- Improved crop yields and diversity through use of bio-slurry produced by the digester.

3. Confirmation that the proposed PoA is a voluntary action by the CME.

There are no laws or mandatory requirements in East Africa stipulating the adoption of biogas systems by households or institutions, nor their dissemination. This proposed PoA is a voluntary action by the CME, African Clean Energy Switch (ACES) Limited.

A.3. Coordinating/managing entity and participants of SSC-POA:

1. Coordinating or managing entity of the PoA as the entity which communicates with the Board.

African Clean Energy Switch - Biogas (ACES-Biogas) Limited, Plot 47, Lubowa Estate, P.O.Box 70480, Kampala, Uganda.

2. Project participants being registered in relation to the PoA.

Project Participant and CME of this PoA.

African Clean Energy Switch - Biogas (ACES-Biogas) Limited, Plot 47, Lubowa Estate, P.O.Box 70480, Kampala, Uganda

Name of Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participant	Kindly indicate if the Party involved wishes to be considered as a project participant (Yes/No)
Uganda (host)	ACES-Biogas Ltd. (private entity and CME)	No
Kenya (host)	None	No
United Republic of Tanzania (host)	None	No
Burundi (host)	None	No
Rwanda (host)	None	No
Ethiopia (host)	None	No

This is a unilateral CDM Project involving a non-Annex I Party company.

A.4. Technical description of the small-scale programme of activities:

A.4.1. Location of the programme of activities:

Burundi, Ethiopia, Kenya, Rwanda, Uganda and United Republic of Tanzania.

A.4.1.1. Host Party(ies):

Burundi, Ethiopia, Kenya, Rwanda, Uganda and United Republic of Tanzania.

A.4.1.2. Physical/ Geographical boundary:

The geographical region within which all CPAs included in this PoA will be implemented is covering Burundi, Ethiopia, Kenya, Rwanda, Uganda and United Republic of Tanzania.

Figure 1. Map of Burundi, Ethiopia, Kenya, Rwanda, Uganda and United Republic of Tanzania; countries within this PoA.

A.4.2. Description of a typical small-scale CDM programme activity (CPA):

A typical CPA will be implemented by a CPA implementer and will consist of the development of the biogas systems market, including the sale and installation of biogas systems on a commercial or non-commercial basis, and after-sales service (e.g. guarantee).

Location and energy limitation

Each CPA will be implemented by a CPA implementer respecting the geographical region of the PoA and a maximum rated thermal capacity of 45MW per CPA. In cases where the number of biogas systems per CPA exceeds the energy limit, the number of emission reductions (ERs) shall be capped at those generated by biogas systems saving a maximum of 45MW thermal energy equivalent. Any additional biogas systems shall not be counted. During the life of the PoA the number of CPAs implemented by each CPA implementer may increase and will be monitored according to the monitoring plan as described below.

As further discussed in section A.4.4.1 below, CPAs under this PoA are considered as not being a de-bundled component of a large-scale activity.

Operational and management plan

The CPA implementer and its supply chain will be responsible for the sale, installation and after-sales service of the biogas systems. The operation of the biogas system will be carried out by the user, and training or instructions on how to operate and maintain the systems will be given by the CPA implementer and its supply chain.

The CPA implementer will follow the monitoring plan and procedures for identifying biogas systems sold during the course of the project and those which are still in use, so the appropriate number of emission reductions can be claimed. To facilitate this process, the CPA implementer will keep traceable information to be used by the CME and the DOE to track back to each individual system installed. The CPA implementer is also responsible for collecting the data of the customer on the Sales Agreement.

Monitoring

Each CPA is monitored and generates a separate annual count of emission reductions (ERs). Each CPA keeps a record of all biogas systems sold and a record of the location of the systems. Duplicate records are kept by the CME and all CPA implementer records are screened through spot-visits, together with cross-checks on the CPA implementer reports and logistics records to confirm that the sales record is authentic and that no double-counting occurs.

A.4.2.1. Technology or measures to be employed by the SSC-CPA:

Each CPA will encompass any of the different types of biogas systems covered by the PoA, depending on the CPA implementer and the type of user of the system. The models of biogas systems covered by the PoA will vary depending on the CPA implementer and the individual users requirements.

Biogas systems are a fuel switch from NRB. Biogas is a renewable fuel produced by waste products of humans, animals and/or plants by placing them in a digester under anaerobic conditions. Biogas is mostly made up of methane, which is combustible and enables biogas to be used as a fuel. The methane composition of biogas varies significantly depending on the feedstock typical values include, 65% for cattle manure, 67% pig manure and 60% poultry manure.[1] The remainder of biogas is mostly carbon dioxide with other trace gases such as hydrogen sulphide. The biogas produced in a digester is then piped to be utilised in a variety of appliances depending on the needs of the users, e.g. biogas stoves.

The most common baseline for thermal energy use in households, and institutions is fuelwood and charcoal with more firewood being consumed in rural areas. These fuels are typically burned in inefficient processes such as the three stone fire or the traditional metal stove, such as the metal *sigiri* in Uganda or metal *jiko* in Kenya.

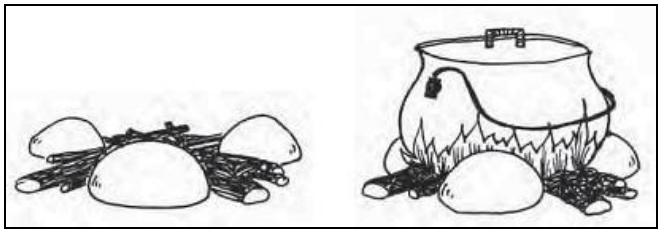


Figure 1. Three stone fire

Figure 2. Sigiri, Ugandan charcoal traditional metal stove

The biogas digesters allowed in this PoA, include, but are not limited to, fixed dome, floating drums and flexible balloons. The preferred design for biogas digesters in East Africa is currently the fixed dome

[1] Nijaguna B.T., Biogas Technology, New Age International, 2002

design. A general description of these technologies will be given at SSC-PoA level but specific technological details will be given at SSC-CPA level.

Fixed Dome Digesters
Fixed dome digesters have been proven in several countries, the technology is robust, reliable and requires little maintenance. The size of these plants can range anywhere from 2 – 16 m^3.

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

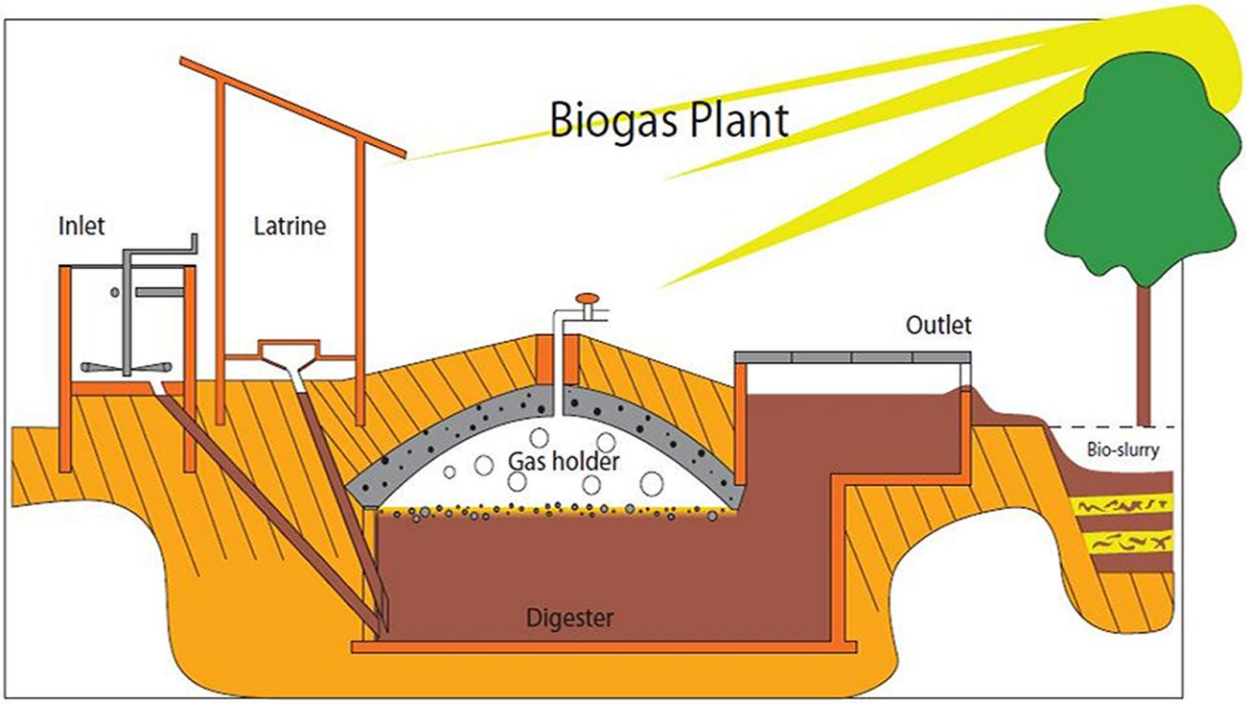


Figure 2. Schematic diagram of fixed dome digester

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 consequently 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

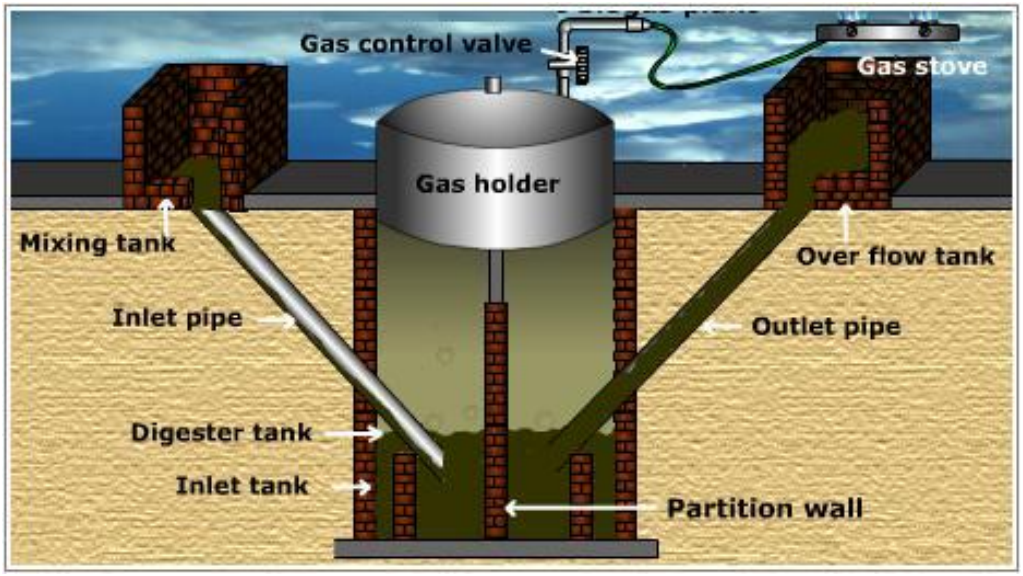
slurry overflows into a composting tank as more manure is fed into the digester. This slurry can then be used as a fertiliser.

Floating drum technology
The basic functioning of the floating drum digester is similar to the fixed dome. The key difference of this technology is a cylindrical or dome-shaped digester with a moving, floating gas-holder or drum that floats depending on the amount of gas in the digester. The gas-holder either floats directly in the digester slurry or in a separate water jacket. The drum in which the biogas collects will usually have an internal or external guide frame that provides stability and keeps the drum upright.

As biogas is produced and more gas is released, the drum is pushed up, indicating a rise in the amount of gas. When the gas is used up, the drum sinks. This provides a useful visual indicator of how much gas is available to users.

Costs of building/installing the floating drum type obviously depend upon the size, the materials used and the model of the digester. Floating drum digesters need some maintenance depending on how well they are managed. Maintenance involves cleaning, painting and fixing leaks.

The lifespan of these digesters vary widely, and is dependent upon the quality of materials used in construction, as well as management and maintenance. High quality, well-managed digesters can last for over 40 years, though there are some floating drums in disuse – largely because of poor management/maintenance. On the average, it is safe to say that floating drum digesters, if built with high quality materials and well managed, can give service of around 20-30 years, the same as fixed dome digesters providing cooking gas, lighting and fertiliser.[2]



Flexible Balloon Digesters
Flexible balloon digesters are constructed from a large plastic or rubber bag and are thus mobile, which is the main difference from the fixed dome and floating drum digesters that are constructed on site. The

[2] www.tutorvista.com

operation however follows largely the same principle as fixed-dome or floating drum digesters. The balloon material should be weather and UV resistant, specially stabilised reinforced plastic or rubber.

A balloon digester combines both the digester and gas-holder, with the biogas stored in the upper part of the balloon which expands as biogas is produced. The gas pressure can be increased by placing weights on the balloon, however a gas pump may be required if higher gas pressures are needed. Gas safety valves are required to control the pressure inside the balloon to avoid damaging the skin of the digester. The inlet and outlet for the digester are attached directly to the skin of the balloon.

The technology is flexible and allows for standard fabrication at low-cost and is suitable for use in areas with a high groundwater table. However, at low gas pressures a gas pump may be required; slurry cannot be removed during operation and the technology has a relatively short useful lifespan.

Biogas Appliances
Appliances for the use of biogas can vary widely from stoves, lamps or generators. There will be no specific requirements under this PoA regarding appliances however it is expected each CPA implementer will ensure that all appliances whether locally manufactured or imported meet appropriate standards. This PoA will focus on the capacity and use of biogas overall to reduce NRB usage in cooking.

This categorisation of biogas systems is only indicative, and further research and development is expected to improve the system design, and completely new designs and models are likely to come onto the market. Details of technologies to be employed will be described at SSC-CPA level.

A.4.2.2. Eligibility criteria for inclusion of a SSC-CPA in the PoA:

SSC-CPAs to be included under this PoA must meet the following requirements:

- 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.
- 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
- 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
- The CPA does not double-count any of its appliances for the ERs estimation
- 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.

A.4.3. Description of how the anthropogenic emissions of GHG by sources are reduced by a SSC-CPA below those that would have occurred in the absence of the registered PoA (assessment and demonstration of additionality):

More than 84% of East African households rely on traditional biomass cooking methods[3], typically charcoal or firewood for urban dwellers, and firewood for rural households. This biomass also accounts for more than 70% of all primary energy needs in East Africa[4]. The wood collected or harvested to be used in meeting energy needs or converted into charcoal for the same purpose, consists of a high percentage of non-renewable biomass in East African countries. The primary use of NRB for most households is cooking, the technology for charcoal users is the traditional metal charcoal stove, while the "three-stone" fire is the most frequently used technology by wood users. Institutions in East Africa also primarily use wood fuel for cooking purposes and in some case for industrial processes. The substitution of traditional technologies with biogas systems is a switch from a non-renewable fuel to a renewable one. By switching from wood fuel consumption, the PoA is reducing anthropogenic GHG emissions.

Households and institutions in East Africa are a large potential market for small-scale biogas systems. Organisations to date have generally focused on zero grazing or semi zero grazing cattle or other livestock owners for biogas system dissemination. Households with at least two cows or seven pigs (or a flock of 170 poultry)[5] can generate sufficient gas to meet their daily basic cooking needs as long as they have access to a reliable supply of water. The estimated potential of this market is seen in the below table.

Country	Potential livestock owning market for domestic biogas (number of households)
Burundi	50,000[6]
Ethiopia	514,129[7]
Kenya	172,312[8]
Rwanda	110,000[9]
Uganda	216,000[10]
United Republic of Tanzania	276,000[11]

[3] Strategy on scaling up access to modern energy services. East African Community. http://www.eac.int/energy/index.php?option=com_docman&task=doc_download&gid=14&Itemid=70

[4] Strategy on scaling up access to modern energy services. East African Community. http://www.eac.int/energy/index.php?option=com_docman&task=doc_download&gid=14&Itemid=70

[5] SNV & HIVOS, Africa Biogas Partnership Programme Proposal, 2008

[6] Conservative estimate based on relative size of the country

[7] SNV & Ethiopia Rural Energy Development and Promotion Centre (EREDPC), National Biogas Programme Ethiopia, Programme Implementation Document, Jan 2008

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

[9] SNV, Investigation on the National Domestic Biogas Programme in Rwanda, 2007

[10] Winrock International, Report on the Feasibility for a National Household Biogas Commercialization Program in Uganda, 2007

[11] GTZ, Feasibility Study for a National Domestic Biogas Programme in Tanzania, June 2007

According to the approved methodology, it is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs. Therefore the emission reductions are calculated based on the annual savings of non-renewable biomass multiplied by an emission factor to establish equivalence to such fossil fuel use.

The host countries have no national laws, policies or mandatory requirements stipulating the adoption of biogas systems by households. This proposed PoA is a voluntary action coordinated by African Clean Energy Switch - Biogas (ACES-Biogas) Limited, the CME. The target of this PoA to up-scale and standardise the use of biogas, which cannot be achieved without the use of carbon credit revenues as explained below.

The technical viability of small-scale biogas technology has been repeatedly proven in field tests and pilot projects, but until now mass dissemination of this technology has not been accomplished in East Africa. Based on this previous experience from other small-scale and governmental initiatives, the CME identified the barriers, for the implementation of a biogas system dissemination programme. The key factors to enable a successful biogas programme to be implemented by CPA implementers are:

- Training an optimum number of masons to install quality systems
- Building installation, manufacturing or importation capabilities, particularly ensuring quality control
- Building up community awareness
- Making biogas systems more affordable and attractive
- Ensuring after-sales maintenance and proper training of owners

To overcome the challenges in the biogas market, CPA implementers need to train local people to manufacture biogas digesters and be able to supply biogas appliances from either local manufacturers or importers. Being a new technology, training is a vital component for the smooth implementation. Masons, their supervisors, other staff as well as the actual users will all receive appropriate training courses.

All potential users must be reached and awareness on biogas will have to be raised to create a strong market. For those who have taken the decision to invest in a biogas system, training will be organised to provide the necessary knowledge and skills for the proper operation and maintenance to use the system efficiently and effectively. An effective after sales service will keep the systems in good order that in turn will serve ‘word of mouth’ promotion. Quality control on systems in operation and under construction is a key aspect of quality enforcement and the long-term success of the market.

Until now, in most cases, biogas has been introduced through a pilot or demonstration project at the premises of a few households and or a compound of a governmental institute. It can be concluded that most initiatives in Africa failed to grow from a product-based project approach implemented by a single actor, towards a market-oriented programme approach. To develop a sustainable biogas market it may require CPA implementers to directly or indirectly provide credit for households to pay for the biogas systems in a number of instalments, and to provide guarantees and maintenance. Hence, a successful biogas project entails significant investment to cover the above-mentioned costs.

There is currently no entirely commercial biogas market in East Africa as the cost of a biogas system is very high at around 600-2200 USD[12] for domestic and small institutional scale biogas systems. The uncertainty about the universal acceptance of biogas among the East African population, together with the failure of previous biogas initiatives, increases the financial risks for investors.

Although there has been a considerable donor-funded effort to promote biogas systems over the past ten years, the actual dissemination of biogas systems is very low across East Africa so far, particularly considering the low operational rate of previously installed biogas systems. The table below shows information on biogas systems installed in East Africa up to 2007.

Country	Installed biogas systems	Operational biogas systems
Burundi[13]	320	96
Ethiopia[14]	1000	600
Kenya[15]	2000	1500[16]
Rwanda[17]	200	150[18]
Uganda[19]	700	560
United Republic of Tanzania[20]	2873	1900

So far no organisation has been able to achieve a sustainable long-term biogas programme, despite the high potential that exists in East Africa. This is due to the many barriers facing the adoption of this technology. In conclusion, a sustainable biogas programme at scale will not be implemented within the host countries in the absence of this PoA providing a sustained revenue source to help overcome the barriers to large-scale dissemination.

A.4.4. Operational, management and monitoring plan for the programme of activities (PoA):

A.4.4.1. Operational and management plan:

Each authorised CPA implementer under this PoA will sign a standard contractual agreement with the CME to participate in the PoA as a CPA implementer in which the CPA implementer will commit itself to the following requirements:

[12] This figure will vary significantly depending on the size of the digester and location of installation.

[13] EAC, EAC Strategy to Scale Up Access to Modern Energy Services, Burundi Country Report, 2008

[14] SNV & Ethiopia Rural Energy Development and Promotion Centre (EREDPC), National Biogas Programme Ethiopia, Programme Implementation Document, Jan 2008

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

[16] Estimate

[17] SNV, Report on the Feasibility Study for a Biogas Support Programme in the Republic of Rwanda, Guy Dekelver, Silas Ruzigana & Jan Lam, 2005

[18] Estimate

[19] Heifer International, Programme Implementation Document for Uganda Domestic Biogas Programme, 2010

[20] GTZ, Feasibility Study for a National Domestic Biogas Programme in Tanzania, June 2007

- Those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA.
- The CPA implementer shall not assign a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA.

During the sales of biogas systems, vendors shall complete Sales Agreements with the customers containing at least the following information:

Mandatory	Optional
- Name of customer - Address/location - Date of purchase - Serial number of the digester - Name of CPA implementer - Biogas model and size	- Signature of buyer - GPS coordinates (if applicable) - Purchase location (if applicable) - Phone number - Serial number (of the receipt) - Name of seller - Appliances purchased

The mandatory items for the Sales Agreement are sufficient to estimate correctly the number of ERs corresponding to each CPA. For instance, the name of the customer and the address will be needed to track back the system during monitoring, and the serial number of the biogas systems will identify the biogas digester unit. The date of purchase will show the CERs earned in the respective monitoring period. The rest of the information is optional to facilitate the monitoring and biogas system identification.

Sales Agreements from vendors will be gathered by the CPA implementer and transferred to an electronic record kept by the CPA implementer (the "Sales Record") and precisely assigned to its corresponding CPA. Copies of the Sales Agreements as well as the electronic records will be periodically delivered to the CME, which carries out or organises spot-visits, together with cross-checks on the CPA implementer materials and logistics records in order to confirm that the Sales Record is authentic. The Sales Record allows for the verification of the actual number of systems sold, avoiding double-counting of emission reductions in the PoA by systematically analysing each biogas system sold and customer data. The contact point of the end user will be the CPA implementer and its network of installers.

It is the responsibility of the CME to register the PoA. The CME prepares all the necessary documentation for validation to be passed to the DOE, including the Letters of Approval from the DNAs. The CME will also be responsible for organising the inclusion of CPAs, and the finalisation of the respective CPA-DDs.

The CME will organise the monitoring of the PoA through field monitoring surveys. The CPA implementers will support the monitoring as required by the CME, but it is the CME that maintains the monitoring reports and makes them available for submission to the DOE for verification.

Finally the CME will be the focal point with the EB and will receive the CERs generated. The CERs will be assigned among their corresponding CPAs, and the respective CPA implementers will each decide on their sale. The CPA implementers may or may not handle the selling of their CERs themselves. In cases where the capacity of the CPA implementers to sell the CERs is limited or they have decide otherwise, the CME may offer a sales service resulting in the transfer of CERs to the respective CERs buyers, and the resulting revenues to the CPA implementers.

The CME operational management system will ensure that the following requirements are met:

(i) ***A record keeping system for each CPA under the PoA***.
To identify each biogas system participating in the PoA, all the biogas systems sold will have a unique serial number that will be recorded in the Sales Agreement at the moment of purchase. The Sales Agreement details will be transferred into the electronic records database of each CPA implementer where the CME will identify its corresponding CPAs, and the Sales Agreements will be kept by the CME for unique record-keeping. The serial numbers will be used to monitor the system and determine the emission reductions for each CPA.

(ii) ***A system/procedure to avoid double accounting.***
This will avoid the risk of including a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA. The electronic database will be used for double accounting checks to be performed. The unique serial number will avoid the same system being counted twice in different CPAs in the PoA. The database will not allow two biogas systems to have the same serial number, and each serial number will belong to only one CPA. The CPA implementers will be aware by their contractual agreement with the CME, that they must not count the same biogas system under another PoA or CDM project activity. The CPA implementer must certify that the proposed CPA is not registered under another CDM project activity. Before submitting a new CPA for inclusion to a DOE, the CME will carry out a search in the UNFCCC CDM registry to ensure that the proposed CPA is not included in another registered PoA, or registered as a CDM project activity. Should such a case occur the CME will not include the CPA under the PoA. If the contractual agreement between the CME and the CPA implementer has been signed, the agreement will automatically terminate and the ER crediting operations of the CPA implementer will be suspended.

(iii) The CPA included in the PoA is not a de-bundled component of another CPA or CDM project activity.
As per the *Guidelines on assessment of de-bundling for SSC project activities, version 03* issued at the EB's 54th meeting, article 10 allows exemption from de-bundling check as follows: *"If each of the independent subsystems/measures (e.g., biogas digester, solar home system) included in the CPA of a PoA is no larger than 1% of the small-scale thresholds defined by the methodology applied, then that CPA of PoA is exempted from performing de-bundling check i.e., considering as not being a de-bundled component of a large scale activity"*. Biogas systems distributed under the PoA should be no larger than the 1% SSC threshold of the methodology that is 0.45MW. Domestic biogas systems are more likely to be 100 times under the 1% limit set for de-bundling. In the case that a CPA includes a biogas system that goes beyond the 1% limit, the corresponding de-bundling check will be carried out at the CPA level.

(iv) The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA.
The contractual agreement between the CME and the CPA implementer will ensure that those operating the CPA are aware of their involvement in the PoA. Each of the levels of biogas system distribution will be informed of its involvement in the PoA and its registration as a CDM project.

A.4.4.2. Monitoring plan:

The CME opts for a verification method that does not use overall sampling but verifies each CPA.

To ensure full transparency and to avoid double-counting, the verification method will treat all CPAs under each CPA implementer as a single population, excluding special circumstances where the CPA implementer requests their CPAs are sampled individually. Hence, there should be the same number of verification populations as there are CPA implementers.

The CME will keep an electronic database of the data contained in all the Sales Agreements. Verification will be done using a statistically sound sample of each CPA implementer population. Verification of the Sales Agreements can be done by phone, post, email or physical visits to households as required, thus ensuring that the status of the verification can be determined anytime for each CPA.

Monitoring of biogas system usage and continued use of NRB will be carried out periodically by the CME and/or by organisations authorised by the CME. The detailed monitoring plan and the parameters to be verified are included in E.7.

A.4.5. Public funding of the programme of activities (PoA):

Public funding is being provided by the, Directorate General for International Cooperation (DGIS) of the Netherlands Ministry of Foreign Affairs through the Humanist Institute for Cooperation with Developing Countries (HIVOS) as support for the process towards registration of the PoA e.g. validation cost, study support.

Official Development Assistance (ODA) is not being diverted to the implementation of the PoA as the Netherlands does not require to purchase any credits from this PoA.

SECTION B. Duration of the programme of activities (PoA)

B.1. Starting date of the programme of activities (PoA):

1 January 2012 or the date of registration whichever is later.

B.2. Length of the programme of activities (PoA):

28 years

SECTION C. Environmental Analysis

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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:

1. Environmental Analysis is done at PoA level ☐
2. Environmental Analysis is done at SSC-CPA level ✓

It has been decided to undertake the environmental analysis at the CPA level due to the differing circumstances of the CPA implementers in relation to the manufacturing and the supplying of biogas systems. Furthermore, due to the multiple host country locations of the PoA, each CPA will need to comply with the respective host country environmental documentation requirements depending on which of them the CPA is operating in.

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

N/A, as this will be provided at the CPA level.

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

N/A, as this will be provided at the CPA level

SECTION D. Stakeholders' comments

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

1. Local stakeholder consultation is done at PoA level ☐
2. Local stakeholder consultation is done at SSC-CPA level ✓

It has been decided to do the stakeholder consultation at the CPA level due to the different nature of the CPA implementers in relation to the manufacturing and the supplying of biogas systems. Furthermore, due to the multiple host country locations of the PoA stakeholders may greatly vary in their comments.

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

N/A, as this will be provided at the CPA level

D.3. Summary of the comments received:

N/A, as this will be provided at the CPA level

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

N/A, as this will be provided at the CPA level

SECTION E. Application of a baseline and monitoring methodology

E.1. Title and reference of the approved SSC baseline and monitoring methodology applied to a SSC-CPA included in the PoA:

The small-scale project activity to be applied by CPAs included in this PoA is a Type I project: "Renewable energy projects" and applies the small scale baseline and monitoring methodology AMS I.E, version 04, "Switch from non-renewable biomass for thermal applications by the user"

E.2. Justification of the choice of the methodology and why it is applicable to a SSC-CPA:

The category "Type I – Renewable energy projects" is applicable according to the methodology AMS I.E, version 04, "Switch from non-renewable biomass for thermal applications by the user" because the "category comprises activities to displace the use of non-renewable biomass by introducing renewable energy technologies.

There exist no similar registered CDM project activities in the region of this PoA. Therefore, this project activity does not save the non-renewable biomass accounted for by an already registered project activity.

Non-renewable biomass has been used since 31 December 1989 as the FAO describes in its Global Forest Resources Assessment 2010 for each country in which it is shown that there has been a clear reduction of forest coverage since 1990[21].

[21] Use of non-renewable biomass can be demonstrated when there is a depletion of biomass stock in forests or a reduction of forest coverage, which means that there has been an unsustainable use of the biomass resources. In Uganda, according to Global Forest Resource Assessment 2010, biomass stock from forests (above-ground biomass) decreased from 287 million tonnes in 1990 to only 182.2 million tonnes in 2010. In Kenya it has decreased from 901.3 million tonnes to 817.1 million tonnes in the same period. A similar trend has been followed in Tanzania, with a decrease from 4,298 million tonnes to 3,464 million tonnes; in Burundi, from 43.3 million tonnes to 28.4 million tonnes,; and in Ethiopia, from 484 million tonnes to 367. In Rwanda for instance, the 698,660 ha of forest in 1990 had decreased to 545,000 ha. by 2005.

E.3. Description of the sources and gases included in the SSC-CPA boundary

The gas included is carbon dioxide in the CPA-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	Combustion of biogas	CO_2	no	Excluded as per methodology
		CH_4	no	Excluded as per methodology
		N_2O	no	Excluded as per methodology

E.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

As per the methodology, it is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs.

E.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the SSC-CPA being included as registered PoA (assessment and demonstration of additionality of SSC-CPA):

E.5.1. Assessment and demonstration of additionality for a typical SSC-CPA:

Additionality is demonstrated at the PoA level and re-examined on CPA-level. The typical CPA has to fulfil the key criteria of additionality as stipulated in chapter E.5.2. of this PoA-DD. The first additionality approach follows the "Attachment A to Appendix B of the Simplified Modalities and Procedures for Small-scale CDM Project Activities"[22]. The second additionality approach follows the "Guidelines for demonstrating additionality of microscale project activities (Version 02)"[23]

First Approach

There are realistic and credible barriers that would prevent the implementation of the proposed project activity from being carried out if the project activity was not registered as a CDM activity:

[22] UNFCCC, Guidance relating to the clean development mechanism, 4/CMP.1

[23] EB 60 Report, Annex 25

(a) **Investment barriers**

A typical CPA will be implemented by a CPA implementer and will consist of the dissemination of biogas systems on a commercial or non-commercial basis, installation and after-sales service (e.g. guarantee). Thus, a CPA implementer directly or indirectly needs support for the installation of biogas systems, including buying materials, investing in training, producing / importing relevant appliances or materials, marketing, sales and after-sales service of the biogas systems. Once the costs of the above are included in the retail price of a biogas system, they become unaffordable to the majority of households and institutions in East Africa. The only initiatives that have achieved any success in sales have not originated from private investors: they have been subsidised by NGOs or donors for a limited period that limits the scope of dissemination and sustainability.

The technology required to manufacture / install biogas systems is available locally in East Africa. The biogas stoves and other appliances can be manufactured locally or imported by local distributors. Market acceptance of biogas system technology has yet to be demonstrated on a large scale in East Africa. In all cases these technologies are available at a cost that is far higher than the acceptable market price, which creates the need for external sources of finance.

(b) **Barriers due to prevailing practice**

Switching to biogas poses a number of barriers due to prevailing practice. For many years families have used either charcoal or wood stoves and cooking on biogas is a significant change in a number of ways. There is a social barrier to cooking with animal and especially with human manure in some parts of East Africa. There is also significant local preference for some local dishes cooked with wood or charcoal.

Therefore, the use of traditional stoves and other appliances still imposes a very strong adoption barrier, which could result in the continuation of the use of traditional cooking methods; even after partial adoption of biogas. Overcoming this “inertia” requires a significant amount of sensitisation, marketing, demonstration and personal recommendation, and the maintenance of the systems over a sustained period.

Current market penetration of biogas systems has been demonstrated in A.4.3. which is currently very low with a very high failure rate due to poor quality control systems as well as lack of user trainings, improper selection of beneficiaries and other factors.

Potential users are unaware of the multiple benefits of biogas including the potential of financial gains made when applying slurry on agricultural products.

Carbon finance can be used to fund these activities, which are required to shift the common practice from traditional stoves to biogas systems.

(c) **Financial barriers at user level**

Disposable income for households and surplus revenue for most institutions in the countries of this PoA are low. As an indicator a table is included below to show GDP per capita in each country of the PoA.

Country	GDP per capita (USD)[24]
Burundi	160
Ethiopia	344
Kenya	759
Rwanda	506
Uganda	481
United Republic of Tanzania	509

When GDP per capita is compared to the average cost of a small biogas system of $600 (this does not include any costs other than that of construction e.g. training and marketing) it can be seen to be greater than all the countries except for Kenya, which is only slightly larger.

A biogas system has multiple benefits and can eliminate the purchase of woodfuel. However, when deciding on its acquisition an individual will compare the price of the biogas system with a cooking stove. In East Africa a small biogas system is much more expensive than an improved cook stove.

Biogas systems are therefore not an option for the vast majority of households and institutions. For these reasons, the majority of programmes that have achieved any success in sales have been subsidised by NGOs or donors, which requires additional external finance to make these programmes sustainable.

The barriers set out here are significant enough to establish that a CPA meeting at least one of these barriers is additional. The criteria to assess if one of the barriers exists for a proposed CPA are described in E.5.2.

Second Approach

Additionality of a CPA can be demonstrated alternatively as follows: [25]

CPAs that aim to achieve energy savings at a scale of no more than 15MW of thermal energy equivalent per year are additional if one of the below two conditions is satisfied:

- The geographic location of the CPA is in one of the LDCs of Burundi, Ethiopia, Rwanda, Uganda, or United Republic of Tanzania, or in an underdeveloped zone of Kenya identified by the Government before 28 May 2010; or
- The project activity is designed for distributed energy generation (not connected to a national or regional grid) with both conditions below satisfied;
    - Each of the independent subsystems/measures in the project activity is smaller than or equal to 450kW thermal installed capacity;
    - End users of the subsystems or measures are households/communities/SMEs.

[24] Taken from www.worldbank.org

[25] EB 60 Report, Annex 25

E.5.2. Key criteria and data for assessing additionality of a SSC-CPA:

Referring to the assessment and demonstration of additionality in section E.5.1, any one of the following criteria will be applied in order to assess the additionality of a CPA that is proposed to be included in the registered PoA:

First Approach

- Lack of access to capital due to the kind of business and risks associated in the region/country as demonstrated by bank letter or other third party information, or,
- Lack of prevailing practice as demonstrated by <20%[26] of all households / institutions having installed biogas systems in the region/country compared to the number of households or institutions using traditional cooking methods.

Second Approach

- CPAs that aim to achieve energy savings at a scale of no more than 15MW of thermal energy equivalent per year and the geographic location of the CPA is in one of the LDCs of Burundi, Ethiopia, Rwanda, Uganda, or United Republic of Tanzania, or in an underdeveloped zone of the host country identified by the Government before, 28 May 2010; or
- CPAs that are designed for distributed energy generation with up to 0.45MW thermal capacity for each biogas system and the end users will be are households/communities/SMEs.

E.6. Estimation of Emission reductions of a CPA:

E.6.1. Explanation of methodological choices, provided in the approved baseline and monitoring methodology applied, selected for a typical SSC-CPA:

A typical CPA includes the switching of fuel from NRB to biogas. Each CPA implementer will be involved with the dissemination of biogas systems. It is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs.

E.6.2. Equations, including fixed parametric values, to be used for calculation of emission reductions of a SSC-CPA:

According to the applied methodology, emission reductions will 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
$f_{NRB,y}$	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

[26] EB63, Annex 12, Guidelines on Common Practice, Version 01.0

$NCV_{biomass}$	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 will be 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:

$HG_{p,y}$	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

If option (a) will be used to determine B_y the following calculation applies:

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

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 systems (N) is determined as the fraction of days in a year for each installed system ($t_{fraction,y}$) multiplied by the fraction of these 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

When a CPA is included in this PoA the variables have to be determined or measured for the region included in the PoA and/or each model of biogas system used as applicable.

Leakage Emissions

The following leakages must be estimated and accounted for, if required, on a sample basis using a 90/30 precision for the selection of samples, and accounted for:

(a) Use of non-renewable woody biomass saved under the project activity to justify the baseline of other CDM project activities. If this leakage assessment quantifies a portion of non-renewable woody biomass saved under the project activity that is then used as the baseline of other CDM project activities then B_y is adjusted to account for the quantified leakage;

(b) Increase in the use of non-renewable woody biomass outside the project boundary to create non-renewable woody biomass baselines can also be a potential source of leakage. If this leakage assessment quantifies an increase in the use of nonrenewable woody biomass outside the project boundary, then B_y is adjusted to account for the quantified leakage;

(c) As an alternative to subparagraphs (a) and (b), B_y can be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.

It has been decided to use 0.95 as a standard figure to account for leakages.

E.6.3. Data and parameters that are to be reported in CDM-SSC-CPA-DD form:

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:	$EF_{projected\ fossilfuel}$
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 tCO_2/TJ
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:	$f_{NRB,y}$
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:	Variable for each region or country
Justification of the choice of data or description of measurement methods and procedures actually applied :	The $f_{NRB,y}$ will be determined for each CPA based on the most recent national approved studies or African studies. Where available, a regional approach will be used to determine $f_{NRB,y}$.
Any comment:	

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:	

If option (a) will be used to determine B_y

Data / Parameter:	C_y
Data unit:	Tonnes/year
Description:	Estimate of average annual consumption of woody biomass per old appliance
Source of data used:	Historical data or a survey(s) of local usage on a national/regional level
Value applied:	Variable depending on each CPA
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data used will depend on the available studies or surveys on national or regional level.
Any comment:	

If option (b) will be used to determine B_y

Data / Parameter:	$\eta_{old,i}$
Data unit:	Fraction
Description:	Efficiency of the system being replaced
Source of data used:	AMS I.E.
Value applied:	0.1
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value according to the methodology will apply as appliances replaced are without improved combustion air supply or flue gas ventilation systems
Any comment:	This parameter may or may not be reported according to the option selected at CPA level for the estimate of emission reductions.

E.7. Application of the monitoring methodology and description of the monitoring plan:

E.7.1. Data and parameters to be monitored by each SSC-CPA:

Data / Parameter:	$t_{fraction,}$
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	Variable for each CPA
Description of measurement methods and procedures to be applied:	The CPA implementer keeps a paper and electronic record of the installation date, and the system is considered to be in use from the day of installation. This factor will be calculated daily 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:	

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	Variable for each CPA
Description of measurement methods and procedures to be applied:	The CPA implementer keeps a paper and electronic record of the installed 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**
Data unit:	Fraction
Description:	The fraction by which emission reductions are multiplied to obtain an assessment adjust for drop off of operational biogas systems per year.
Source of data to be used:	Survey of biogas system users using sampling methods
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Variable for each CPA
Description of measurement methods and procedures to be applied:	The CPA implementer keeps a paper and electronic record and a survey is done at least every two years in order to assess the biogas systems 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
Any comment:	

If option (a) will be used to determine B_y

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	Variable depending on each CPA
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 by one of the following options: a) 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. b) The gas flow will be measured for 1 -3 days by a device which can be connected between digester and stove for the time of measurement. The displacement of woody biomass by $1m^3$ biogas has to be determined. c) The amount of woody biomass used for cooking in a household will be weighted over a couple of days following the procedures for the baseline survey.
QA/QC procedures to be applied:	The survey follows the representative sampling methods as described in paragraph 17 of AMS I.E.
Any comment:	

If option (b) will be used to determine B_y

Data / Parameter:	$HG_{p,y}$
Data unit:	TJ
Description:	Quantity of thermal energy generated by the new renewable energy technology in the project in year *y*
Source of data to be used:	Manufacturers specifications / laboratory test and survey of users
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Variable according to CPA and type of biogas appliances to be used.
Description of measurement methods and procedures to be applied:	Estimate of average annual energy production per household (TJ/year) derived from a survey of local usage.
QA/QC procedures to be applied:	The survey will follow the representative sampling methods as described in paragraph 17 of AMS I.E
Any comment:	

E.7.2. Description of the monitoring plan for a SSC-CPA:

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)"[27], will comply with the requirements for the verification stated in 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

[27] EB 50 Report, Annex 30

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. 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.
If option (a) of the methodology is used to determine B_y confirmation of the continued use of the biogas system will be checked.
If option (b) of the methodology is used to determine B_y the parameter for operational use will be tested at least every two years by the CME and/or by an authorised organisation designated by the CME

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 mandatory missing data will automatically invalidate that biogas system and the *t fraction* will be counted as zero 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 a Monitoring Report corresponding to the preceding Monitoring Period of the required sample of CPAs for the DOE to verify. This report will present the data relating to the emission reductions generated by CPAs during the Monitoring Period. The Monitoring Report will also include, as required by the sampling plan:

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

Generally, the Monitoring Report will use the current CDM Monitoring Report Form and follow the current "Guidelines for completing the Monitoring Report Form (CDM-MR)"[28].

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 studies for monitoring the required parameters, but the final responsibility for the data contained in the Monitoring Report belongs to the CME.

E.8 Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)

Date of completion:
28/10/2011

Name of the responsible persons and entity:
Stuart Leckie
Georg Zenk
Uganda Carbon Bureau Ltd
E-Mail: mail@ugandacarbon.org

[28] EB 54 Report, Annex 34

Annex 1

CONTACT INFORMATION ON COORDINATING/MANAGING ENTITY and PARTICIPANTS IN THE PROGRAMME of ACTIVITIES

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Annex 3

BASELINE INFORMATION

Annex 4

MONITORING INFORMATION