PROGRAMME OF ACTIVITIES DESIGN DOCUMENT (PoA-DD)

PART I. Programme of activities (PoA)

SECTION A. General description of PoA

A.1. Title of the PoA

Production of biogas from animal manure for rural household

Version: 01
Date: 02/04/2013

A.2. Purpose and general description of the PoA

The proposed small scale Program of Activity (“hereafter SSC-PoA”) involves the installation of biogas digesters in the households of Sudan for the treatment of the animal manure. The biogas thus generated will be used for cooking purposes. Implementation of the proposed activity will reduce the usage of non renewable biomass i.e. fuel wood for house hold activities. Thus, the PoA will reduce the GHG emission occurring from the combustion of non-renewable biomass, i.e. fuel wood, thereby also contributing to sustainable development. In the absence of the implementation of the PoA all the manure would be left to decay and thus the PoA will contribute to the sustainable development of the rural households involved in the project. Agricultural Technological Transfer Society (ATTS) is the coordinating/managing entity (“CME”) for this SSC-PoA and will be implementing the CDM Programme Activities (CPAs) in Sudan.

The rural population and large parts of the urban population are dependent on fuel wood for energy use especially for cooking purpose. Fuel wood make up approximately 80% of the country’s energy supply. Fuel wood is mostly collected for cooking needs. Rampant deforestation have led to a loss of about 11.6% of Sudan’s forest cover between 1990 and 2005 which is around 8,835,000 hectares. Two thirds of the forests in north, central and eastern Sudan disappeared between 1972 and 2001. In Darfur, one third of the forest cover has been lost between 1973 and 2006. This has led to increased habitat loss, deforestation and desertification.

According to World Bank Statistics 2011, the estimated total population of Sudan is 34.3 Million. Sudan is an agricultural country with plenty of livestock and agricultural residues. The PoA will be implemented across all potential rural households in all the states in Sudan. In the present scenario the rural households use fuel wood for cooking purposes.

As per the Energy Statistics Database, United Nations Statistics Division, fuel wood consumption in Sudan by household per year is given as:

<table>
<thead>
<tr>
<th>Year</th>
<th>Fuel wood consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>8,100 thousand cubic metres</td>
</tr>
<tr>
<td>2008</td>
<td>8,050 thousand cubic metres</td>
</tr>
<tr>
<td>2007</td>
<td>7,995 thousand cubic metres</td>
</tr>
</tbody>
</table>

1 http://www4.ncsu.edu/~bemorga2/world_forestry/website.html
3 http://data.un.org/Data.aspx?v=EDATA&i=cmID%3aFW%3btrID%3a1231
Each component project activity (CPA) under the proposed SSC-PoA will involve in the implementation of biogas digesters of 6 m³ capacity each for single households. Once the digesters will be installed and commissioned, the biogas generated in the digester shall be used to meet the energy requirement for cooking purposes of the household thereby replacing the use of fuel wood.

**General operating and implementing framework of PoA**

**ATTS**
Agricultural Technological Transfer Society (ATTS) is the coordinating/managing entity (“CME”) for this SSC-PoA and will be implementing the CDM Programme Activities (CPAs) in Sudan. Under the scheme, it will coordinate the set up of biogas in the households. Thus, ATTS is both the CME and the CPA implementer for the PoA.

**Core CarbonX Sols Pvt Ltd**
CoreCarbonX offer carbon management services to ATTS. These range from the development of the PoA-DD, the CPA-DDs and the Monitoring Reports to the management of the entire CDM cycle up to the issuance of CERs.

**Policy/measure or stated goal of the PoA**
With the implementation of PoA, the biogas digesters will replace the current usage of fuel wood in rural households of Sudan and hence, it will help in reducing the consumption of non-renewable biomass. In addition to reducing the consumption of non-renewable biomass, the PoA will help in making the rural households self-sufficient in the most basic necessity in daily life i.e. fuel for cooking, heating, etc. Agricultural Technology Transfer Society is the coordinating/managing entity (“CME”) for this SSC-PoA and will be implementing the CDM Programme Activities (CPAs) in Sudan. All CPAs within the PoA will consist of implementation of biogas digester facilities only.

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

The proposed SSC-PoA is a voluntary action by the Co-ordinating Managing Entity (CME) – Agricultural Technology Transfer Society

**Contribution of the proposed PoA towards sustainable development:**

**Environmental well-being:**
- The PoA will replace the use of fuel wood in a large number of households in Sudan which will result in the GHG emission reduction and conservation of fuel wood.
- The by-product of the biogas digester is a useful fertilizer and displaces in reducing the use of harmful chemical fertilizers. The project activity under PoA will generate organic fertiliser.

**Economic well-being:**
- After the installation of biogas digesters, the households will not need to make expenses on fuel wood and save their time resources for other uses. Hence, the PoA will make a significant contribution to the economic well-being of the rural households.
The PoA will create certain employment opportunities in the area for skilled and unskilled job where each CPA is located, leading to a general increase in local-community income due to installation of digester.

_Social well-being:_
- The PoA increases the employment opportunities in the area where each CPA is located, leading to a general increase in local-community income.
- The PoA will reduce the consumption of fuel wood by participating households and will therefore reduce the pressure on scarce forest resources in the project area.
- The PoA will make the households self-sufficient in terms of energy requirement and contribute to their general well being.
- The combustion of fuel wood create serious health hazard to the people. The PoA will also improve the indoor air pollution because of replacement of non renewable fuel wood health of the rural people by replacing the fuel.

_Technological well-being:_
- This PoA is a clean technology demonstration at household level.

A.3. CMEs and participants of PoA

Agricultural Technology Transfer Society is the coordinating/managing entity (“CME”) for this SSC-PoA.

A.4. Party(ies)

<table>
<thead>
<tr>
<th>Name of Party involved (host) indicates a host Party</th>
<th>Private and/or public entity(ies) project participants (as applicable)</th>
<th>Indicate if the Party involved wishes to be considered as project participant (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sudan</td>
<td>Agricultural Technology Transfer Society</td>
<td>No</td>
</tr>
<tr>
<td>Sudan</td>
<td>Core CarbonX Sols Pvt Ltd</td>
<td>No</td>
</tr>
</tbody>
</table>

A.5. Physical/Geographical boundary of the PoA

The geographical area, in which SSC-CPAs included in this PoA will be implemented, is defined as Sudan. The geographical boundary of SSC-PoA in Sudan is also given in the below figure.
A.6. Technologies/measures

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The biogas units will be constructed of bricks, sand, cement, pipes, pipe fittings, metal clips, wire and gas burners. Each bioreactor will have a mesophytic fixed dome. The capacity of the bio-digesters will be either 6 m$^3$. Cattle Dung and waste water will be fed to the digester daily. Kitchen waste will be added from above through an inlet pipe connecting to the digestor chamber. The waste slurry remains in the chamber for approximately 40 days. The waste breaks down anaerobically producing biogas which mainly has methane. This biogas builds up above the slurry and remains in the chamber until it is released through the gas outlet pipe at the top of the dome. As the slurry increases in the digester, it is pushed into the outlet tank and finally exits through slurry discharge hole. The dried slurry can be used as manure in the farm.

A.7. Public funding of PoA

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A confirmation that no funding from Annex 1 parties has been used for this CPA or that, if used, this did not result in a diversion of official development assistance.
SECTION B. Demonstration of additionality and development of eligibility criteria

B.1. Demonstration of additionality for PoA

The CME has proposed to implement the given PoA to promote and accelerate the implementation of household biogas project with the support from potential CER revenues. This has justified in the below paragraph by demonstrating additionality for the whole PoA.

As per Section III, para 09 of Annex 03 version 02.1, EB 65, “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities” states that “PoA that consist of one or more small scale projects as CPAs shall include eligibility criteria derived from all the relevant requirements of Attachment A of Appendix B of the Simplified modalities and procedures for small scale CDM project activities”.

Demonstration of additionality of proposed PoA:

As per paragraph 3.1(a) of “Standard for Demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities” Version 02.1, Annex 03, EB 65 “Additionality shall be demonstrated by establishing that in the absence of CDM, none of the implemented CPAs included in the PoA would occur.”

In accordance with simplified modalities and procedures for small-scale Clean Development Mechanism (CDM) project activities, a simplified baseline and monitoring methodology listed in Appendix B may be used if project participants can demonstrate that the project activity would otherwise not be implemented due to the existence of one or more barrier(s) listed in “Guidelines On The Demonstration Of Additionality Of Small-Scale Project Activities”, Version 09.0, EB 68. As per the paragraph 2 (c) of “Guidelines On The Demonstration Of Additionality Of Small-Scale Project Activities”, Version 09, EB 68 Annex 27: “2. Documentation of barriers, as per paragraph 1 above, is not required for the positive list of technologies and project activity types that are defined as automatically additional for project sizes up to and including the small-scale CDM thresholds (e.g. installed capacity up to 15 MW). The positive list comprises of: (c) Project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size of each unit is no larger than 5% of the small-scale CDM thresholds; “

The proposed small scale Program of Activity (“hereafter SSC-PoA”) involves the installation of biogas digesters in the households in Sudan for the treatment of the animal manure. The biogas thus generated will be used in the existing cook stoves for cooking purposes. Implementation of the proposed activity will reduce the usage of non renewable biomass i.e. fuel wood for house hold activities.

There are two thresholds according to applied methodologies by the proposed project to analyze its automatically additionality, stating as below:

- The threshold of the project activity under methodology I.C, the total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW thermal. The thermal energy generation capacity of each digester is 5.53 kWth which is only 0.13% of the small scale threshold for the small scale project activities under methodology AMS I.C
- The threshold of the project activity under methodology III.R, aggregated annual emission reductions of all systems included shall be less than or equal to 60 ktCO2 equivalent. The emission reduction of each unit is 3.66 tCO2e per year which is only 0.06% of the small scale threshold under Type III category.

4 That is the size of each unit under 750 kW installed capacity or under 3000 MWh of energy savings per year or 3000 tonnes of emission reductions per year.
Hence the PoA falls under positive list as per paragraph 2 (c) of “Guidelines On The Demonstration Of Additionality Of Small-Scale Project Activities”, Version 09, EB 68 Annex 27.

Hence additionality is demonstrated by establishing that in the absence of CDM, none of the implemented CPAs would occur at the PoA level and the same need not be replicated at each SSC_CPA.

B.2. Eligibility criteria for inclusion of a CPA in the PoA

The eligibility criteria for inclusion of a CPA under the PoA are in accordance with the “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for Programme of Activities”, Version 02.1, annex 3 of EB 65 as follows:

- The geographic boundary of the SSC-CPA area is uniquely defined and located in Sudan.
- The biogas digester that will be set up in each household, will have a standard contractual agreement with the CME. Each biogas covered under the PoA and SSC-CPA will have a unique serial number which will ensure that there is no double counting.
- The sales agreement of the components of the first biogas will be the start date of the CPA. It will be ensured that the start date of the CPA’s will be after the publication of the PoA for the GSC process.
- Uses the small scale approved methodologies AMS I.E, version 05.0., The CME will verify that all CPA-DDs employ aforesaid version of the technology.
- The thermal energy capacity for each CPA will be lower than 45 MWth and SSC CPA will remain within those threshold level throughout the crediting period of the CPA
- SSC CPA included in the PoA meet the requirements pertaining to the demonstration of additionality falls under positive list as specified in para 2(c) “Guidelines for demonstrating additionality of small-scale project activities” that is “Project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size of each unit is no larger than 5% of the small-scale CDM thresholds;”. The thermal energy generation capacity of each project system will be lower than 5% of the Threshold of 45 MWth as defied under the methodology.
- A Local stakeholder consultation meeting shall be conducted for each of the CPA included in the PoA to gauge the opinions and comments of the stakeholders in the immediate project area. This is a social sector project which will have positive environmental impact through improved indoor air pollution in the households. The use of improved cooking stove technology will reduce the adverse environmental and social impacts associated with the use of non-renewable biomass. The reduced consumption of the stated baseline fuel will have sustainable benefit for all households included in the project activity. The distribution of ICS reduce workloads involved in fuel collection, and by reducing indoor air pollution, thus, will reduce the risk of respiratory diseases, especially for women and children. Improved cooking stoves also contribute to environmental protection by reducing biomass consumption and hence greenhouse gas emissions, mainly CO2, when the combusted biomass originates from non-renewable stocks. As use of ICS does not entail significant environmental impacts, it is not necessary to undertake an environmental impact assessments for each SSC-CPA included in the PoA.
- The biogas digesters distributed under SSC CPA will not result in diversion of official development assistance.
- The SSC-CPA will involve the distribution of biogas digesters to households. The CPA implementer will distribute the digesters to the households through the channel of the distribution networks created in each province vis-à-vis the distributors.
• Sampling plan shall be described in each SSC CPA and consistent with the latest standard/guideline for sampling and survey required by CDM EB.

• As per the “GUIDELINES ON ASSESSMENT OF DEBUNDLING FOR SSC PROJECT ACTIVITIES” in case if each independent subsystem/measures included in the CPA of a PoA is no greater than 1% of the small scale threshold defined by the methodology applied, then that CPA of PoA is exempted from performing de-bundling check, i.e. considered as being not a de-bundled component of a large scale activity. It will be checked that each unit under SSC CPA is no greater that 1% of the small scale thresholds.

• The SSC CPA will be a voluntary action.

• The SSC CPA should in conformance with mandatory laws and regulations.

• The SSC-CPA is not registered or being registered, as a stand-alone CDM or as a CPA of another PoA.

• For each verification, the number of biogas digesters installed as the part of the program that are still operating will be checked for a representative sample of biogas installed. The representative sample will be determined through the simple random sampling method. Average annual consumption of woody biomass per appliance substituted will also be determined using the simple random sampling procedure for each CPA before the installation of the biogas digesters.

B.3. Application of methodologies

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Type I: Renewable Energy Projects
Category IE: Switch from Non-Renewable Biomass for Thermal Applications by the User
Version: 05.0

<p>| | |</p>
<table>
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<tbody>
<tr>
<td>1</td>
<td>This category comprises activities to displace the use of non-renewable biomass by introducing renewable energy technologies. Examples of these technologies include but are not limited to biogas stoves, solar cookers, passive solar homes, renewable energy based drinking water treatment technologies.</td>
</tr>
<tr>
<td></td>
<td>The CPAs in this PoA comprise of installation of biogas plants that will replace use of non-renewable biomass.</td>
</tr>
<tr>
<td>2</td>
<td>Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics.</td>
</tr>
<tr>
<td></td>
<td>The CPAs of the given PoA will use the survey methods to show that renewable biomass has been used since 31st December, 1989.</td>
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SECTION C. Management system

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The operational and management arrangements as established by the CME for implementing PoA are as follows:

(i) A record keeping system for each CPA under the PoA

Pursuant to the installation of biogas digester units, the CPA implementer will make sure that data regarding the installations in house hold are electronically archived for claiming emission reductions. This involve various details involving

• Name of customer
• Address and ID number
• Biogas digester serial number
• Installation date

Based on the agreement, CPA implementer will transfer the information of each biogas to the installation record, which will ensure that no biogas unit is counted more than under the SSC-CPA or the PoA. The installations record will further be transferred to the CME which is stored in electronic format as well as in the paper format. These records will also serve as the basis for the calculation of CERs.

The information collected by the distributors is screened on a periodic basis by cross checking of the installation records by CME in order to ensure the authenticity of installations.

(ii) A system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as CDM project activity or as a CPA of another PoA.

Double counting of the installed biogas is normally avoided by assigning each unit a special serial number. The record maintaining system with customer’s name and address, serial number, installation date, type of unit the new cooker is replacing ensures that the biogas can be traced in a specific CPA to avoid double counting.

As part of the inclusion of a SSC-CPA under the PoA, an agreement will be signed by the distributor and the CME. The agreement will include specific provisions and declarations that confirm the SSC-CPA project distributors agree that the biogas equipment by the CME for setting up of the digester will be included in the PoA and CME will be the sole owner for the rights of the CERs. A similar agreement will also be signed with the user which details that the biogas set up by the CME will be subscribed to the PoA and the CME will be the sole owner of the CER rights.

The CME will impart the initial training for the distributors. The distributors will provide the further training to the technicians employed for installation of biogas digesters and further oversee the implementation of the biogas digesters. Training will be given to technicians on implementation record keeping and maintenance of the digesters. These technicians will be designated for certain number of biogas digesters and will be responsible for data recording and data storage. Suitable training regarding the rules of the CDM and PoA will be given to each distributor and also to each new biogas digester technician.

The CME shall develop and implement a management system that includes the following:

(a) A clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies:

The management structure involved for the review of the inclusion of the CPA in the PoA is as follows:
<table>
<thead>
<tr>
<th>Role</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distributor</td>
<td>Will make sure that data regarding the installations in household are electronically archived to avoid repetitions</td>
</tr>
<tr>
<td>Analyst, CME</td>
<td>- Obtains the inputs from the manufacturer of biogas equipments and the sales agreement</td>
</tr>
<tr>
<td></td>
<td>- Calculates the energy saving from each biogas digester and evaluates the additionality as per guidelines described in section B.1 of the PoA-DD</td>
</tr>
<tr>
<td></td>
<td>- Conduct the local stakeholder consultation meetings for the CPA</td>
</tr>
<tr>
<td></td>
<td>The sampling plan along with the sample size calculation as determined by analyst CCX will be employed by Analyst CME for:</td>
</tr>
<tr>
<td></td>
<td>- Conducting the survey for a representative sample for computing the number of biogas digesters installed as the part of the program which are still operating</td>
</tr>
<tr>
<td></td>
<td>- Coordinating with the third party agency for calculating the efficiency of representative sample of the operating biogas once every year</td>
</tr>
<tr>
<td></td>
<td>- Calculating the average annual consumption of woody biomass per digester substituted using the sampling survey before the installation of biogas digesters</td>
</tr>
<tr>
<td>Expert, CME</td>
<td>- Analyzes the computation sheet provided by Analyst CCX for the computations of the energy savings and approves the additionality of the CPA</td>
</tr>
<tr>
<td></td>
<td>- Checks the survey results as conducted by Analyst CME</td>
</tr>
<tr>
<td></td>
<td>- Forwards the CPA to Director CCX for the inclusion in the PoA</td>
</tr>
<tr>
<td>Analyst, CME</td>
<td>- Determines the energy savings of the CPA</td>
</tr>
<tr>
<td></td>
<td>- Analyses if the CPA falls under the positive list as specified in para 2(c) “Guidelines for demonstrating additionality of small-scale project activities”.</td>
</tr>
<tr>
<td></td>
<td>- Determines the sampling plan latest standard/guideline for sampling and survey required by CDM EB.</td>
</tr>
</tbody>
</table>
• Calculates the sample size in accordance with the latest standard/guideline for sampling and survey required by CDM EB

Director, CME

• Reviews the additionality as determined by the analyst, CCX
• Reviews the Sampling Plan and the sample size calculations as prepared by Analyst CCX
• Forwards the inclusion of the CPA to the Director, CME

(b) Records of arrangements for training and capacity development for personnel:

The distributor of biogas equipments and CME will be responsible for the installation and maintenance of biogas digester. The operation of the biogas is carried out by the user, and training on how to operate and maintain the biogas is given by the distributor. The CME will provide the initial training for the distributor; and the training will be penetrated through to the users. The training records for the distributors will be maintained in the database of the CME. Further on the recruiting of the new employee by the distributor in the team to disseminate the biogas; the distributor will inform the CME of the same and CME will impart the initial training to the new employee.

Physical maintenance of the biogas will be provided by the distributor and their technicians. The distributors will follow the monitoring plan and procedures for identifying each biogas set up during the course of the project and those which are still in use, so the appropriate number of emission reductions is claimed. To facilitate this process, the distributor will assign a serial number to each digester during its set up and record this number in the installation record. The serial number will be present on each biogas and also on the sales agreement corresponding to the digester. The distributors are also responsible for collecting the sales agreement contract from the users.

Sales contract and installation record

(c) A procedure to avoid double counting (e.g. to avoid the case of including a new CPA that has already been registered either as a CDM project activity or as a CPA of another PoA):

Before the installation of the biogas digester, the user shall be informed that CDM finance is being used to fund the biogas installation, and the user shall agree, as per sales contract, to:

− Cooperate with the distributor and the CME for monitoring purposes
− Transfer the rights of the CERs to the CME

The sales contract will also contain the following information:

− Name of the customer
− Address and ID number of the customer
− Digester serial number
− Installation date

The information collected by the distributor is transferred on an electronic database (the installations record) which is updated regularly and shared with the CME. The installations record carries all the sales information listed above including the actual installation date. The installations record is a key component of the annual monitoring report, since the actual installation date is used to calculate the emission reductions achieved by the biogas installed.

Monitoring

Each SSC-CPA keeps an Installation record, which lists all biogas installed with a unique serial number per biogas in addition to a record of the location of the biogas and the kitchen. All distributors records
are screened by the CME together with cross-checks on the distributors installation records in order to confirm that the installation record is authentic and that no double counting occurs.

(d) Records and documentation control process for each CPA under the PoA:

The sales contract will also contain the following information:

- Name of customer
- Address and ID number of the customer
- Biogas digester serial number
- Installation date

The information collected by the distributor is transferred to an electronic database (the installations record) which is updated regularly and shared with the CME. The Installations Record carries all the sales information listed above including the actual installation date. The installations record is a key component of the annual monitoring report, since the actual installation date is used to calculate the emission reductions achieved by the biogas installed.

(e) Measures for continuous improvements of the PoA management system;

It will be ensured that the PoA management system will be reviewed annually for the continuous improvements for the management system. There will be a systematic collection and analysis of data to ensure that:

- There is relevant and sufficient documentation of management systems for the scope and scale of biogas project implementation.
- The system is focused on providing quality training, assessment and support services.
  - arrangements are in place to meet regularly with distributors to seek feedback and make changes in response
  - appropriate selection processes and ongoing professional development for trainers and assessors
  - strong customer service standards
  - maintenance of and improvements to training and assessment of the distributors
- Staff know and meet their responsibilities for applying the system, e.g.
  - communication through the organisation about management systems and decisions is effective
  - staff are actively engaged in improving the system
  - checks are made to ensure that key policies and procedures are being implemented appropriately
- establishing key performance indicators and monitoring organisational performance against them
- gaining and analysing stakeholders’ feedback about the overall performance
- internal audit and organisational self-assessment
- The CME will also monitor their improvements to determine their effectiveness and make further changes if needed.

SECTION D. Duration of PoA

D.1. Start date of PoA

The starting date of the PoA will be the date of commencement of validation of the PoA – i.e. the date on which the PoA-DD is first published for global stakeholder consultation.
D.2. Length of the PoA

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28 years

SECTION E. Environmental impacts

E.1. Level at which environmental analysis is undertaken

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The PoA involves the installation of household biogas digesters. These digesters do not entail significant negative environmental impacts. For this reason, it is reasonable to undertake a single environmental analysis at the level of the PoA rather than individual assessments for each SSC-CPA.

E.2. Analysis of the environmental impacts

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The implementation of PoA does not impose any impacts on the ecological system in the surrounding areas. The project activity included in this PoA helps in reducing the consumption of firewood by installing household biogas digesters for cooking purpose thereby reducing the pressure of deforestation, reducing indoor air pollution. The use of household biogas technology will reduce adverse environmental and social impacts associated with the use of non-renewable biomass. The reduced consumption of the stated baseline fuel will have sustainable benefit for all households included in the project activity. these sustainable benefits have been summarily presented in Section A.2 of this PoA DD. The implementation of the PoA reduce workloads involved in fuel collection, and by reducing indoor air pollution, they can reduce the risk of respiratory diseases, especially for women and children. Household biogas also contributes to environment protection by reducing biomass consumption and hence greenhouse gas emissions, mainly CO₂, when the combusted biomass originates from non-renewable stocks.

Sudan itself has not legislated for EIA as a mandatory requirement. Instead legislation pertaining to environmental management is found in the Environment Policy Act of 2001 which, under section 9, stipulates that EIA be undertaken where the quality of the environment is to be adversely affected upon implementation of major development projects⁵. The authority responsible for environment management is the Higher Council for Environment and Natural Resource. Since the typical SSC-CPA will involve the installation of household biogas digesters which will have positive environmental impact, hence this does not need any environmental impact assessment.

SECTION F. Local stakeholder comments

F.1. Solicitation of comments from local stakeholders

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The stakeholder meeting was carried out on 21st March 2013 at the policeman club hall at El-Obeid city capital. Invitees included national and international NGOs, research institutions, universities, government officials, humanitarian affair commission representative, and villagers’ representatives. The invitations were given to many of the stakeholders. The meeting started at 9 AM, and included two sessions. Ms Huda Hassan Khalil welcomed the participants.

First session (two hours) four talks were delivered by:

Humanitarian affair commission representative at North Kordofan (NK) Dr. Hafiz El-Hag Makki welcomed the proposed biogas technology and said there is enabling environment and high potentialities for implementation of such technology as they have more than 99 CBOs and farmers’ associations well organized and willing to accept renewable energy techniques. He also appreciated the huge efforts exerted by national and international NGOs working in very good relations with the CBOs in

developmental projects concerning health, education and agriculture, especial appreciation goes to SOS Sahel which is now constructing a network of water pipes. There are 6,000 villages in the area all suffering from desertification and fire risks, the government cannot reach the 14 localities present in the area. Gender issues are not well taken good care of and we wish that such technology will reach more and more villages in the future.

Dean of faculty of natural resources, University of NK, Dr. Jaffar Mohamed Suleiman spoke about the advantages the biogas would deliver as a clean energy compared to fossil fuel and the damages oil extraction causing to the environment. He said in the university there are some researchers are going on investigating alternative energy resources and some engineers are now working on using biogas in operating generators. He hoped that the university would cooperate in such a project and contribute actively in it especially that biogas can be used in cooking and lighting.

Village UmLubanna representative Mr. Abdel-Rahman Hemati Ishager expressed his real concerns about the negative impact of green house gases effects and thinks that such technology is excellent since it targeted human beings as they are the real capital of any nation. He thinks other developmental projects addressing health and education are equally important in poverty alleviation.

Parliament representative Mr. Mubarak Nouren thought that biogas is an appropriate technology since it contributes in alleviating hard burden that women experience in wood collection and cooking for a long time beside the unhealthy conditions where women and children are exposed to respiratory diseases from breathing soot coming from burning of wood. He thinks this kind of workshops or any effort directed towards capacity building will benefit the society to improve their living conditions. It is high time that people should organize themselves and make their own contribution and not to depend on the government on everything.

Second session started after breakfast (3 hours).
First presentation was delivered by Professor Muna Ahmed, manager ATTS. The presentation put forward several concepts mainly: Carbon credit, carbon finance, and clean development mechanism and emission reduction commitments. The presentation gave a brief summary about the sector background of biomass consumption, government policy in addressing sanitation and health. Also it gave a brief description of the technology to be employed and its current use in the country. It gave a summary about the implementation plan which is considered under the proposed PoA that is to distribute biodigestors across CPAs in order to meet the general requirements of the local population.

Second presentation was delivered by engineer Faisl El-Gizuli Eisab, from Bicon Company. He explained the importance of biogas and its wide dispersal in many parts of the world, the concern about the biogas in Sudan started since 1978 but did not get the support from the government till the middle of the 90th where Geizera (central Sudan state), supported by ministry of finance (Khartoum state), ministry of economic affair Gadarif state (eastern state) together with ministry of energy and mining have implemented several large biogas units for some jails, hospitals, pre-schools teaching holy Quran and some sites used for food preparations. The engineer spoke about his experience in biogas technology as he was the one who executed all biogas plants in different parts of Sudan. Biogas applications were for lighting, cooking and ironing. With the advent of oil discovery in Sudan government has neglected everything including agriculture and animal wealth. However, in 2003 he established a biogas unit for a pre-school for 1,000 students using toilets drainage system and waste water treated before used for irrigation of trees around the school. In 2008, he contributed in Khartoum exhibition with 100 units for household. He then showed different units designs with different sizes and showed the benefits and durability according to materials the units made of. He showed such applications can be suitable for large sugar industries present in Sudan and other food industries and large farms. He then outlined how the technology works, what are the requirements and benefits.

Third presentation was delivered by Mr. Niroj Mohanty, Managing Director, Core CarbonX Sols Pvt Ltd. He emphasized the importance of global warming due to GHG and its negative impact on changing precipitation, rising sea levels, change crop yields and fauna and flora. He explained the Kyoto protocol
which sets targets on developed countries to limit emissions; Sudan ratified the protocol and hence committed to help in reduction of emissions. He brought the attention to the importance of stakeholders meeting which helps in understanding any concern of project impact and help to build concerns while developing or during operation of the project. He showed the socio-economic benefits of the project, building skills of the local community and avoidance of Greenhouse Gases emissions through the usage of biodigestors raising finance from the CDM carbon credit market.

After the question-answer session, Professor Muna Ahmed proposed the vote of thanks and the meeting concluded with thanks to the chair.

Although the PoA and first CPA meeting was conducted on 26/06/2012. The CME understands that local stakeholder issues will differ from place to place. Thus, the CM implementing the PoA has decided to conduct stakeholder meeting for each CPA included in the PoA separately to judge the opinions comments and views of the local stakeholders surrounding the project area.

F.2. Summary of comments received

A detailed list of points/concerns rose during the stakeholder meeting and their respective replies have been provided below:

Q1: There is lot of technologies of renewable energy, solar, wind, hydrogen, why did you pick up the biogas? (Mr. Abdel-Rahman Hemati Ishager, Reprehensive of villages Um-Lubana)
Answer: for each type of technology you have to choose the suitable one, for example in the north where there is always clear sky, solar is better, in places with high wind velocity, wind is more suitable. The target biogas installations are cheaper in comparison to the solar and wind installation. Biogas can provide both heat for cooking. The sludge remaining after fermentation is good fertilizer, while the green manure would last for 3 - 4 months to give a positive effect the compost of the biogas is highly degradable and would improve crop production by 20%. Biogas also provides clean environment in the houses and around villages. The compost has a good market in Khartoum and for export.

Q2: Since we are not responsible for green house gases emissions and since it is the responsibility of the developed countries, why do not support development project and only clean energy technology? (Mr. Murtada Mahdi, SOS Sahel representative)
Answer: That is true but if we do not take any action in reducing emissions which is a global problem, we will be more affected by the negative impacts of climate change and global warming. For example, all the countries are suffering from increased frequency of cyclones, flood and other natural disaster due to climate change and global warming that killed thousands and forced millions to migrate although developed countries are responsible for the problem. There must be a combine effort to reduce the emission from global level and this project is part of the same solutions. We will be eligible for carbon revenue through this project and this will help sustainable development of our country.

Q3: There are 6,000 villages here and farmers are used to green manure for fertilization, how are we going to convince them to use the manure for the biogas and what type of precautions they would undertake to handle the biogas which is inflammable and there might be a risk of fire since all houses and kitchens made of wood. (Mr. Tag El-Deen Abdel-Nabi, Coordinator of villages of UmLubana)
Answer: the risk of inflammable gas of propane is higher than of biogas as the cylinder of propane is compressed under pressure and so if explodes can be very dangerous. The risk of throwing a small coke or small burning would also have a risk of fire, so the usual precautions taken for not other sources of fire should be applied to the biogas. The biogas flow is smooth and whenever you see accumulation you can use a valve to release extra gas.

Q4: Yesterday there was a workshop on climate change held by the higher council for environment and natural resources, and it was claimed that the many incidents of cancer occurring today are due to climate
change, is there any other means that developed countries would compensate for such risks? (Mr. Salih El-Agab, Agricultural Research Corporation)

Answer: may be some skin cancer could be related to high temperature, but there are several other causes not related to climate change as women exposed to kitchen smokes for time suffering from respiratory diseases because of indoor air pollution. If the CDM can encourage establishment of biogas technology, then let us make use of it we will end up with better health and more resistance to diseases.

Q5: How much of biomass we need for the unit and how much does it cost? (Ms Nimat Ibrahim, WFP representative)

Answer: The small unit for the household that produce one and half liter of gas would require 3kg of manure for three hour cooking throughout the day. The cost is between 500 – 1000 US$ depending on type and durability of the product.

Q6: When I was at Ahfad Women University we tried the solar cooker which was not welcomed by some communities. I am not sure whether people will accept this type of technology as animal manure are not usually handled for this kind of purpose. (Ms Nafessa Adam Bashir, Plan Sudan representative)

Answer: manure was used all over Sudan for building houses and in some places used directly for cooking. In north Sudan there was an experience of making plates of manure put directly on fire for making barbecue and nobody was reluctant to eat the meat. People making bricks cook their food using animal manure. Now we are using biogas from manure which is generating fire or electricity and not using manure directly.

Q7: Even on the household level, the cost of biogas is expensive; there are large poultry farms and slaughter houses, why do not you start by these ventures. (Mr. Ibrahim Zakaria Abdalla, Ministry of agriculture and animal wealth)

Answer: The present proposed project activity is meant for households biogas installation only. Other potentials are there in many other fields and this can be taken up at the next level. To make the cost of biogas affordable, many sources can contribute.

Q8: This technology needs intensive awareness raising in other communities complemented with developmental packages. Since this technology started long ago, why it is not successful? (Mr. Medani Ismail, Agricultural research corporation)

Answer: if you look at it you can find development as women will be in better healthy conditions, no time will be expended in wood collection. Children can study more because of the lighting; youth can have employment in collecting compost and selling it. The technology was discontinued because it started at state level; it was susceptible to change of policy and government priorities.

Q9: This is a development project since it targets both health and environmental issues and also provides energy for cooking and electricity. Do we have to change the cooker already used for propane or do we have to change it. (Ms Afaf Hamid, Ministry of Agriculture, Shaikan locality)

Answer: there are special biogas cooker which are now available in the market.

Q10: We have a huge area of forest for gum Arabic production where we have a meteorological station and campaigns for gum Arabic producers beside the communities around, we suffer from power failure and communities cutting gum Arabic trees. (Mr. Munir Ilias Siddig, Agricultural research corporation)

Answer: there is another mechanism where you can get support from it is called REDD for protecting the forest.

F.3. Report on consideration of comments received

The assembled stakeholders appreciated the efforts taken by Core CarbonX Soultions Private Limited and Agricultural Technology Transfer Society (ATTS) for the effort in combating climate change.
Ensuring that the stakeholders do not have any doubt regarding the CDM process and their queries were answered, the chairman closed the Question and answer session.

SECTION G. Approval and authorization
>>
Letter(s) of approval from the party (ies) which wishes to be involved in the PoA will be given to the DOE before the time of request for registration of the given PoA.

PART II. Generic component project activity (CPA)

SECTION A. General description of a generic CPA
A.1. Purpose and general description of generic CPAs
>>
The proposed small scale Component Project Activity (hereafter referred as CPAn) involves the implementation of biogas units to households in rural areas of [name of districts] districts in [name of state] state, Sudan. The CPAn will reduce the amount of fuel wood used for cooking with cleaner biogas. This will contribute strongly to the sustainable development of the rural households involved in the project. The CPA will involve in the implementation of biogas digesters of 2-3 m³ capacity each for single households. Once the digesters have been installed and commissioned, the biogas generated in the digester shall be used to meet the energy requirement of the household.

The objective of the CPAn is to implement biogas digesters in rural areas of Sudan and help in reducing the consumption of non-renewable biomass such as forest wood. In addition to reducing the consumption of non-renewable biomass, the PoA will help in making the rural households self-sufficient in the most basic necessity in daily life i.e. fuel for cooking, heating, lighting etc. Agricultural Technological Transfer Society is the coordinating/managing entity (“CME”) for this SSC-PoA and will be implementing the CPA [Name of the CPAn].

Contribution towards sustainable development:

Environmental well-being:
- The typical CPAn will replace use non renewable fuel wood in a large number of households in Sudan which will result in the GHG emission reduction.
- The by product of a biogas digester is a useful fertilizer and will be helpful in reducing the use of harmful chemical fertilizers. Therefore, the CPAn will also promote the use of bio-fertilizers.

Economic well-being:
- After the installation of biogas digesters in CPAn, the households will not need to make expenses on fuel wood and save their time resources for other uses.
- The CPAn will create certain employment opportunities in the area for skilled and unskilled job leading to a general increase in local-community income due to installation of digester.

Social well-being:
- The CPAn increases the employment opportunities in the area and will lead to a general increase in local-community income.
- The CPAn will reduce the consumption of fuel wood by participating households and will therefore reduce the pressure on scarce forest resources in the project area.
- The CPAn will make the households self-sufficient in terms of energy requirement and contribute to their general well being.
• The combustion of fuel wood create serious health hazard to the people. The CPAn will also result in improvement in the indoor air pollution because of replacement of non renewable fuel wood health of the rural people by replacing the fuel.

**Technological well-being:**
The bio digester installation in CPAn is a clean technology demonstration at household level.

**SECTION B. Application of a baseline and monitoring methodology**

**B.1. Reference of the approved baseline and monitoring methodology(ies) selected**

Type I: Renewable Energy Projects  
Category IE: Switch from Non-Renewable Biomass for Thermal Applications by the User  
IE./Version 05.0  
Sectoral Scope: 01  
EB 68

**B.2. Application of methodology(ies)**

Type I: Renewable Energy Projects  
Category IE: Switch from Non-Renewable Biomass for Thermal Applications by the User  
Version: 05.0

<table>
<thead>
<tr>
<th></th>
<th>This category comprises activities to displace the use of non-renewable biomass by introducing renewable energy technologies. Examples of these technologies include but are not limited to biogas digesters, solar cookers, passive solar homes, renewable energy based drinking water treatment technologies.</th>
<th>The CPAn [CPA name] comprises of installation of biogas plants that will replace use of non-renewable biomass.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics.</td>
<td>The CPAn [CPA name] will use the survey methods to show that renewable biomass has been used since 31st December, 1989.</td>
</tr>
</tbody>
</table>

**B.3. Sources and GHGs**

<table>
<thead>
<tr>
<th></th>
<th>Source</th>
<th>Gas</th>
<th>Included</th>
<th>Justification/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>Thermal energy generation from firewood</td>
<td>CO₂</td>
<td>Yes</td>
<td>Major source of emission</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CH₄</td>
<td>No</td>
<td>Excluded for simplification</td>
</tr>
</tbody>
</table>
B.4. Description of baseline scenario

The baseline parameters were identified using a survey of target households for the CPA [CPA name]. The survey was carried out in the [Name of the districts] Districts of [Name of state] state. The survey results show that a typical household has on average 7.2 persons, an annual income of [income in USD] and 4 or 5 heads of cattle.

(i) Non-renewable biomass component

According to the paragraph 4 of AMS-I.E, “Switch from non-renewable biomass for thermal applications by the user”, version 05.0, 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.”

As per paragraph 4 and 5 of AMS I.E. version 05.0, it is assumed that in the absence of the CPA [CPA name], the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs.

Thus, an Emission reduction is calculated as:

\[ ER_y = B_y \times f_{NRR,y} \times NCV_{biomass} \times EF_{projected_fossilfuel} \]

Where:

- \( ER_y \) Emission reductions during the year \( y \) in tCO\(_2\)e
- \( B_y \) Quantity of woody biomass that is substituted or displaced in tonnes
- \( f_{NRR,y} \) Fraction of woody biomass used in the absence of the project activity in year \( y \) that can be established as non-renewable biomass using survey methods or government data or approved default country specific fraction of non-renewable woody biomass (\( f\text{NRR} \)) values available on the CDM website\(^6\).
- \( NCV_{biomass} \) Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)
- \( EF_{projected_fossilfuel} \) Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 tCO\(_2\)/TJ\(^7\)

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\(^6\) [http://cdm.unfccc.int/DNA/fNRB/index.html](http://cdm.unfccc.int/DNA/fNRB/index.html)

\(^7\) This value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis. It is assumed that the mix of present and future fuels used would consist of a solid fossil fuel (lowest in the ladder of fuel choices), a liquid fossil fuel (represents a progression over solid fuel in the ladder of fuel use choices) and a gaseous fuel (represents a progression over liquid fuel in the ladder of fuel use choices). Thus a 50% weight is assigned to coal as the alternative solid fossil fuel (96 tCO\(_2\)/TJ) and a 25% weight is assigned to both liquid and gaseous fuels (71.5 tCO\(_2\)/TJ for kerosene and 63.0 tCO\(_2\)/TJ for Liquefied Petroleum Gas (LPG)).
B_y is determined by using survey method. It is calculated as the product of the number of appliances multiplied by the estimate of average annual consumption of woody biomass per appliance (tonnes/year).

A sample survey was conducted covering [number of households] households of the project beneficiaries for the CPAn [CPA name]. According to the survey, the annual consumption of biomass per appliance per family is [value in t/family/yr] t/family/yr, annual consumption of kerosene per family is [value in liters per family per year] lts/family/year and annual consumption of LPG is [value in kg per family per year] kg/family/year.

f_{NRB,y} is the fraction of biomass used in the absence of the project activity that is non-renewable: 81%.

In the project activity the manures collected by an average surveyed household will be fed into the 2 m³ or 3m³ biogas units. The methane will be captured and used for cooking.

B.5. Demonstration of eligibility for a generic CPA

The eligibility criteria for inclusion of a CPA under the PoA are in accordance with the “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for Programme of Activities”, Version 01.0, annex 3 of EB 65 as follows:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Eligibility Criteria for inclusion in the PoA</th>
<th>Verification of the eligibility condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The geographic boundary of the SSC-CPA area is uniquely defined and located in Sudan.</td>
<td>The CPA xxx is implemented in the households of [name of the towns] in Sudan.</td>
</tr>
<tr>
<td>2</td>
<td>The biogas digester that will be set up in each household, will have a standard contractual agreement with the CME. Each biogas covered under the PoA and SSC-CPA will have a unique serial number which will ensure that there is no double counting.</td>
<td>All the biogas digesters will be installed through contractual agreement. The biogas in the CPA xxx will have unique serial number from [initial serial number] to [final serial number] which ensures that there is no double counting.</td>
</tr>
<tr>
<td>3</td>
<td>The CPA will involve replacement of traditional cook stoves. The biogas that will be installed under CPA will be new biogas digesters. The digester installed under the CPA will be designed based on the technology as described in section A.6 of the PoA DD. It will be ensured that the replaced traditional cook stoves will be disposed of and not used within the boundary.</td>
<td>The CPA xxx will be replacing fuel wood use for cooking purpose. The CPA xxx will install the biogas digester based on the design technology as described in section A.6 of the PoA-DD.</td>
</tr>
<tr>
<td>4</td>
<td>The agreement of the first biogas digester in the CPA will be the start date of the CPA. It will be ensured that the start date of the CPA’s will be after the publication of the PoA for the GSC process.</td>
<td>The Sales Agreement of the 1st digester in the CPA xxx will be the start date of the CPA xxx and the same is after the publication of the PoA for the GSC process.</td>
</tr>
<tr>
<td>5</td>
<td>Uses the small scale approved methodologies AMS I.E, version 05.0. The CME will verify that all CPA-DDs employ aforesaid version of the methodologies.</td>
<td>The CPA xxx will use the small scale approved methodologies AMS I.E, version 05.0.</td>
</tr>
<tr>
<td>6</td>
<td>SSC CPA included in the PoA meet the</td>
<td>The energy saving from biogas supplied</td>
</tr>
</tbody>
</table>
requirements pertaining to the demonstration of additionality falls under positive list as specified in para 2(c) “Guidelines for demonstrating additionality of small-scale project activities” that is “Project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size of each unit is no larger than 5% of the small-scale CDM thresholds.”. The energy saving from installed supplied for SSC CPA will be lower than the 5% of the Type I threshold of 180 GWh\textsuperscript{th} for small scale project activities. The 5% corresponds to maximum of 9 GWh\textsuperscript{th}.

<table>
<thead>
<tr>
<th>7</th>
<th>A Local stakeholder consultation meeting shall be conducted for each of the CPA included in the PoA to gauge the opinions and comments of the stakeholders in the immediate project area. This is a social sector project which will have positive environmental impact through improved indoor air pollution in the households. The use of improved cooking stove technology will reduce the adverse environmental and social impacts associated with the use of non-renewable biomass. The reduced consumption of the stated baseline fuel will have sustainable benefit for all households included in the project activity. The installation of biogas digesters will also contribute to environmental protection by reducing biomass consumption and hence greenhouse gas emissions, mainly CO\textsubscript{2}, when the combusted biomass originates from non-renewable stocks. As use of ICS does not entail significant environmental impacts, it is not necessary to undertake an Environmental Impact Assessments for CPA xxx.</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>The Biogas installation under SSC CPA will not result in diversion of official development assistance.</td>
</tr>
<tr>
<td>9</td>
<td>The SSC-CPA will involve the installation of biogas digester in households. The CPA implementer will install biogas digesters in the households through the channel of the distribution networks created in each province vis-à-vis the distributors. The CPA xxx doesn’t involve diversion of public funding or ODA or that, if used, this did not result in a diversion of official development assistance. The same is confirmed by the letter from [Implementer].</td>
</tr>
</tbody>
</table>
Sampling plan shall be described in each SSC CPA and consistent with the latest standard/guideline for sampling and survey required by CDM EB

As per the “Guidelines on Assessment of Debundling for SSC project activities” in case if each independent subsystem/measures (biogas digester) included in the CPA of a PoA is no greater than 1% of the small scale threshold defined by the methodology applied, then that CPA of PoA is exempted from performing de-bundling check, i.e. considered as being not a de-bundled component of a large scale activity. It will be checked that each biogas under SSC CPA is no greater than 1% of the small scale thresholds.

The SSC CPA will be a voluntary action

The SSC CPA should in conformance with mandatory laws and regulations

The SSC CPA is not registered or being registered, as a stand-alone CDM or as a CPA of another PoA.

For each verification, the number of biogas installed as the part of the program that are still operating will be checked for a representative sample of biogas installed. The representative sample will be determined through the simple random sampling method. Further the CME will depute a third party agency for checking the efficiency of representative sample of the installed biogas (the representative sample will be determined using the simple random sampling method) annually. Average annual consumption of woody biomass per appliance substituted will also be determined using the simple random sampling procedure for each CPA before the installation of the biogas digesters.

The proposed CPA [CPA name] will reduce greenhouse gas emissions by preventing methane emission to the atmosphere from the existing manure management system and this will also displace emission of CO$_2$e associated with the cooking in [number of households] households that would have happened in the absence of the installation of household biogas in the [number of households] households in [name of districts] districts of [name of state] state.

B.6. Estimation of emission reductions of a generic CPA
B.6.1. Explanation of methodological choices

The CPA xxx is a voluntary action[Name of the Implementer]. The same is confirmed by the letter from [Implementer]

The CPA xxx is in conformance with mandatory laws and regulations.

CPA xxx is not registered or being registered, as a stand-alone CDM or as a CPA of another PoA.

The average annual consumption of woody biomass per appliance substituted has been determined using the simple random sampling procedure for CPA: xxx as [Average fuel wood consumption in tonnes / household / annum]

>>
Type I: Renewable Energy Projects: Category IE: Switch from Non-Renewable Biomass for Thermal Applications by the User I.E./Version 05.0; lays down the step-wise approach for projects for which the methodology is applicable. These are followed, as demonstrated above.

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

<table>
<thead>
<tr>
<th>Data / Parameter</th>
<th>$f_{\text{NRB},y}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit</td>
<td>%</td>
</tr>
<tr>
<td>Description</td>
<td>Fraction of woody biomass used in the absence of the project activity in year. Default value is being used.</td>
</tr>
<tr>
<td>Source of data</td>
<td><a href="https://cdm.unfccc.int/Panels/ssc_wg/meetings/035/ssc_035_an20.pdf">https://cdm.unfccc.int/Panels/ssc_wg/meetings/035/ssc_035_an20.pdf</a></td>
</tr>
<tr>
<td>Value(s) applied</td>
<td>81%</td>
</tr>
<tr>
<td>Choice of data or Measurement methods and procedures</td>
<td></td>
</tr>
<tr>
<td>Purpose of data</td>
<td>Calculation of baseline emission</td>
</tr>
<tr>
<td>Additional comment</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data / Parameter</th>
<th>NCV_{\text{biomass}}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit</td>
<td>TJ/t</td>
</tr>
<tr>
<td>Description</td>
<td>Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)</td>
</tr>
<tr>
<td>Source of data</td>
<td>IPCC</td>
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<td>Value(s) applied</td>
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<tr>
<td>Choice of data or Measurement methods and procedures</td>
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</tr>
<tr>
<td>Purpose of data</td>
<td>Calculation of baseline emission</td>
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<td>Additional comment</td>
<td></td>
</tr>
</tbody>
</table>
### Data / Parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Unit</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>( B_y )</td>
<td>81%</td>
<td>-</td>
<td>Default value</td>
</tr>
<tr>
<td>( F_{NRB, y} )</td>
<td>0.015</td>
<td>TJ/tonnes</td>
<td>2006 IPCC Table 1.2</td>
</tr>
<tr>
<td>( EF_{\text{projected}}_{\text{fossil fuel}} )</td>
<td>81,600</td>
<td>Kg CO_2/TJ</td>
<td>Methodology AMS I.E.</td>
</tr>
</tbody>
</table>

\[
ER_y = B_y \cdot f_{NRB, y} \cdot NCV_{\text{biomass}} \cdot EF_{\text{projected}}_{\text{fossil fuel}}
\]
Project Emission

Project emission is zero as per AMS I E.

Leakage

As per the paragraph 10 of the methodology AMS I E Version 05,

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

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

As per the paragraph 11 of the methodology AMS I E Version 05 “If equipment currently being utilized is transferred from outside the boundary to the project activity, leakage is to be considered.”

The project does not involve any transfer of equipments from outside the project boundary to the project boundary. Thus the above provision on leakage is not applicable.

As per the paragraph 18, of the methodology AMS I E Version 05, “The use of this methodology in a project activity under a programme of activities is legitimate if the following leakages are estimated and accounted for, if required on a sample basis using a 90/30 precision for the selection of samples, and accounted for:
(a) Use of non-renewable woody biomass saved under the project activity to justify the baseline of other CDM project activities can also be a potential source of leakage. If this leakage assessment quantifies a portion of non-renewable woody biomass saved under the project activity that is then used as the baseline of other CDM project activities then $B_{old}$ 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.”

$B_{y}$ will be multiplied by a net to gross adjustment factor of 0.95 to account for leakages in line with the paragraph 10 and paragraph 11 of the Approved methodology AMS I E Version 05.

Thus, $B_{y} =$ Average annual consumption of woody biomass per household * number of appliances installed * percentage of appliances in operations * 0.95

B.7. Application of the monitoring methodology and description of the monitoring plan
B.7.1. Data and parameters to be monitored by each generic CPA
(Copy this table for each data and parameter)
### Data / Parameter

<table>
<thead>
<tr>
<th>Description</th>
<th>Number of biogas units constructed for the CPAn [CPA name]</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Source of data</th>
<th>Business plan</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Value(s) applied</th>
<th>The timeline of construction of the units will be monitored and database Maintained.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement methods and procedures</td>
<td>100% of the units will be monitored from the procurement of material till construction and commissioning of the biogas units of the CPAn [CPA name]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>QA/QC procedures</th>
<th>Purpose of data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring frequency 100% of the units will be monitored from the procurement of material till construction and commissioning of the biogas units of the CPAn [CPA name]</td>
<td>Calculation of baseline emissions</td>
</tr>
</tbody>
</table>

### Additional comments

**B.7.2. Description of the monitoring plan for a generic CPA**

**Maintenance of the Biogas Units:**

The project participants will conduct number of capacity building programme to ensure that households will be educated on the benefits and functional aspects of biogas plant. The CPAn controller will appoint the local coordinator who will be the contact person for some villages. Beneficiaries (end users) households will be intimated about the local coordinator and he will be the point of contact for the household. The beneficiaries will contact the local coordinator in case of any fault in the biogas plant and take steps to resolve the problem. The local coordinator also informs the central office on the problem faced by the end users faulty issues and the shut down days of digester due to fault. The same will be
noted at the central office. The fault will be addressed immediately by the operation and maintenance team.

Repairs and maintenance will be undertaken by CPAn controller Staff and problems fixed within 7 working days. A portion of the CER revenues received as forward funding by the project will be set aside for such repair and maintenance during the ERPA period.

Each biogas plant will be given a unique identification number and the relevant data associated with the CDM project will be monitored, recorded, stored and archived for crediting years plus 2 years. Monitoring shall consist of checking of all appliances thereof, at least once every two years (biennial) to ensure that they are still operating or are replaced by an equivalent in service appliance.

**Authority for Review:**

In addition to the established systems and procedures by which daily usage is monitored and problems identified, the CPAn CDM Local Coordinators and project monitoring team will randomly check to ensure that the monitoring systems actually work. They will listen to End User complaints and obtain feedback on performance. These observations will be discussed in the weekly Staff Meetings in order to improve standard operating practices.

**Training:**

The details of this particular CDM Project, including revenue flows, costing, selection of End Users, maintenance fund generation/management, monitoring requirements, etc. will be communicated in an open and transparent manner to the households.

Specific training sessions for skill upgradation, monitoring capacity, and usage/maintenance will be imparted to Project Staff, Masons and End Users. A manual that contains the information needed for project implementation and monitoring will be used in this exercise.

- Monitoring I E

*Para 12.* Monitoring shall consist of checking of all appliances or a representative sample thereof, at least once every two years (biennial) to ensure that they are still operating or are replaced by an equivalent in service appliance.

This will be done once every two years.

*13. In order to assess the leakages specified under paragraph 10, monitoring shall include data on the amount of woody biomass saved under the project activity that is used by non-project households/users (who previously used renewable energy sources). Other data on non-renewable woody biomass use required for leakage assessment shall also be collected.*

The project developer considers net to gross adjustment factor of 0.95 to account for leakage. By is multiplied by a net to gross adjustment factor of 0.95 to account for leakages. Thus, surveys are not required.

*14. Monitoring should confirm the displacement or substitution of the non-renewable woody biomass at each location.*

This will be confirmed through survey.

The project developer will provide the service to see that all the plant will be in operation and in case of operational issues it will be resolved at the earliest. The project participants will conduct number of capacity building programme to ensure that households will be educated on the benefits and functional aspects of biogas plant. The CPAn controller will appoint the local coordinator who will be the contact person for some villages. Beneficiaries (end users) households will be intimated about the local
coordinator and he will be the point of contact for the household. The beneficiaries will contact the local coordinator in case of any fault in the biogas plant and take steps to resolve the problem. The local coordinator also informs the central office on the problem faced by the end users faulty issues and the shut down days of digester due to fault. The same will be noted at the central office. The fault will be addressed immediately by the operation and maintenance team.
Appendix 1: Contact information on entity/individual responsible for the PoA

<table>
<thead>
<tr>
<th>Organization</th>
<th>Agricultural Technology Transfer Society</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street/P.O. Box</td>
<td>P.O. Box 321</td>
</tr>
<tr>
<td>Building</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>Khartoum</td>
</tr>
<tr>
<td>State/Region</td>
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<tr>
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<td>Country</td>
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</tr>
<tr>
<td>Telephone</td>
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</tr>
<tr>
<td>Fax</td>
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<tr>
<td>E-mail</td>
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</tr>
<tr>
<td>Website</td>
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</tr>
<tr>
<td>Contact person</td>
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</tr>
<tr>
<td>Title</td>
<td></td>
</tr>
<tr>
<td>Salutation</td>
<td>Ms.</td>
</tr>
<tr>
<td>Last name</td>
<td>Ahmed</td>
</tr>
<tr>
<td>Middle name</td>
<td></td>
</tr>
<tr>
<td>First name</td>
<td>Muna</td>
</tr>
<tr>
<td>Department</td>
<td>Secretary General</td>
</tr>
<tr>
<td>Mobile</td>
<td></td>
</tr>
<tr>
<td>Direct fax</td>
<td>+249 183 270440</td>
</tr>
<tr>
<td>Direct tel.</td>
<td></td>
</tr>
<tr>
<td>Personal e-mail</td>
<td><a href="mailto:Munamm789@yahoo.com">Munamm789@yahoo.com</a></td>
</tr>
</tbody>
</table>

Appendix 2: Affirmation regarding public funding

A confirmation that no funding from Annex 1 parties has been used for this CPA or that, if used, this did not result in a diversion of official development assistance.

Appendix 3: Application of methodology(ies)

Type I: Renewable Energy Projects

Category I.E.: Switch from Non-Renewable Biomass for thermal application by the user

I.E./Version 05.0

EB 68
Appendix 4: Further background information on ex ante calculation of emission reductions

Please refer section B.6.1

Appendix 5: Further background information on the monitoring plan

Please refer section B.7.2

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Nature of revision(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>02.0</td>
<td>EB 66, 13 March 2012</td>
<td>Revision required to ensure consistency with the &quot;Guidelines for completing the programme design document form for small-scale CDM programmes of activities&quot; (EB 66, Annex 13).</td>
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</table>

Decision Class: Regulatory
Document Type: Form
Business Function: Registration