**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):

Hebei Animal Manure Management System (AMMS) GHG Mitigation Programme

Version: 03.1

Date: 10/01/2013

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

#### 1. General operating and implementing framework of PoA

The Hebei Animal Manure Management System (AMMS) GHG Mitigation Programme aims at developing a series of small scale methane recovery and utilization project activities to mitigate greenhouse gas (GHG) emissions by modifying the manure management systems in livestock farms from anaerobic treatment including open lagoon to biogas digesters and utilizing the generated biogas to provide electricity or thermal energy or both thermal energy and electricity for the livestock farms and/or households nearby.

This PoA will potentially involve livestock farms in 11 prefectures of Hebei province that generate an intensive amount of GHG emissions. The locations of the participating prefectures are: Handan, Xingtai, Shijiazhuang, Hengshui, Cangzhou, Baoding, Langfang, Tangshan, Qinhuangdao, Chengde, and Zhangjiakou. The PoA plans to construct biogas digesters in around 600 intensive livestock farms, in which, 200 intensive livestock farms will construct medium scale biogas digesters (300-1000 $m^3$), and 400 intensive livestock farms will construct large scale biogas digesters (>1000 $m^3$).

The baseline manure management system prior to the implementation of each CPA was anaerobic treatment. The CDM Programme of Activities (CPAs) included in this PoA consist in the installation of biogas digester system to capture biogas, utilization of biogas to provide electricity, or thermal energy, or both thermal energy and electricity, and the installation of flare system to combust the excess biogas, which will be applied in one or multiple livestock farms within the boundary of the PoA. The revenue obtained from carbon credits will support the program implementation by making the individual activity viable and therefore encouraging livestock farms to improve their waste management technologies. Table A1 lists three scenarios of biogas utilization.

Table A1: Scenarios of biogas utilization under this PoA

| Scenario | Description |
|---|---|
| A | Biogas will be routed to produce heat for internal use in the farms and/or nearby household. |
| B | Feed captured biogas to the power generator to produce electricity, which will displace grid electricity, for use of the farm itself or nearby household. |
| C | Use biogas to provide both thermal and electricity by using boiler/heater and power generator separately, for use of the farm itself or nearby household. |

The design of the medium and large scale biogas digesters will meet the requirements of the *Technical Standards of Biogas Digester* (NY/T220.1-2006) and the *Technical Standards of Biogas Digester for Intensive Livestock Farms*(NY/T222-2006).

Hebei Provincial government faces significant hurdles in attracting livestock farmers and commercial investors to finance and develop biogas plants due to barriers such as high investment cost and operational uncertainty etc. The objective of this programme is to give livestock farm owners access to carbon finance as a financing source to implement advanced biogas digester systems promoted by Hebei Provincial government. The investment decisions to participate in this project are made by individual farm owners on a purely voluntary basis.

Hebei Green Agriculture Co. Ltd, which has a rich experience in the design and construction of biogas digesters, will participate in this project as a Coordinating/Managing Entity (hereinafter referred to as CME). Hebei Green Agriculture Co. Ltd owns extensive biogas digester service network which will be used for the implementation of PoA at the CPA level hence it is the best candidate to initiate and coordinate the PoA action.

## 2. Policy/measure or stated goal of the PoA

The program aims to establish a sustainable livestock waste management model that would significantly improve rural environment and reduce greenhouse gas emissions, through the use of a programmatic approach for biogas digester activities.

In addition to reduce significant GHG emissions compared to the baseline condition, the proposed Hebei AMMS GHG Mitigation Programme will improve living conditions in rural communities near the project sites and is well in line with the development priorities defined by China's central government. The implementation of the Programme will protect human health and the environment, solve animal manure pollution problems, facilitate agricultural restructuring, and increase farms' income, which demonstrates a model for other livestock operations. It supports China's sustainable development strategy in the following ways:

(i) Improving the local environment and human health. The proposed Hebei AMMS GHG Mitigation Programme, through installing biogas digesters and biogas utilizing systems, aims to reduce negative environmental impacts of intensive livestock production. Treatment of large quantities of animal waste instead of open lagoon will reduce organic material in wastewater and the nuisance of odors and wastewater, thus decreasing diseases vectors and bacteria, and leading to better environmental conditions and local quality of life.

(ii) Creating job opportunities and increasing farms' income. The Hebei AMMS GHG Mitigation Programme brings several contributions to improving social and economic conditions for intensive livestock farms. This programme will increase local employment for skilled labor during production, installation, operation, and maintenance of equipment and systems. The programme will reduce the farms energy costs for operation of the livestock farms.

(iii) Diversifying energy supply. The programme will diversify the source of the energy supply through biogas production with biogas-based heating and power generation systems. The implementation of the programme can contribute to the reduction of the country's heavy dependence on coal to generate electricity and provide heat.

(iv) Application of advanced technology. The Hebei AMMS GHG Mitigation Programme will apply new, advanced, and environmentally friendly technologies in treating animal wastes, which can be replicated by other CAFO livestock farms to dramatically reduce livestock-related GHG emissions, produce new sources of revenue and green power, raise economic benefits from the livestock industry and promote utilization of agricultural waste, hence building a circular economy. The programme will also provide technological support to the local farms, thus ensuring safe conditions for farmers to adopt and operate biogas digesters and other related equipment.

### 3. Confirmation that the Proposed PoA is a Voluntary Action by the Coordinating/Managing Entity

This programme is purely a voluntary initiative undertaken by Hebei Green Agriculture Co. Ltd, which is the CME of this PoA. There are no mandatory requirements in China enforcing the use of biogas digesters to treat animal manure produced in livestock farms or the use of biogas digesters to provide thermal energy or electricity.

## A.3. Coordinating/managing entity andparticipants of SSC-POA:

Hebei Green Agriculture Co. Ltd will be the coordination/managing entity of this PoA. Information relating to the parties involved in the project activity is described in Annex 1. The parties involved are:

Table A2: Parties involved in the PoA

| Name of Party involved (*) (host indicates a host Party) | Private and/or public entity(ies) project participants (*) (as applicable) | Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|---|---|---|
| People's Republic of China (host) | Hebei Green Agriculture Co. Ltd | Yes |

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

### A.4.1. Location of the programme of activities:

#### A.4.1.1. Host Party(ies):

The host party for the project is People's Republic of China.

#### A.4.1.2. Physical/ Geographical boundary:

The geographical boundary for the PoA is Hebei Province of P. R. China. The geographic coordinate is N36° 1' 0.12" ~ N42° 37' 0.12" (36.0167~42.6167 latitude)
E113° 4' 0.12" ~ E119° 52' 59.88" (113.0667~119.8833 longitude).


Figure A1: The proposed PoA location in China


Figure A2: Location of prefectures and counties in Hebei Province

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

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

The proposed activity for all CPAs in this PoA is to construct anaerobic biogas digesters to capture biogas. The captured biogas will be utilized to provide electricity or thermal energy or both thermal energy and electricity. The PoA will replace baseline manure management system (including open anaerobic lagoons) with advanced biogas digester systems and energy supply system(s). Technology or measures to be employed in the PoA will comprise of four stages, which are biogas production in anaerobic digesters, biogas collection and purification, biogas utilization, and land application of biogas digesters residue, as described in figure A3-1 to A3-3.

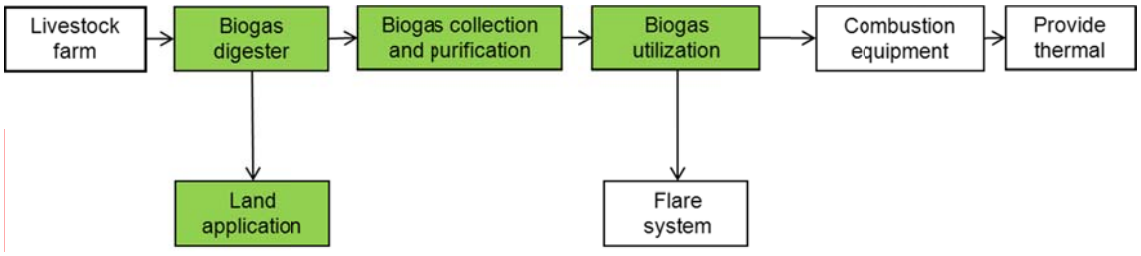


Figure A3-1: Technology or measures to be implemented in the PoA Scenario A

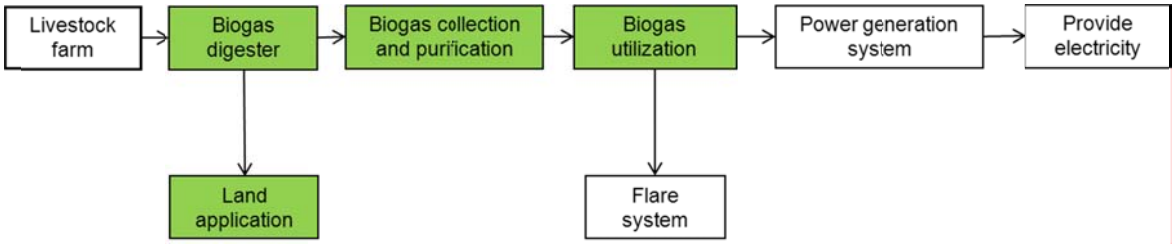


Figure A3-2: Technology or measures to be implemented in the PoA Scenario B

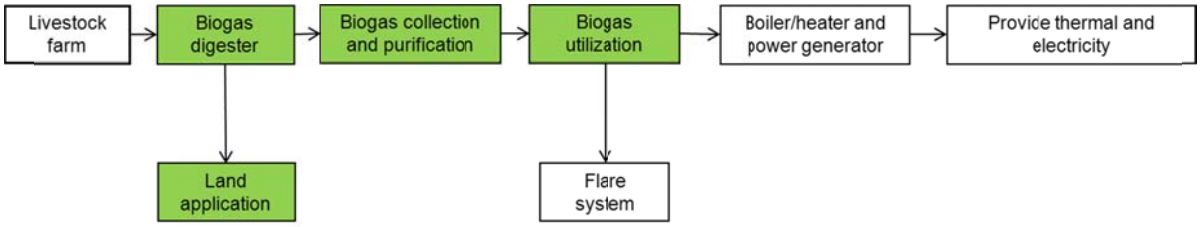


Figure A3-3: Technology or measures to be implemented in the PoA Scenario C

***Stage 1: Biogas production in anaerobic digesters:*** Sealed anaerobic digesters (AD) are one of the most important equipment in animal manure treatment. The anaerobic digesters receive the animal manure and maintain a steady–state population of methanogenic bacteria for degradation. Methanogenic bacteria convert organic matter into biogas in the anaerobic environment. To ensure the air-tightness of the anaerobic digesters, measures will be adopted to reduce possible leakage from the anaerobic fermentation process.

***Stage 2: Biogas collection and purification:*** the biogas derived from the sealed anaerobic digesters is mixed gas, containing combustible $CH_4$ and inert $CO_2$, as well as $H_2S$ and other solids in grain form. In addition to its toxicity, $H_2S$ may cause anerodibility sufficient for shortening the life of biogas distribution system. In this project, oxidation desulfurizing tower will be used for biogas purification. The purified biogas will be stored in the gas tank. In addition, an open flare system will be installed for preventing over pressure and explosion risk of the anaerobic digesters.

***Stage 3:Biogas utilization:*** The biogas is to be utilized for provision of electricity, or thermal energy, or both thermal and electricity energy. Three scenarios of biogas utilization are envisaged:

A) Captured biogas of some CPA will be routed to produce heat for internal use in the farms and/or households nearby

B) Some CPAs will feed captured biogas to the power generator to produce electricity, which will displace grid electricity, for use of the farm itself or nearby household.

C) Some CPAs will use biogas to provide both thermal and electricity by using boiler/heater and power generator separately.

A pressure indication device is installed to ensure proper control of gas flow for end users. To ensure all collected biogas is burned, special maintenance procedures have been developed to ensure safe use of biogas. The flare system will also be operated for downtime periods of the generator, such as maintenance or malfunction, to ensure gas is not vented into the atmosphere during these events.

***Stage 4:Land application of biogas digester residue and sludge*:** The residue and sludge from biogas digesters will be applied to dry land fields, such as maize, wheat, orchard, which are under aerobic condition.

The CME will take integrated measures to ensure successful implementation of the project. These measures include careful specification and design of a complete technology solution, identification and qualification of appropriate technology/service providers, supervision of the complete project installation, and stringent monitoring and management plans. The operating staff will be trained to ensure that all installed equipment are properly operated and maintained, and will carefully monitor the data collection and recording process. Through daily management, staff will acquire appropriate expertise and resources to operate the system on an ongoing/continuous basis.

All technologies utilized in the project activity are domestic technologies and there will be no international technology transfer involved in this project.

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

The eligibility criteria for inclusion of CPAs in the PoA:

1. The project boundary has to be within the geographical territory of Hebei Province. The location will be specified in each CPA –DD.

2. To meet the condition that avoid double counting of emission reductions, the proposed CPA under this PoA has not been and will not be either registered as a single CDM project activity or included as a CPA under another PoA: a **unique identification number** will be included in the specific CPA-DD for each farm included in the CPA-DD. **Geographical coordinates** of each farm will be the basis for the unique identification number. In addition, the CME will check the UNFCCC website with the date of access, and a statement from CME will be included in CPA-DD that the specific CPA will not be part of another single CDM project activity or CPA under another POA.

3. The proposed CPAs shall use the same principle technologies, which include the construction of anaerobic biogas digesters to replace open lagoon to treat the manure from confined livestock farms to achieve methane recovery and destruction by flaring/combustion or gainful use of the recovered methane. Open flare system shall be installed to prevent any over pressure and

explosion risk. The captured biogas can be used to provide thermal or electrical energy, or both thermal and electrical energy, that displaces fossil fuel. Specific biogas digester technologies, utilization or flaring of captured biogas, as well as the manure storage time limit and aerobic residues handle measures with the requirement of AMS III. D will be described in specific CPA-DD.

4. The starting date of the CPA is the earliest date at which either the implementation or construction or real action of a CDM project activity, and it cannot be prior to 11/05/ 2011, the commencement of validation (date of beginning of the Global Stakeholder Process posted on the UNFCCC website).

5. The proposed CPA meets the applicability condition of applied methodology AMS III.D version 18, The CPA should present the following characteristics:
    a) The livestock population in the farm is managed under confined conditions;
    b) Manure or the streams obtained after treatment are not discharged into natural water resources;
    c) In the baseline scenario the retention time of manure waste in the anaerobic treatment system is greater than one month, and in the case of anaerobic lagoon in the baseline, their depths are at least 1 m;
    d) No methane recovery and destruction by flaring, combustion or gainful use takes place in the baseline scenario.
    e) The residual waste from manure management should be handled aerobically. In case of soil application of the final sludge the proper conditions and procedures (not resulting in methane emissions) must be ensured.
    f) The captured biogas of the CPA should be used for thermal or electricity supply, or both thermal and electricity supply, and flaring system will be installed to ensure that excess biogas produced by the digester is flared.
    g) The storage time of the manure after removal from the animal barns, including transportation, should not exceed 45 days before being fed into the anaerobic digester when the dry matter content of manure is less than 20%.
    h) Each livestock farm will use its own livestock manure produced on site to feed the biogas digester. No manure will be collected/processed/transported from off-site.

6. The biogas generated under CPA will be utilized to supply thermal energy and/or electricity to displace fossil fuel, and should meet applicability conditions of one of the two applied methodologies AMS I.C Version 19 and/or AMS I.F version 2, or both; Specifically, Scenario A as described in Stage 3 Biogas Utilization in the section A4.2.1 should meet the application conditions of AMS I.C Version 19. Scenario B should meet the application conditions of AMS I.F Version 2, and Scenario C should meet the applicability conditions of both AMS I.C Version 19 and AMS I.F Version 2. The PoA will not apply biomass co-generation unit. The specific CPA should present following characteristics wherever they are applicable:
    a) The specific CPA included in the proposed PoA is installation of a new biogas based boiler(s) or/and power generator(s) at a livestock farm where there was no renewable thermal energy supply and no renewable power plant operating prior to the implementation of the project activity. . This criterion applies to Scenario A), B) and C).
    b) The specific CPA supply biogas based electricity to user(s) that would have otherwise been supplied by the North China Power Grid. This criterion applies to Scenario B) and Scenario C).
    c) If electricity and/or heat produced by the project activity is delivered to a third party i.e. another facility or facilities within the project boundary, a contract between the supplier

and consumer(s) of the energy will have to be entered into that ensures there is no double-counting of emission reductions. This criterion applies to Scenario A), B) and C).

d) Each livestock farm to be included in CPA will construct biogas digester and install new energy generating equipment to utilize the biogas. No energy generating equipment is transferred from another activity or outside the project boundary. This criterion applies to Scenario A), B) and C).
e) The replaced coal-based boiler, if existing in the baseline, is kept onsite as backup for thermal energy supply. This criterion applies to Scenario A) and Scenario C).
f) CPAs are only eligible when coal is used as a baseline fuel in the existing farms and nearby households where coal is being displaced. This criterion applies to Scenario A) and Scenario C).

7. The CPA is not new livestock farming facilities (Greenfield projects) nor project activities involving livestock farming capacity additions compared to the baseline scenario.

8. The proposed CPA meets small scale CDM project applicability conditions. Aggregated emission reductions of the CPA is less than or equal to 60 kt $CO_2$ equivalent annually; The maximum output capacity equivalent of each CPA should not exceed 15 megawatts or equivalent to 45 MW thermal output of the equipment or the plant.

9. The proposed project activity has to be voluntary action by the livestock farms involved in one of the CPAs under the PoA and the implementation of the proposed project activity is not to fulfill any mandatory policy or regulation; The statement on voluntary action by the CPA implementer and no requirement or enforcement under existing regulation will be included in the CPA-DD.

10. Additionality criteria: as per "Guidelines on the demonstration of additionality of small-scale project activities" (version 09), the PoA choose d) other barrier(s) to demonstrate additionality. Due to the other barrier, the investment on biogas technology become financially unviable and the project would not have occurred without carbon finance support. The additionality criteria that demonstrate the existence of the other barrier in an objective manner is defined as that the equity Internal Rate of Return (IRR) after tax, is lower than the defined livestock industry benchmark of 9%.

11. As the requirement related to undertaking local stakeholder consultations and environmental impact analysis, if the power generation is envisaged as a component of the project, an approved Environmental Impact Assessment is available at the time of inclusion of CPA; The related official EIA document number and major conclusions will be included in CPA-DD.

12. In case there is funding from annex 1 country, the proposed CPA will provide an affirmation that funding, does not result in a diversion of official development assistance;

13. The proposed CPA project activity is not a debundled one whose project boundary is not within 1 km of the project boundary of the proposed small-scale activity at the closest point.

**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):**

Currently livestock manure management system for intensive livestock farms is open anaerobic lagoons. This manure treatment practice is in line with relevant legislation in Hebei Province. There is no

mandatory policy or regulation by national, provincial or local government of China which insists on the treatment of manure by biogas digesters. There is also no requirement for environmental reasons or GHG emission reduction using biogas digesters instead of open lagoon. Therefore PoA is not implementing any mandatory policy or regulation of the Government of China and is considered as a voluntary action by the CME.

The proposed PoA will install anaerobic biogas digesters to treat manure, mitigate $CH_4$ emission from open lagoon, and use biogas for providing thermal energy or electricity, or both thermal and electricity energy. Hebei Green Agriculture Co. Ltd has proposed a voluntary coordinating action as the CME for the PoA. CME has initiated the programme activity on a voluntary basis considering CDM benefits as a driving factor. This initiative by the CME would not have been taken up if potential CDM revenue was not considered.

As per "Guidelines on the demonstration of additionality of small-scale project activities" (version 09), it is demonstrated below that the PoA would not have occurred in the absence of the CDM consideration due to various barriers stated below:

*a. Legal issues*

There is one relevant regulations regarding to manure management of livestock/poultry farms. It is 《Pollution Prevention Management Measures for Livestock and Poultry Breeding》 published by State Environmental Protection Agency on 8 May, 2001. It required the livestock and poultry farms to set storage facility to store livestock/poultry manure. However, it didn't mandate to construct biogas digester to treat the manure[1]. There is no national or local requirement to control GHG emissions of agricultural industrial operations, including husbandry industry in China. In summary, current domestic policies and regulations in China do not stipulate the treatment of manure by biogas digester.

*b. Other Barrier*

The core business of livestock farms is to operate the farms on a profitable basis by raising animal population and providing high-quality final products. Modification or replacement of the existing anaerobic lagoon or other anaerobic treatment practice is not a financially attractive option for the livestock farms. It is also difficult to secure financial support from commercial banks because of the low revenue of the livestock farms.

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

### A.4.4.1. Operational and management plan:

The construction and equipment installation for the biogas production, biogas for thermal or electricity generation, or both thermal and electricity generation, will be carried out by qualified company contracted by livestock farm owners. Operation and monitoring of biogas digester system is carried out by the livestock farm owners. Training of the operation and monitoring of the biogas digester is given by CME and outsourced technicians and experts. Technical staff in each livestock farm included under a CPA will cooperate with CME to implement the CPA. Technical staff in each livestock farm will monitor the system performance according to the monitoring plan developed by CME.

[1] http://www.zhb.gov.cn/gkml/zj/jl/200910/t20091022_171815.htm.

The operational, management and monitoring plan for the Programme of Activities (PoA) is shown below:

The detailed responsibility of each institution is described below:

1) The responsibility of each livestock farm will include the following:
   - Construction of biogas digester, biogas utilization systems and installation of relevant meters for monitoring under the guidance of CME;
   - Operation of biogas system and daily maintenance;
   - Provision of relevant information required for baseline identification and additionality assessment;
   - Monitoring of biogas system and related livestock production parameters based on the monitoring plan described in the CPA;
   - Maintenance of original monitoring data /record;
   - Provision support of validation and verification.

2) The responsibility of CME will include following:
   - Registration of PoA;
   - Application for the inclusion of a CPA under PoA;
   - Publication of each CPA information on its website, including: 1)Name of the CPA; 2) Address; 3)GPS (latitude and longitude); and 4) Commissioning date;
   - Application of issuance of CERs of CPA;
   - With support of outsource technician and experts, training the staff of livestock farm who are responsible for the construction, operation and monitoring of biogas digester, provision of technical support to ensure proper operation of biogas digester;
   - Transfer of CERs revenue to livestock farms involved in each CPA.
   - CPA development: 1) Collection of information and identification of potential CPAs under PoA, including eligibility assessment, baseline identification and additionality assessment; 2) Preparation of Project Design Document for the eligible CPAs;
   - Provision of technical support to each livestock farm on site monitoring;
   - Maintenance of specific information for each livestock farm under the PoA;
   - Data back-up and archival, and establishment of database ,process and analysis of monitored parameters,;
   - Provision support of validation / verification during the crediting period;
   - Preparation of monitoring report for emission reduction with outsourced support;
   - Checking of information eligibility criteria of CPA under PoA and to avoid double accounting;
   - Checking of monitored data and records;
   - Provision guidance to each livestock farm to calibrate the monitoring equipment.

Manual data recording will be kept in the log book and input to computer by the livestock farms. The captured data will be stored in the computer and print out as paper document. CME will collect all data related to CDM once a month with a hard copy and electronic version. Figure A4 presents the record keeping system and archive system for each CPA and the PoA.

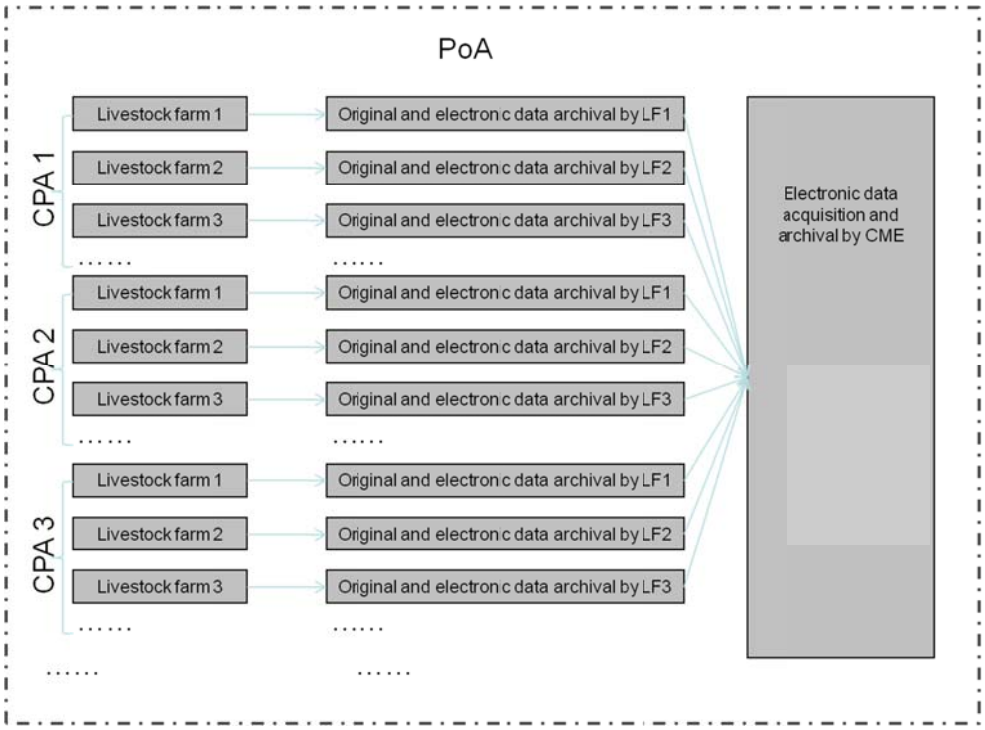


Figure A4: Record keeping system and archive system for PoA

The CME will provide as per EB 55 Annex 38 Paragraph 6(i), 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 a CDM project activity or as a CPA of another PoA:

1) At time of CPA eligibility check, CME will seek confirmation in SSC-CPA and also check any double counting using public information sources like UNFCCC website data, NDRC CDM website and so on;

2) The CME will sign an agreement with each livestock farm that is willing to participate in the PoA;

3) In the signed agreement, each livestock farm will ensure that the livestock farm is not registered in any other SSC CPA of this PoA and any other PoA, or any other registered CDM Project activity;

4) The CME will publish the unique identification information of each livestock farm involved in the PoA on the CME website;

5) The CME will develop a database that will record: 1) similar registered projects which apply one or some of the three methodologies in Hebei Province; 2) similar CPAs included in other PoA in Hebei Province; 3) CPAs included in this PoA. Any new incoming CPA will be examined against the above mentioned information in the database therefore double counting can be eliminated.

As per EB 65 Annex 3, the CME shall

1) Demonstrate that compliance with the additionality related eligibility criteria set in the PoA design document will ensure that all the relevant additionality related guidelines, tools or any requirements embedded in the methodologies are met;

2) Develop eligibility criteria for inclusion of a CPA under the PoA and shall include these criteria in the PoA design documents (e.g. CDM-SSC-PoA-DD) and demonstrate their usability to assess the inclusion of CPAs in the generic CDM-SSC-CPA-DD;

3) Have the competencies to check the features of potential CPAs and ensure that each CPA meets all requirements and eligibility criteria before inclusion in the registered PoA. The CME shall develop and implement a management system that includes the following made available to the DOE at the time of validation of the PoA:
   (a) A clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies;
   (b) Records of arrangements for training and capacity development for personnel;
   (c) Procedures for technical review of inclusion of CPAs;
   (d) 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);
   (e) Records and documentation control process for each CPA under the PoA;
   (f) Measures for continuous improvements of the PoA management system;
   (g) Any other relevant elements.

4) Update the eligibility criteria to the requirements of the revised or new methodologies with immediate effect if the version of methodologies applied by the PoA is revised or replaced, subsequent to being placed on hold;

5) Update the eligibility criteria to reflect the consequent changes if the boundary of the PoA is amended post-registration to expand the geographic coverage or to include one or more additional host Parties;

6) Update the eligibility criteria to reflect the consequent changes if the revision of the eligibility criteria of this PoA is requested by the Board.

The "Guidelines on assessment of debundling for SSC project activities (version 03.1)" will be applied to demonstrate that the SSC CPA included in the PoA is not a de-bundled component of another CDM PoA or another CDM Project activity.

1) The livestock farms will provide the statement to CME stating that, they are aware and have agreed that their activity is subscribed to the PoA.

   The livestock farms have to give a declaration to CME that the project activity is not a component of other large scale projects.

2) Besides self-declaration, a check will be undertaken to see if a proposed small-scale CPA satisfies both conditions (a) and (b) below:

   a) Has the same activity implementer as the proposed small scale CPA or has a coordinating or managing entity, which also manages a large scale PoA of the same technology/measure, and;

   (b) The boundary is within 1 km of the boundary of the proposed small-scale CPA, at the closest point.

If the proposed small-scale CPA satisfies both conditions, it is a debundled component of a large scale project.

**A.4.4.2. Monitoring plan:**

The CME has opted for verification of each CPA by DOE, all farms will monitor the parameters specified in E.7.1. However considering the number of farms included in each CPA and the standardized and homogeneous monitoring procedures set up in the PoA, it is suggested for the DOE to select randomly a sample of farms in each CPA at verification.

Monitoring plan for each CPA (covering monitoring of all individual farms), will be developed according to the applied baseline and monitoring methodologies. The transparent system will be developed for monitoring, data collection and storage. Transparent system is defined to ensure that no double counting occurs (refer section A.4.4.1).

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

No public funding is implemented in this PoA. The coordinating/managing entity will ensure that, at the time of inclusion of CPA, there is no public funding from Annex I Parties received. This can be confirmed through declaration given by the owners of livestock farms to coordinating/managing entity.

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

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

The start date of the crediting period is 01/02/2013 or the date of the registration of the PoA, whichever is later. And the start date of PoA is 11/05/2011, which is the starting date of global stakeholder process posted on the UNFCCC

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

28 years.

## SECTION C. Environmental Analysis

**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:**

Environmental Analysis is done at PoA level ☐

Environmental Analysis is done at SSC-CPA level ☒

Every livestock farm included in the PoA will undertake environmental impact analysis. Assessment report will be approved by appropriate level of environment agency in Hebei Province. The approval letter will be provided to DNA for the national approval of CPA. Hence, the CME proposes to undertake environmental impact analysis at CPA level.

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

Not Applicable.

**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),:**

Chinese environmental legislation ***Categorization of construction project and the requirement for environmental impact assessment*** does not require an Environmental Impact Assessment for biogas digester project, in general but EIA is required for biogas project with power generation component.

**SECTION D. Stakeholders' comments**

**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 ☐

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

The program stakeholder consultations have been conducted by the CME, to inform the program stakeholders about the program objective and activities, and collect the feedbacks and comments on the program concept and design framework, as well as the willingness in participating in the program. The local stakeholders' comments have been invited and compiled through issuing public notification, holding workshop and circulating and collecting questionnaires by Hebei Renewable Office with the assistant of Hebei Green Agricultural Company.

(1) Public notification

Public notifications introducing program objective, main activities, expected benefits and modalities of the P-CDM farm-level biogas project were prepared and posted on the website of Hebei Renewable Energy Network to solicit the public comments on the program from March 15, 2011.

(2)Consultation Meeting and Questionnaires

To better inform the program to local stakeholders and understand the wishes and concern, as well as collect feedbacks from those who are interested in or potentially affected by the program, a consultant meeting was organized by Hebei Renewable Office and Hebei Green Agricultural Company on March 26, 2011. Total 59 participants attended the meeting. The representatives from provincial government rural energy management and environmental agencies, county rural energy management agency, livestock farms, communities and farmers participated in the meeting. Some experts have also participated in the meeting. Questionnaires were distributed to the participants, in an attempt in making the survey as comprehensive as possible. Table D1 details participants from various aspects. The questionnaires were circulated to all the participants and filled questionnaires were collected.

Table D1: Status of participants

| Participants Number. | **Gender** | | **Occupation** | | | |
|---|---|---|---|---|---|---|
| | Male | Female | Governmental Official and environment | Animal operation owner | Village leader | Household |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | experts | | | |
| 59 | 46 | 13 | 29 | 24 | 2 | 4 |
| % | 78 | 22 | 49 | 41 | 3 | 7 |

## D.3. Summary of the comments received:

According to the consultation process, livestock farms expressed strong interesting in participating in the program; the local government expressed the support to the program and local communities welcome the program very much. Feedbacks from local stakeholders are summarized below:

(1) Public attention to environmental issues

The local residents and governmental agencies have an increased concern on the potential pollution caused by the recently rapid expansion and concentrated livestock management approach in Hebei Province, which has posed the threat to the local environment conditions and public health. Currently livestock manure in livestock farms is stored in open lagoons and the discharged livestock manures affects living conditions for the surrounding communities, as well as promotes zoonotic diseases transmission.

(2) Public awareness of the program

The local stakeholders visited were informed of this program including the program objective, activities and benefits and impacts. From questionnaires collected, 100 % of the investigated targets have chosen "having knowledge of the project".

(3) Implications of the project on the local social and economic development

The program will largely improve the environmental conditions in the villages around or adjacent to the participating livestock farms. It will also promote energy-saving as well as the green and clean agriculture activities by using digested slurry to replace direct application of livestock manure. As a result indicated in questionnaires 88.1% of the investigated targets believe that the project will play an important role in stimulating local energy-saving and 83.1% considers that the project will improve local environmental conditions.

(4) Interesting in participating in the program,

Survey results showed that 100% of the investigated farms are interested in participating in the program because it is expected that the program will generate reliable and long-term stable revenue flow from the emission reduction. The program will also contribute to the environmental improvement to local communities as well as the farms' working conditions.

(5) Attitude of other stockholders. The Hebei provincial and county government agencies and experts consider that the program will be an effective way to reduce livestock waste pollutions and CDM program will provide an incentive to encourage farm to change the traditional livestock management practice, which would course pollutions to local areas. The program will also generate financing source to biogas digester operation, the necessary technical support and monitoring system management, to ensure a sustainable livestock waste management and environment improvement. The local communities and farmers welcome the program because they believe that the program will improve the environmental conditions and reduce the health risk in the areas where livestock farm located.

(6) Other comments to the project

Some other feedbacks have been also received. For instance, the livestock farms hope to speed-up the development of the P-CDM process; to strengthen biogas technical services and training for biogas digester installation and operation; to strengthen the awareness education in biogas digester management program, as well as to promote the sustainable livestock farm management through bringing an effective biogas management system to the program.

In summary, local stockholders consider that the program will play a critical role in rural energy saving and environmental conditions improvement. It will generate significant social, environmental well as economic benefits. There were no complaints concerning negative implications of the program on local residents and rural areas. Most of livestock farms are interested to participate in the program.

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

Comments and suggestions received from stakeholder's consultation were fully taken into account in the project design. For instance:

- Each participating entity has been well informed and consulted to ensure that the participation of local farmers and company is on a voluntarily basis. The consultation process will be continued during the program implementation period;
- To address the issue of inadequate training and technical support to users in the grassroots level, the project would introduce the improved biogas technical extension services and provide training to farm staff to improve the efficiency of the biogas digester operation and maintenance. The technical training to farm staff will focus on training in biogas trouble shooting and program monitoring.
- To address the financing difficulty in biogas digester operation, the project would use part of the income generated by selling the carbon emission credit to finance the biogas digester operation, technical services and monitoring program.

# 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 proposed Hebei AMMS GHG Mitigation Programme will apply AMS-III.D - Methane recovery in animal manure management systems (version 18), AMS-I.C - Thermal energy production with or without electricity (version 19), and AMS-I.F - Renewable electricity generation for captive use and mini-grid (version 2).

The following methodological tools are used:

Tool to determine project emissions from flaring gases containing methane (version 1);

Tool to calculate baseline, project and/or leakage emissions from electricity consumption (version 1);

Guidelines On the Demonstration of Additionality of Small-Scale Project Activities (version 9.0);

General Guidelines to SSC CDM methodologies (version 17);

Tool to determine the remaining lifetime of equipment (version 1);

Tool to calculate project or leakage $CO_2$ emissions from fossil fuel combustion (version 2);

Tool to determine the baseline efficiency of thermal or electric energy generation systems (version 1).

Tool to calculate the emission factor for an electricity system (version 02.2.1)

These baseline and monitoring methodologies can be downloaded from the Executive Board (EB) website: http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html.

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

The project will construct biogas digesters to treat livestock manure which is currently treated using anaerobic including open anaerobic lagoons. Biogas produced by anaerobic biogas digesters will be used to supply thermal or electrical energy, or both thermal and electrical energy. All the CPAs under this PoA will apply one of the following combinations of the applicable methodologies, i.e. 1)AMS III.D (version 18)and AMS-I.C(version 19), or 2) AMS III.D(version 18)and AMS-I.F(version 2), or 3) AMS III.D(version 18)+ AMS-I.C(version 19)+ AMS I.F(version 2).

**Table E1：Justification of the choice of the methodologies**

| **Applicability of AMS III.D(version 18)** | **Project activity** |
|---|---|
| 1. This methodology covers project activities involving the replacement or modification of anaerobic animal manure management systems in livestock farms to achieve methane recovery and destruction by flaring/combustion or gainful use of the recovered methane. It also covers treatment of manure collected from several farms in a centralized plant. This methodology is only applicable under the following conditions: | Each CPA to be implemented under this PoA will involve biogas recovery from biogas digesters to replace current lagoon or other anaerobic animal manure management systems in livestock farms under baseline, and utilize the captured biogas to provide electricity or thermal energy or both thermal and electricity energy. The excessive biogas will be destructed by flaring system. |
| (a) The livestock population in the farm is managed under confined conditions; | a) Only farms that the livestock is managed under confined conditions are eligible for the inclusion under this PoA. |
| (b) Manure or the streams obtained after treatment are not discharged into natural water resources (e.g. river or estuaries); | b) Only the farms that the manure or the streams obtained after treatment are not discharged into natural water resources are eligible for the inclusion under this PoA. |
| (c) The annual average temperature of baseline site where | c) The annual average temperature in |

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| anaerobic manure treatment facility is located is higher than 5°C;<br><br>(d) In the baseline scenario the retention time of manure waste in the anaerobic treatment system is greater than one month, and in case of anaerobic lagoons in the baseline, their depths are at least 1 m;<br><br>(e) No methane recovery and destruction by flaring, combustion or gainful use takes place in the baseline scenario. | all prefectures of Hebei Province is higher than5°C.[2]<br><br>d) Only farms that the retention time of manure waste in the anaerobic treatment system under the baseline scenarios greater than one month, and, their depths are at least 1 meter, are eligible for the inclusion under this PoA.<br><br>e) Only farms that no methane recovery and destruction by flaring, combustion or gainful use takes place in the baseline scenario are eligible for the inclusion under this PoA.<br><br>The conditions (a) , (b), (d), and (e) has been included as eligibility criteria 5a), 5b), 5c) and 5d) |
| 2. The project activity shall satisfy the following conditions:<br><br>(a) The residue waste from the AMMS must be handled aerobically. In case of soil application of the final sludge the proper conditions and procedures (not resulting in methane emissions) must be ensured.<br><br>(b) Technical measures shall be used (e.g. including a flared for exigencies) to ensure that all biogas produced by the digester is used or flared.<br><br>(c) The storage time of the manure after removal from the animal barns, including transportation, should not exceed 45 days before being fed into the anaerobic digester. If the project proponent can demonstrate that the dry matter content of the manure when removed from the animal barns is larger than | a) Only farms that the final residue will be handled aerobically and the proper conditions and procedures are in place to prevent methane emission in case of soil application of the final sludge, are eligible for the inclusion under this PoA.<br><br>b)The captured biogas in all farms under this PoA will be used for electricity or thermal supply, or both electricity and thermal supply. Flaring system will be installed in all farms to ensure that the excessive biogas produced by the digester is flared.<br><br>c) Eligibility criteria will make sure all farms that the storage time of the manure after removal from the animal barns, including transportation, should not exceed 45 |

[2]Hebei Meteorological Bureau provided average temperature in different prefecture for 2009 and 2010 are as following: Handan, 14.2°C; Xingtai, 14.4°C; Shijiazhuang, 14.2°C; Hengshui, 13.3°C; Cangzhou, 13.0°C; Baoding, 13.4°C; Langfang, 12.4°C; Tangshan, 11.1°C; Qinhuangdao, 9.9°C; Chengde, 8.0°C; and Zhangjiakou, 9.1°C.

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| 20%, this time constraint will not apply. | days before being fed into the anaerobic digester.<br><br>The conditions (a) ~ (c) have been included as eligibility criteria 5e), 5f), and 5g). |
| 3. Projects that recover methane from landfills shall use AMS-III.G "Landfill methane recovery" and projects for wastewater treatment shall use AMS-III.H. Project for composting of animal manure shall use AMS-III.F "Avoidance of methane emissions through composting". Project activities involving co-digestion of animal manure and other organic matters shall use the methodology AMS-III.AO "Methane recovery through controlled anaerobic digestion". | NA. The manure from each CPA under the PoA will be treated by biodigester, which is different technology from landfill or compost. And the manure will not be co-treated with other organic matters. |
| 4. Different options to utilise the recovered biogas as detailed in paragraph 3 of AMS-III.H are also eligible for use under this methodology. The respective procedures in AMS-III.H shall be followed in this regard. | NA. It is manure treatment by biogas digesters not related to waste water treatment. |
| 5. New facilities (Greenfield projects) and project activities involving capacity additions compared to the baseline scenario are only eligible if they comply with the related and relevant requirements in the "General Guidelines to SSC CDM methodologies". | The CPAs are not new livestock farming facilities (Greenfield projects) nor project activities involving livestock farming capacity additions compared to the baseline scenario. This has been included as eligibility criteria 7. |
| 6. The requirements concerning demonstration of the remaining lifetime of the replaced equipment shall be met as described in the "General Guidelines to SSC CDM methodologies". | The remaining life time shall be demonstrated using the manufacturer specifications of boiler and household stoves and the date of delivery by the manufacturer and EB50 Ann15. |
| 7. Measures are limited to those that result in aggregate emission reductions of less than or equal to 60 kt $CO_2$ equivalent annually from all type III components of the project activity. | Each CPA to be included in the PoA will get emission reductions of no more than 60kt $CO_2$ from all type III components<br><br>It has been included in the eligibility criteria 8. |
| 8. The following conditions apply for use of this methodology in a project activity under a programme of activities:<br><br>In case the project activity involves the replacement of equipment, and the leakage effect of the use of the replaced equipment in another activity is neglected, because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check if the number of project activity | N.A. As argued in applicability condition 6, the open lagoon as the baseline AMMS will be replaced by biogas digester system. Open lagoon is a concrete structure rather than equipment and will continue to be used as aerobic lagoon before the digested slurry goes to land application. |

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| equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified. | |

If the CPA will use the captured biogas to supply thermal energy and/or produce electricity to the grid, the CPA will meet applicability condition of AMS-I.C **(version 19)** and/or AMC-I.F (version 2)in addition to the AMS III.D**(version 18)**.

| **Applicability of AMS I.C(version 19)** | Project activity |
|---|---|
| 1. This methodology comprises renewable energy technologies that supply users with thermal energy that displaces fossil fuel use. These units include technologies such as solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass and other technologies that provide thermal energy that displaces fossil fuel. | The proposed PoA comprises biogas digesters that supply users with thermal and /or electrical energy to displace fossil fuel. |
| 2. Biomass-based cogeneration systems are included in this category. For the purpose of this methodology "cogeneration" shall mean the simultaneous generation of thermal energy and electrical energy in one process. Project activities that produce heat and power in separate element processes (for example heat from a boiler and electricity from a biogas engine) do not fit under the definition of cogeneration project. | NA. The PoA will not apply biomass cogeneration units, the project produce heat from boriler /heater and produce power from biogas engine in separate element processes. |
| 3. Emission reductions from a biomass cogeneration system can accrue from one of the following activities:<br>(a) Electricity supply to a grid;<br>(b) Electricity and/or thermal energy (steam or heat) production for on-site consumption or for consumption by other facilities;<br>(c) Combination of (a) and (b). | NA. The PoA will not apply biomass cogeneration units |
| 4. The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW thermal | The total installed thermal energy generation capacity of the project equipment will be no more than 45 MW thermal for each CPA to be included in the PoA.<br><br>It has been included in the eligibility criteria 8. |
| 5. For co-fired systems, the total installed thermal energy generation capacity of the project equipment, when using both fossil and renewable fuel, shall not exceed 45 MW thermal (see paragraph 6 for the applicable limits for cogeneration project activities). | NA. The PoA will not apply co-fired system. |
| 6. The following capacity limits apply for biomass cogeneration units:<br>(a) If the project activity includes emission reductions from both the thermal and electrical energy | NA. The PoA will not apply biomass cogeneration units |

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| components, the total installed energy generation capacity (thermal and electrical) of the project equipment shall not exceed 45MW thermal. For the purpose of calculating this capacity limit the conversion factor of 1:3 shall be used for converting electrical energy to thermal energy (i.e. for renewable project activities, the maximal limit of 15MW(e) is equivalent to 45MW thermal output of the equipment or the plant);<br>(b) If the emission reductions of the cogeneration project activity are solely on account of thermal energy production (i.e. no emission reductions accrue from electricity component), the total installed thermal energy production capacity of the project equipment of the cogeneration unit shall not exceed 45MW thermal;<br>(c) If the emission reductions of the cogeneration project activity are solely on account of electrical energy production (i.e. no emission reductions accrue from thermal energy component), the total installed electrical energy generation capacity of the project equipment of the cogeneration unit shall not exceed 15MW. | |
| 7. The capacity limits specified in the above paragraphs apply to both new facilities and retrofit projects. In the case of project activities that involve the addition of renewable energy units at an existing renewable energy facility, the total capacity of the units added by the project should comply with capacity limits in paragraphs 4 to 6, and should be physically distinct from the existing units. | Total capacity of CPA under this POA will be less than 45 MW thermal or 15 MW electricity energy. No retrofit project is envisaged. CPA is installation of a new biogas based boiler(s) or/and power generator(s) at a livestock farm where there was no renewable thermal energy supply and no renewable power plant operating prior to the implementation of the project activity. Therefore, there is no project activity involving the addition of renewable energy units at an existing renewable energy facility.<br><br>This has been included as eligibility criteria 6a) and 8. |
| 8. Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category. | NA.<br>CPA is installation of a new biogas based boiler(s) or/and power generator(s) at a livestock farm where there was no renewable thermal energy supply and no renewable power plant operating prior to the implementation of the project activity. Therefore, no retrofit or modification of a existing facility for renewable energy generation are included in the PoA.<br>This has been included as eligibility |

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| | criteria 6a) and 7. |
| 9. New Facilities (Greenfield projects) and project activities involving capacity additions compared to the baseline scenario are only eligible if they comply with the related and relevant requirements in the "General Guidelines to SSC CDM methodologies". | This PoA intends not to include greenfield project and project activities not involving capacity additions. Therefore the CPA can not be greenfield project or project activities involving capacity addition. This has been included as eligibility criteria 7. |
| 10. If solid biomass fuel (e.g. briquette) is used, it shall be demonstrated that it has been produced using solely renewable biomass and all project or leakage emissions associated with its production shall be taken into account in emissions reduction calculation. | NA.<br>This PoA doesn't involve solid biomass fuel |
| 11. Where the project participant is not the producer of the processed solid biomass fuel, the project participant and the producer are bound by a contract that shall enable the project participant to monitor the source of the renewable biomass to account for any emissions associated with solid biomass fuel production. Such a contract shall also ensure that there is no double-counting of emission reductions. | NA.<br>This PoA doesn't involve solid biomass fuel. |
| 12. If electricity and/or steam/heat produced by the project activity is delivered to a third party i.e. another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered into that ensures there is no double-counting of emission reductions. | If electricity and/or steam/heat produced by the project activity is delivered to a third party i.e. another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered into that ensures there is no double-counting of emission reductions.<br><br>This has been included as eligibility criteria 6c) |
| 13. If the project activity recovers and utilizes biogas for power/heat production and applies this methodology on a standalone basis i.e. without using a Type III component of a SSC methodology, any incremental emissions occurring due to the implementation of the project activity (e.g. physical leakage of the anaerobic digester, emissions due to inefficiency of the flaring), shall be taken into account either as project or leakage emissions. | NA.<br>In this PoA, this methodology will be applied together with AMS III.D, which already considers physical leakage of the bio-digester and emission due to inefficiency of the flaring. |
| 14. Charcoal based biomass energy generation project activities are eligible to apply the methodology only if the charcoal is produced from renewable biomass sources provided:<br>(a) Charcoal is produced in kilns equipped with methane recovery and destruction facility; or<br>(b) If charcoal is produced in kilns not equipped with a methane recovery and destruction facility, methane emissions from the production of charcoal shall be considered. These emissions shall be calculated as per the procedures defined in | NA.<br>This PoA doesn't involved charcoal based biomass. |

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| the approved methodology AMS-III.K. Alternatively, conservative emission factor values from peer reviewed literature or from a registered CDM project activity can be used, provided that it can be demonstrated that the parameters from these are comparable e.g. source of biomass, characteristics of biomass such as moisture, carbon content, type of kiln, operating conditions such as ambient temperature. | |
| 15. The following conditions apply for use of this methodology in a project activity under a programme of activities:<br><br>(a) In the specific case of biomass project activities the applicability of the methodology is limited to either project activities that use biomass residues or processed biomass (e.g. briquette) only or biomass from dedicated plantations complying with the applicability conditions of AM0042;<br><br>(b) In the specific case of biomass project activities the determination of leakage shall be done following the general guidance for leakage in small-scale biomass project activities (attachment C of Appendix B18 of simplified modalities and procedures for small-scale clean development mechanism project activities; decision 4/CMP.1) or following the procedures included in the leakage section of AM0042;<br><br>(c)In case the project activity involves the replacement of equipment, and the leakage effect of the use of the replaced equipment in another activity is neglected, because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified. | (a). The biogas produced in this PoA is a biomass residue , therefore the methodology is applicable.<br><br>(b). The CPA will only use its own livestock manure produced on site to feed the biogas digester. No manure will be collected/processed/transported from off-site. Therefore leakage is not expected.<br><br>This has been included as eligibility criteria 5h).<br><br>(c) The replaced boiler, if existing in the baseline, will continue to be used onsite as a backup for thermal energy supply. The leakage effect of the use of the replaced equipment in another activity can be avoided.<br>This has been included as eligibility criteria 6e) |

| **Applicability of AMS I.F** | **Project activity** |
|---|---|
| 1.This category comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to user(s). The project activity will displace electricity from an electricity | The proposed PoA comprises biogas digesters that supply biogas based electricity to user(s) that would have otherwise been supplied by fossil-fuel |

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| distribution system that is or would have been supplied by at least one fossil fuel fired generating unit i.e., in the absence of the project activity, the users would have been supplied electricity from one or more sources listed below:<br>(a) A national or a regional grid (grid hereafter);<br>(b) Fossil fuel fired captive power plant;<br>(c) A carbon intensive mini-grid. | dominated regional grid- the North China Power Grid.[3] Electricity from source b) and c) are not part of the baseline for the PoA.<br><br>This has been included as eligibility criteria. |
| 2.A mini-grid is defined as small-scale power system with a total capacity not exceeding 15 MW (i.e. the sum of installed capacities of all generators connected to the mini-grid is equal to or less than 15 MW) which is not connected to a national or a regional grid. | NA.<br>All the electricity that the biogas generation will replace the electricity from the regional grid, no mini-grid is involved. |
| 3.Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:<br>● The project activity is implemented in an existing reservoir with no change in the volume of reservoir;<br>● The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the project emissions section, is greater than 4 W/m2;<br>● The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m2. | NA. As no hydropower plants will be included. |
| 4.For biomass power plants, no other biomass other than renewable biomass is to be used in the project plant. | The CPA will only use biogas in the project plant; no other biomass other than biogas is to be used. |
| 5.This methodology is applicable for project activities that: (a) Install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) Involve a capacity addition, (c) Involve a retrofit of (an) existing plant(s); or (d) Involve a replacement of (an) existing plant(s). | Each CPA included in the proposed PoA will (a) install a new biogas based power generator(s) at a livestock farm where there was no renewable energy power plant operating prior to the implementation of the project activity. Conditions (b), (c), and (d) are not the case of the proposed PoA.<br><br>This has been incorporated into eligibility criteria 6a) and criteria 7 |
| 6.In the case of project activities that involve the capacity addition of renewable energy generation units at an existing | This has been incorporated into eligibility criteria 6a) and 8. |

[3] The operating margin emission factor of North China Power Grid is 0.9914 t $CO_2$e/Mwh, according to the Climate Change Department, National Development and Reform Commission (NDRC)'s announcement on December 20, 2010 (http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2552.pdf)

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| renewable power generation facility, the added capacity of the units added by the project should be lower than 15MW and should be physically distinct from the existing units. | |
| 7.In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15MW. | NA. The PPOA doesn't involve retrofit or replacement. |
| 8.If the unit added has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15MW. | NA. The thermal and/or electricity supply will be all biogas based. No non-renewable component or co-fired system is to be involved. |
| 9.Combined heat and power (co-generation) systems are not eligible under this category. | NA. The PoA will not apply co-generation systems |
| 10. If electricity and/or steam/heat produced by the project activity is delivered to a third party i.e. another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered that ensures that there is no double counting of emission reductions. | This has been included into eligibility criteria 6c). |
| 11. The following conditions apply for use of this methodology in a project activity under a programme of activities:<br><br>(a) In the specific case of biomass project activities the applicability of the methodology is limited to either project activities that use biomass residues or processed biomass (e.g. briquette) only or biomass from dedicated plantations complying with the applicability conditions of AM0042;<br><br>(b) In the specific case of biomass project activities the determination of leakage shall be done following the general guidance for leakage in small-scale biomass project activities (attachment C of Appendix B18 of simplified modalities and procedures for small-scale clean development mechanism project activities; decision 4/CMP.1) or following the procedures included in the leakage section of AM0042;<br><br>(c)In case the project activity involves the replacement of equipment, and the leakage effect of the use of the replaced equipment in another activity is neglected, because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should | (a). The biogas produced in this PoA is a biomass residue , therefore the methodology is applicable.<br><br>(b). The CPA will only use its own livestock manure produced on site to feed the biogas digester. No manure will be collected/processed/transported from off-site. Therefore leakage is not expected.<br><br>This has been included as eligibility criteria 5h).<br><br>(c) NA. As the electricity generation applicable under this methodology will replace electricity import from the regional grid, it doesn't involve replacement of equipment. |

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| be documented and independently verified. | |

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

The SSC-CPA boundary included in the PoA is

- The livestock farm (for scenario A, B, and C);
- Animal manure management systems (for scenario A, B, and C);
- Facilities which generate, recover and flare/combust or use biogas to generate heat (for scenario A), or power (for scenario B), or both power and heat (for scenario C) located at the project site.
- The spatial extent of the project boundary includes facilities consuming energy generated by the system (for scenario A, B, and C).
- The boundary also extends to the project power plant and all power plants connected physically to the electricity system[4] that the CDM project power plant is connected to (for scenario B and C).

The proposed project boundary consists of different components under different project scenarios. Figure E1.1-1.3 defines the CPA boundary under different project scenarios.

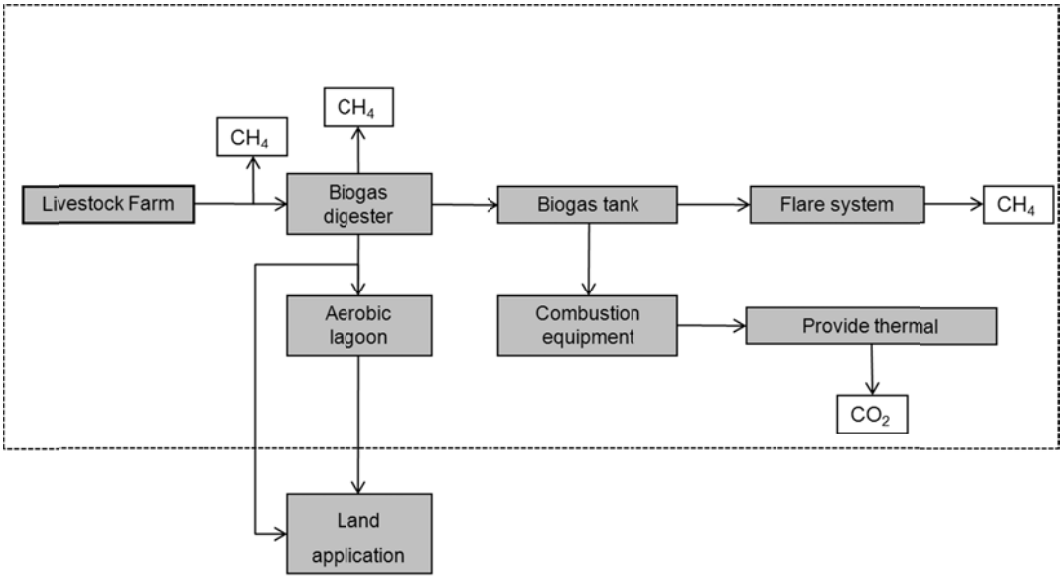


Figure E1.1: CPA boundary for scenario A

[4] Refer to the latest approved version of the "Tool to calculate the emission factor for an electricity system" for definition of an electricity system.

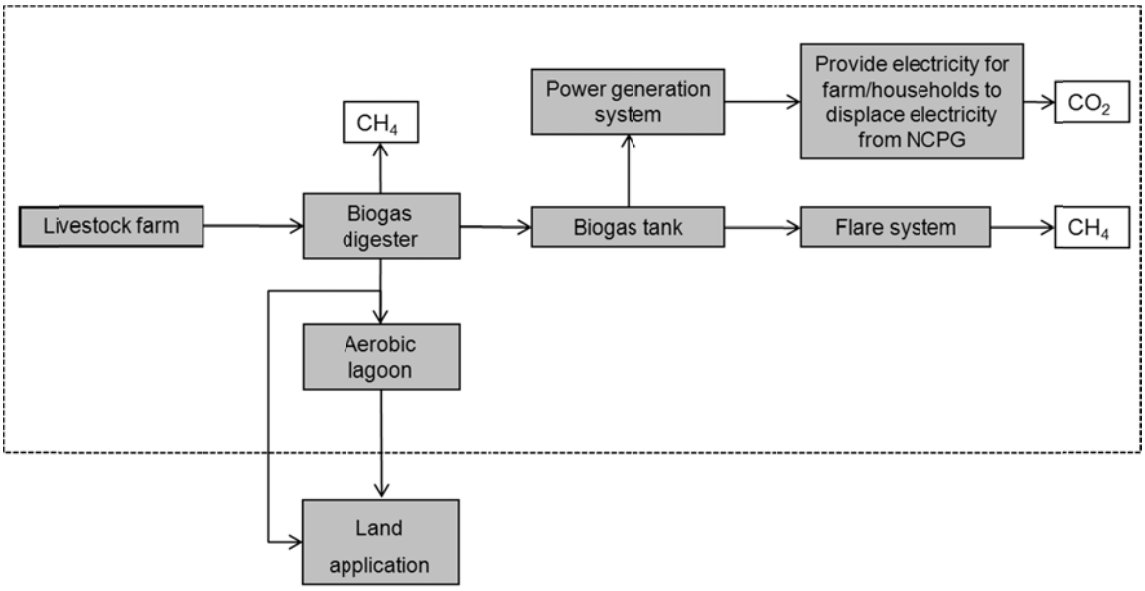


Figure E1.2: CPA boundary for scenario B

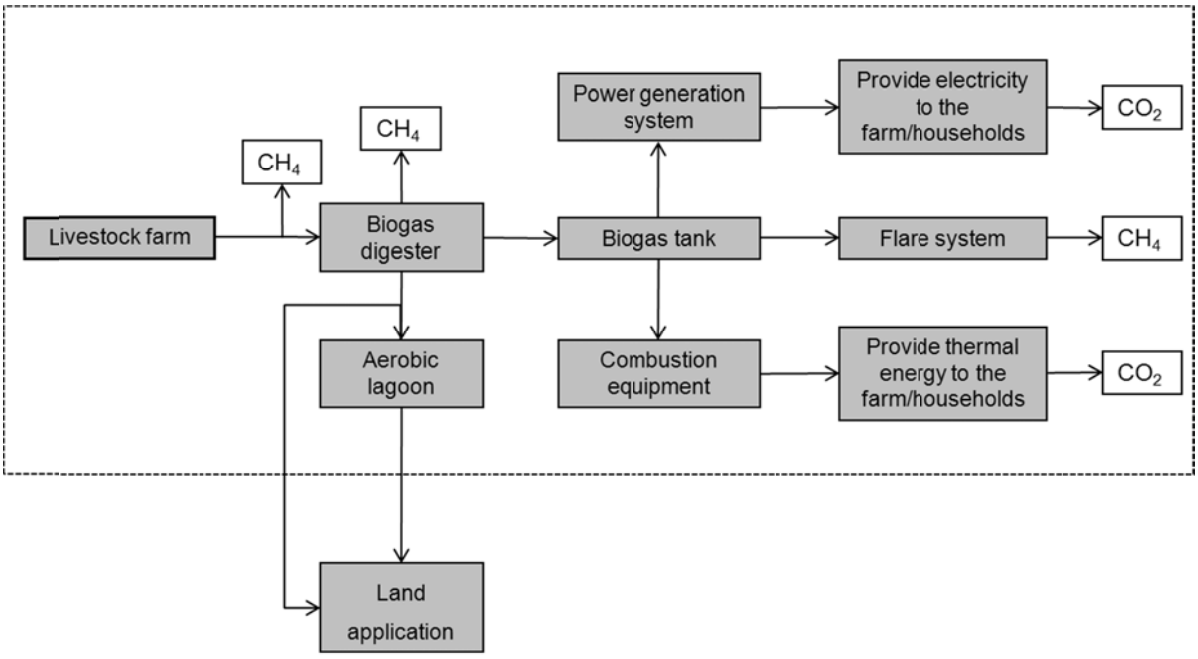


Figure E1.3: CPA boundary for scenario C

The proposed project boundary considers the $CH_4$ emissions that come from livestock manure management systems (anaerobic treatment without methane recovery, including open anaerobic lagoon(s)), $CH_4$ emissions from biogas digesters (leakage), $CO_2$ emissions from electricity consumption

by biogas system (electricity consumption under project activity), $CH_4$ emission from flare, and avoided $CO_2$ emissions by using $CH_4$ for thermal provision or power generation, or both thermal and electricity energy (fossil fuel and/or electricity displaced by biogas), and $CH_4$ emission from manure storage. The project boundary does not consider the effects of enteric emissions, as these emissions are not affected by the proposed practice changes. Emission sources and gases included in the project boundary are listed in Table E2.

Table E2: Emission sources and gases to be included in project boundary

| | **Source** | **Gas** | | **Justification /Explanation** |
|---|---|---|---|---|
| **Baseline** | Direct emissions from the anaerobic treatment | $CH_4$ | Included | Main emission source |
| | | $N_2O$ | Excluded | Not required by AMS III.D.# |
| | | $CO_2$ | Excluded | Not required by AMS III.D. |
| | Emissions from displaced burning of fossil fuel | $CO_2$ | Included | Main emission source |
| | | $N_2O$ | Excluded | Minor emission source, excluded for simplification. This is conservative. |
| | | $CH_4$ | Excluded | Minor emission source, excluded for simplification. This is conservative. |
| | Emissions from electricity consumption/ generation | $CO_2$ | Included | Main emission source |
| | | $CH_4$ | Excluded | Minor emission source, excluded for simplification. This is conservative. |
| | | $N_2O$ | Excluded | Minor emission source, excluded for simplification. This is conservative. |
| **Project activity** | Emissions fromon site electricity use | $CO_2$ | Included | Main emission source |
| | | $CH_4$ | Excluded | Minor emission source |
| | | $N_2O$ | Excluded | Minor emission source, no requirement from AMS-I.F |
| | Direct emission from physical leakage | $CH_4$ | Included | Main emission source |
| | | $CO_2$ | Excluded | Not required by AMS III.D. |
| | | $N_2O$ | Excluded | No TN reduction based on Annex 1 of AMS III.D. |
| | Emissions from flare | $CH_4$ | Included | Main emission source |
| | | $CO_2$ | Excluded | Not required by AMS I.C. |
| | | $N_2O$ | Excluded | No $N_2O$ produced during flare of biogas. |
| | Emissions from manure storage | $CH_4$ | Included | Main emission source |
| | | $CO_2$ | Excluded | Not required by AMS III.D. |
| | | $N_2O$ | Excluded | Not required by AMS III.D. |

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

The approved small scale methodologies that are selected by the proposed PoA prescribe the baseline scenario as following:

1. According to the AMS III.D. Version 18, the baseline scenario for animal waste management is the scenario where, in the absence of the project activity, animal manure is left to decay anaerobically within the project boundary and methane is emitted to the atmosphere.
2. Accordingly to the AMS I.C. Version 19 and AMS. I.F. Version 2, for biogas technologies that displace coal-dominated grid electricity and/or thermal energy, the simplified baseline is the fossil fuel consumption of the grid electricity and/or thermal energy that would have been used in the absence of the projects activities.

| Scenario | Baseline scenario | Methodological combination |
|---|---|---|
| A | Anaerobic manure treatment, production of heat using fossil fuel | AMS III.D(version 18)+ AMS I.C(version 19) |
| B | Anaerobic manure treatment (open anaerobic lagoon), electricity is imported from a grid. | AMS III.D(version 18)+ AMS I.F(version 02) |
| C | Anaerobic manure treatment(open anaerobic lagoon), electricity is imported from a grid, and thermal energy (steam/heat) is produced using fossil fuel as described in the paragraph 19 (a) of AMS I.C (version 19) | AMS III.D(version 18)+ AMS I.C(version 19) + AMS I.F(version 02) |

The applicability criteria of these three methodologies have been incorporated into the CPA eligibility criteria for inclusion into the PoA (section A.4.2.2 of PoA-DD).

Because the anaerobic treatment has been included in the eligibility criteria and the technology used has been determined to be biogas digester technology, baseline scenario for the CPA is determined to be the anaerobic treatment, thermal energy produced from fossil fuel and/or electricity imported from the grid once the CPA meets these eligibility criteria.

**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:**

The main objective of this analysis is to demonstrate that a proposed CPA is not business as usual for typical animal manure management systems.

*a. Legal issues*

There is no national or local requirement to control GHG emissions of agricultural industrial operations (animal production) in China. The project activity goes beyond these legal provisions. The proposed project activity treats the manure by introducing the manure to the biogas digester. The biogas is formed and captured in the biogas digester. The effluent from digesters is directed to an open-air non-permeable lagoon for storage and then will be applied in surrounding fields with aerobic conditions.

b. *Other Barrier*

The additionality of each CPA will be demonstrated through an investment analysis. The Internal Rate of Return (IRR) will be calculated for each CPA under two scenarios: with CDM and without CDM

revenues. The comparison between both financial indicators should show that the IRR of the proposed CPA without CDM is lower than the defined livestock industry benchmark. The benchmark equity IRR of project capital after tax is of 9% for the animal industry sector, recommend by "Economic Evaluation for Construction Project: Methods and Parameters version 3", issued by NDRC and Ministry of Construction, therefore showing that the project is not a financially attractive option. However, if the proposed CPA can be registered as a CDM project, the CDM revenue will make the CPA, financially viable, while reducing the pressure from long-term investment needed to sustain the operational performance of the CPA.

Additionality shall be demonstrated by establishing that in the absence of CDM, the IRR would be lower than the benchmark IRR applicable to animal husbandry sector, none of the implemented CPA would occur. To make sure the change of major parameters will not affect the additionality of the CPA, the sensitivity analysis will be applied to further demonstrate that the proposed CPA without CDM is financially unacceptable.

With this comparison, we can prove that, from an economic standpoint, the proposed CPA is additional. This investment comparison is demonstrated at CPA level for individual farms.

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

Key criteria and data for assessing additionality of a SSC-CPA will include:

- The Equity IRR for each CPA after tax without CDM revenue shall be lower than the defined livestock industry benchmark of 9% (after-tax equity IRR).

## 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:

Baseline emissions include: 1) $CH_4$ emission from the open anaerobic lagoon; 2) $CO_2$ emission from burning of displaced fossil fuel for thermal supply; and 3) $CO_2$ emission from electricity consumption/generation. Project emissions include: 1) $CH_4$ emission from physical leakage of captured biogas; 2) $CH_4$ emission from flaring of residual biogas; 3) $CO_2$ emission from onsite electricity use; and 4) $CH_4$ emission from manure storage. The detailed information on methodological choices is listed in table E3.

Table E3: The methodological choices provided in the approved baseline and monitoring methodology

| Sources | Description in approved Baseline Methodology |
|---|---|
| Baseline $CH_4$ emission from the open anaerobic lagoon | Paragraph 10 of AMS III.D (version 18) |
| Baseline $CO_2$ emission from burning of displaced fossil fuel(for scenario A and C) | Paragraph 22 of AMS I.C ( version 19) for boilers<br>Paragraph 43 of AMS I.C ( version 19) for household stoves |
| Baseline $CO_2$emission from displaced electricity consumption(for scenario B and C) | Paragraph 13, 14, 15 of AMS I.F (version 02) |
| Project $CH_4$ emissions from physical leakage | Paragraph 13 of AMS III.D (version 18) |
| Project $CH_4$ emission from flaring/combustion of biogas (for scenario A, B, and C) | Tool to determine project emissions from flaring gases containing methane |
| Project $CO_2$emissions fromon site electricity use and export to grid (for scenario A, B, and C) | Latest Operating Margin emission factor ( $EF_{OM,y}$ ) |

| | |
|---|---|
| | and the Build Margin emission factor ( $EF_{BM,y}$ ) can be obtained from National Development and Reform Commission (NDRC) website (cdm.ccchina.gov.cn). |
| Project $CH_4$ emission from manure storage (for scenario A, B, and C) | Paragraph 16 of AMS III.D (version 18) |

In related to above methodology, the following choices in the parameters shall apply to the CPA under the PoA.

1. Maximum methane-producing capacity of the manure (Bo)

The preferred method to obtain Bo measurement values is to use data from country-specific published sources, measured with a standardised method (Bo shall be based on total as-excreted VS). These values shall be compared to IPCC default values and any significant differences shall be explained. If country specific Bo values are not available, default values from tables 10 A-4 to 10 A-9 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories volume 4 Chapter 10 can be used, provided that the project participants assess the suitability of those data to the specific situation of the treatment site;

2. Volatile solids (VS)

The preferred method to obtain VS is to use data from nationally published sources. These values shall be compared with IPCC default values and any significant differences shall be explained. If data from nationally published sources are not available, default VS value from 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 chapter 10 table 10 A-4 to 10 A-9 can be used and adjusted for a site-specific average animal weight.

Because genetic source for confined livestock farms are from developed countries, and feeding management are similar to that of the developed countries, AMS III.D required the following four conditions are satisfied if $B_0$ and $VS$ values applicable to developed countries will be used.

- The genetic source of the livestock originates from an Annex I Party;
- The farm uses formulated feed rations (*FFR*) which are optimized for the various animal(s), stage of growth, category, weight gain/productivity and/or genetics;
- The use of *FFR* can be validated (through on-farm record keeping, feed supplier, etc.);
- The project specific animal weights are more similar to developed country IPCC default values.

3. Methane Conversion Factors (MCF)

Methane Conversion Factors (MCF) values are determined for a specific manure management system. Where available country-specific MCF values that reflect the specific management systems used in particular countries or regions shall be used. Alternatively, the IPCC default values for uncovered anaerobic lagoon provided in table 10.17 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 Chapter 10 can be used according to the local temperature. For average annual temperatures below 10 ºC and above 5 ºC, a linear interpolation should be used to estimate the MCF value at the specific temperature assuming an MCF value of 0 at an annual average of 5 ºC[5] (Table E4).

[5]Page 9 of Approved consolidated baseline methodology ACM0010 version 5. "Consolidated baseline

Future revisions to the IPCC Guidelines for National Greenhouse Gas Inventories should be taken into account.

Table E4: Methane Conversion Factors

| Temperature (°C) | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|
| MCF（%） | 40 | 53 | 66 | 68 | 70 | 71 | 73 | 74 | 75 |

4. Methane content of the biogas

Default value of 60% methane content in the biogas can be used according to table III.D.1 of AMS III.D (version 18).

5. Grid emission factor

Grid emission factor is obtained from Development and Reform Commission (NDRC) (http://cdm.ccchina.gov.cn), which publishes the grid emission factors for regional grids in China.

6. Efficiency of the baseline units

The preferred method to obtain VS is to use data from nationally published sources. If the nationally published data are not available, efficiency of the baseline units (excluding cogeneration plants) shall be determined by adopting one of the following criteria (in a preferential order) as per paragraph 30of AMS-I.C:

(a) Highest measured operational efficiency over the full range of operating conditions of a unit with similar specifications, using baseline fuel. The efficiency tests shall be conducted following the guidance provided in relevant national/international standards;

(b) Highest of the efficiency values provided by two or more manufacturers for units with similar specifications, using the baseline fuel;

(c) Default efficiency of 100%.

Equations for determining emission reductions are stipulated in section E.6.2.

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

**1. Baseline Emission Calculation:**

The baseline emission is as equation (1).

$$BE_y = BE_{CH_4,y} + BE_{Electricity,y} + BE_{thermal,y} \quad (1)$$

Where:

$BE_{CH_4,y}$ Baseline $CH_4$ emissions from anaerobic treatment of manure in year $y$ ($tCO_2e$)

methodology for GHG emission reductions from manure management systems”.

| | |
|---|---|
| $BE_{Electricity,y}$ | Baseline $CO_2$ emission from displaced electricity useand electricity supply to the gridby the project activity in year $y$ (t $CO_2$) |
| $BE_{thermaly}$ | The baseline emissions from displaced steam/heat consumption by the project activity in the year $y$ ($tCO_2$) |

**1.1 Baseline $CH_4$ emission from the open anaerobic lagoon ( $BE_{CH_4,y}$ )**

Baseline $CH_4$ emission from anaerobic treatment of manure shall be calculated as per paragraph 10 of AMS III.D

$$BE_{CH_4,y} = GWP_{CH4} * D_{CH4} * UF_b * \sum_{LT} MCF * B_{0,LT} * N_{LT,y} * VS_{LT,y} * MS\%_{Bl} \quad (2)$$

Where:

| | |
|---|---|
| $BE_{CH_4,y}$ | Baseline $CH_4$ emissions in year $y$ ($tCO_2e$) |
| $GWP_{CH4}$ | Global Warming Potential (GWP) of $CH_4$ (25) |
| $D_{CH4}$ | $CH_4$ density (0.00067 t/m$^3$ at room temperature (20 ºC) and 1 atm pressure) |
| $LT$ | Index for all types of livestock |
| $MCF$ | Annual methane conversion factor (MCF) for the baseline animal manure management system |
| $B_{0,LT}$ | Maximum methane producing potential of the volatile solid generated for animal type $LT$ (m$^3$ $CH_4$/kg dm) |
| $N_{LT,y}$ | Annual average number of animals of type $LT$ in year y (numbers) |
| $VS_{LT,y}$ | Volatile solids for livestock $LT$ entering the animal manure management system in year y (on a dry matter weight basis, kg dm/head/year) |
| $MS\%_{Bl}$ | Fraction of manure handled in baseline animal manure management system j |
| $UF_b$ | Model correction factor to account for model uncertainties (0.94) |

Annual baseline $CH_4$ emission from the anaerobic treatment of manure and values of related parameters were listed in table E5.

Table E5: Estimated annual baseline methane emissions in year y

| Parameters | Unit | Livestock type 1 | Livestock type 2 | …… | Livestock type n |
|---|---|---|---|---|---|
| $GWP_{CH4}$ | - | 25 | 25 | 25 | 25 |
| $D_{CH4}$ | t/m$^3$ | 0.00067 | 0.00067 | 0.00067 | 0.00067 |
| $UF_b$ | fraction | 0.94 | 0.94 | 0.94 | 0.94 |

| | | | | | |
|---|---|---|---|---|---|
| *MCF* | fraction | | | | |
| $B_{O,LT}$ | $m^3CH_4/kg\_dm$ | 0.29 | 0.29 | 0.29 | 0.29 |
| $N_{LT}$ | head | | | | |
| $VS_{LT,y}$ * | kg dm/head/year | | | | |
| $MS\%_{Bl}$ | % | | | | |
| $BE_{CH_4,y}$ | $tCO_2e$ | | | | |

*: Calculated using equation (3).

If $VS_{LT,y}$ data from nationally published sources are not available, default values from 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 chapter 10 table10 A-4 to 10 A-9 can be used and adjusted for a site-specific average animal weight. The following equation shall be used:

$$VS_{LT,y} = \left( \frac{W_{site}}{W_{default}} \right) * VS_{default} * nd_y \quad (3)$$

Where:

$W_{site}$ Average animal weight of a defined livestock population at the project site (kg)

$W_{default}$ Default average animal weight of a defined population, this data is sourced from IPCC 2006 (kg)

$VS_{default}$ Default value for the volatile solid excretion rate per day on a dry-matter basis for a defined livestock population (kg dm/ head/day)

$nd_y$ Number of days in year y where the animal manure management system is operational

In case of sequential treatment stages, the reduction of the volatile solids during a treatment stage is estimated based on referenced data for different treatment types. Emissions from the next treatment stage are then calculated following the approach outlined above, but with volatile solids adjusted for the reduction from the previous treatment stages by multiplying by (1 - *RVS*), where *RVS* is the relative reduction of volatile solids from the previous stage. The relative reduction (*RVS*) of volatile solids depends on the treatment technology and should be estimated in a conservative manner. Default values for different treatment technologies can be found in the table in annex 1 of AMS III.D.

The annual average number of animals ( $N_{LT,y}$ ) are determined as follows:

$$N_{LT,y} = N_{da,y} * \left( \frac{N_{p,y}}{365} \right) \quad (4)$$

Where:

$N_{da,y}$ Number of days animal is alive in the farm in the year y (numbers)

$N_{p,y}$ Number of animals produced annually of type *LT* for the year y (numbers)

Estimation of annual volatile solid for livestock was listed in table E6.

Table E6: Annual volatile solid for livestock

| Parameters | $VS_{default}$ (kg dm/head/day) | $W_{default}$ (kg) | $W_{site,LT}$ (kg) | $nd_y$ (day) | $VS_{LT,y}$ (kg dm/year/head) |
|---|---|---|---|---|---|
| Livestock type 1 | | | | | |
| Livestock type 2 | | | | | |
| …… | | | | | |
| Livestock type n | | | | | |

### 1.2 Baseline $CO_2$ emission from displaced electricity consumption ( $BE_{Electricity,y}$ )

Baseline $CO_2$ emission from electricity use, that would have been otherwise generated by the grid, equals the quantity of renewable electrical energy produced by the project activity multiplied by the grid emission factor, as per paragraph 14 of AMS I.F described as following:

$$BE_{Electricity,y} = EG_{BL,y} * EF_{CO_2,y} \quad (5)$$

Where:

$BE_{Electricity,y}$ Baseline emissions from displaced electricity consumption and electricity supply to the grid in year y (t $CO_2$ )

$EG_{BL,y}$ Quantity of net electricity displaced as a result of the implementation of the CDM project activity in year y(MWh)

$EF_{CO2,y}$ Emission factor (t$CO_2$/MWh). The emission factor will be calculated as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the latest version of 'Tool to calculate the Emission Factor for an electricity system'. It is the weighted average of $EF_{OM,y}$ and $EF_{BM,y}$. $EF_{CO2,y}$=0.5* $EF_{OM,y}$ +0.5* $EF_{BM,y}$ . $EF_{OM,y}$ and $EF_{BM,y}$ will be determined at CPA level.

$EF_{OM,y}$ , $EF_{BM,y}$ Operating and Build margin emission factor (t$CO_2$/MWh) of the North China Power Grid will be determined at CPA level..

Estimation of annual baseline emissions from displaced electricity consumption in year y was listed in table E7.

Table E7: Annual baseline emissions from displaced electricity consumption in year y

| Parameters | Unit | Livestock farm |
|---|---|---|

| | | |
|---|---|---|
| $EG_{BL,y}$ | MWh | |
| $EF_{OM,y}$ | $tCO_2/MWh$ | |
| $EF_{BM,y}$ | $tCO_2/MWh$ | |
| $EF_{CO2,y}$ | $tCO_2/MWh$ | |
| $BE_{Electricity,y}$ | $t\ CO_2e$ | |

### 1.3 Baseline $CO_2$ emission from displaced heat production ( $BE_{thermal,y}$ )

$CO_2$ emission from burning of displaced fossil fuel shall be calculated as per paragraph 18 of AMS I.C. Equation (6) is used calculate $CO_2$ emission from burning of displaced fossil fuel by boiler and/or household stove.

$$BE_{thermal,CO_2,y} = BE_{thermal,boiler,CO_2,y} + BE_{thermal,stove,CO_2,y} \quad (6)$$

| | |
|---|---|
| $BE_{thermal,CO_2,y}$ | The total baseline emissions from steam/heat displaced by the project activity during the year y ($tCO_2$) |
| $BE_{thermal,boiler,CO_2,y}$ | The boiler baseline $CO_2$ emissions from steam/heat displaced by the project activity during the year y ($tCO_2$) |
| $BE_{thermal,stove,CO_2,y}$ | The household stove baseline $CO_2$ emissions from steam/heat displaced by the project activity during the year y ($tCO_2$) |

$CO_2$ emission from burning of displaced fossil fuel by boiler shall be calculated according to paragraph 22 and equation (2) of AMS I.C. version 19.

$$BE_{thermal,boiler,CO_2,y} = (EG_{thermal,boiler,y} / \eta_{b,thermal,boiler}) * EF_{FF,CO_2} \quad (6\text{-}1)$$

Where:

| | |
|---|---|
| $BE_{thermal,boiler,CO_2,y}$ | The boiler baseline $CO_2$ emissions from steam/heat displaced by the project activity during the year y ($tCO_2$) |
| $EG_{thermal,boiler,y}$ | The net quantity of steam/heat supplied by the project activity to displace steam/heat provided by boiler under baseline scenario during the year y (TJ) |
| $EF_{FF,CO_2}$ | The $CO_2$ emission factor of the fossil fuel that would have been used in the baseline plant; $tCO_2/TJ$, obtained from reliable local or national data if available, otherwise, IPCC default emission factors are used |
| $\eta_{b,thermal,boiler}$ | The efficiency of the boiler using fossil fuel that would have been used in the absence of the project activity |

$CO_2$ emission from burning of displaced fossil fuel by household stove shall be calculated according to paragraph 43 and equation (9) of AMS I.C. version 19.

$$BE_{thermal,stove,CO_2,y} = [HG_{p,y} / \eta_{householdstove,b}] * EF_{FF,CO2}$$
$$= \{[B_{biogas,p,y} * NCV_{biogas} * \eta_{biogasstove,p}] / \eta_{householdstove,b}\} * EF_{FF,CO2}$$

(6-2)

Where:

| | |
|---|---|
| $BE_{thermal,stove,CO_2,y}$ | The household stove baseline $CO_2$ emissions from thermal energy displaced by the project activity using biogas during the year *y* ($tCO_2$) |
| $HG_{p,y}$ | The net quantity of thermal energy supplied by the project activity using biogas during the year *y* (TJ) |
| $\eta_{householdstove,b}$ | Efficiency of the baseline equipment (household stove) being replaced |
| $\eta_{biogasstove,p}$ | Efficiency of the project equipment (biogas stove) measured using representative sampling methods or based on referenced literature values. The efficiency tests shall be conducted following the guidance provided in the relevant national/international standards |
| $EF_{FF,CO_2}$ | The $CO_2$ emission factor of the fossil fuel that would have been used in the baseline ($tCO_2$/TJ) |
| $B_{biogas,p,y}$ | The net quantity of the biogas consumed in year *y* ($m^3$) |
| $NCV_{biogas}$ | The net calorific value of the biomass (TJ/$m^3$) |

Estimation of annual $CO_2$ emission from displaced fossil fuel in year y was listed in table E8.

Table E8: Annual baseline $CO_2$ emission from displaced fossil fuel in year y

| Parameters | Unit | Livestock farm |
|---|---|---|
| $EG_{thermal,boiler,y}$ | TJ | |
| $B_{biogas,p,y}$ | $m^3$ | |
| $NCV_{biogas}$ | $m^3$ | |
| $\eta_{biogasstove,p}$ | % | |
| $HG_{p,y}$ | TJ | |
| $EF_{FF,CO_2}$ | $tCO_2$/TJ | |
| $\eta_{b,thermal,boiler}$ | % | |
| $\eta_{householdstove,b}$ | % | |

| | | |
|---|---|---|
| $BE_{thermal,boiler,CO_2,y}$ | $tCO_2e$ | |
| $BE_{thermal,stove,CO_2,y}$ | $tCO_2e$ | |
| $BE_{thermal,CO_2,y}$ | $tCO_2e$ | |

**2. Project Emission Calculation:**

Project emissions include direct $CH_4$ emissions from physical leakage, $CH_4$ emission from flaring/combustion of biogas, $CO_2$emissions fromon site electricity use, and manure storage.

$$PE_y = PE_{PL,y} + PE_{flare,y} + PE_{power,y} + PE_{transp} + PE_{storage,y} \quad (7)$$

Where:

| | |
|---|---|
| $PE_y$ | Project emissions in year *y* ($tCO_2e$) |
| $PE_{PL,y}$ | Emissions due to physical leakage of biogas in year *y* ($tCO_2e$) |
| $PE_{flare,y}$ | Emissions from flaring or combustion of the biogas stream in the year *y* ($tCO_2e$) |
| $PE_{power,y}$ | Emissions from the use of electricity for the operation of the installed facilities in the year *y* ($tCO_2e$) |
| $PE_{transp}$ | Emissions from incremental transportation in the year *y* ($tCO_2e$). Each livestock farm will use its own livestock manure produced on site to feed the biogas digester. No manure will be collected/processed/transported from off-site. No emission from transportation will be occurred in this PoA. |
| $PE_{storage,y}$ | Emissions from the storage of manure ($tCO_2e$) |

Under this PoA, there will not be any project emissions from transport, as there will be no incremental transportation due to the project activity.

**2.1 Project $CH_4$ emissions from physical leakage ( $PE_{PL,y}$ )**

The direct $CH_4$ emissions from physical leakage shall be calculated as per Paragraph 13 (a)(i) of AMS III.D, version 18. Project emissions due to physical leakage of biogas from the animal manure management systems used to produce, collect and transport the biogas to the point of flaring or gainful use is estimated as10% of the maximum methane producing potential of the manure fed into the management systems implemented by the project activity:

$$PE_{PL,y} = 0.10 * GWP_{CH4} * D_{CH4} * \sum_{LT} B_{0,LT} * N_{LT,y} * VS_{LT,y} * MS\%_y \quad (8)$$

Where:

| | |
|---|---|
| 0.10 | 10% of the maximum methane producing potential (Bo) for the physical leakages from anaerobic digesters |

$MS\%_y$ Fraction of manure handled in biogas digester in year y

Estimation of annual project $CH_4$ emissions from physical leakagein year y was listed in table E9.

Table E9: Annual project $CH_4$ emissions from physical leakagein year y

| Parameters | Unit | Sows | Boar | Piglets | Nursery | Growing and Finishing |
|---|---|---|---|---|---|---|
| $GWP_{CH4}$ | - | 25 | 25 | 25 | 25 | 25 |
| $D_{CH4}$ | t/m$^3$ | 0.00067 | 0.00067 | 0.00067 | 0.00067 | 0.00067 |
| $B_{O,LT}$ | m$^3$CH$_4$/kg_dm | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 |
| $N_{LT}$ | head | | | | | |
| $VS_{LT,y}$* | kg dm/head/year | | | | | |
| $MS\%_y$ | % | | | | | |
| $PE_{PL,y}$ | tCO$_2$e | | | | | |

**2.2 $CH_4$ emission from flaring/combustion of biogas ( $PE_{flare,y}$ )**

For flaring/combustion of biogas, project emissions are estimated using the procedures described in the latest version "Tool to determine project emissions from flaring gases containing methane" (Annex 13, EB 28).

Because open flare system will be installed and the flare efficiency cannot be measured in a reliable manner, default value of 50%is to be used when the flare is operational. If the flare is not operational the default value to be adopted for flare efficiency is 0%.

Project emissions from flaring are calculated as the sum of emissions from each hour *h*, based on the methane flow rate in the residual gas ($TM_{RG,h}$) and the default flare efficiency during each hour *h* ($\eta_{flare,h}$), as follows:

$$PE_{flare,y} = \sum_{h=1}^{8760} TM_{RG,h} \times (1 - \eta_{flare,h}) \times \frac{GWP_{CH4}}{1000} \quad (9)$$

Where:

$PE_{flare,y}$ Project emissions from flaring of the residual gas stream in year y, tCO$_2$e

$TM_{RG,h}$ Mass flow rate of methane in the residual gas in the hour h

| | |
|---|---|
| $\eta_{flare,h}$ | Flare efficiency in hour h. In this project, fixed value of 0% for the flare efficiency will be applied, and this is for conservative. |

Estimation of annual project $CH_4$ emissions from flaring/combustion of biogasin year y was listed in table E10.

Table E10: Annual baseline emissions from flaring/combustion of biogasin year y

| Parameters | Unit | Value |
|---|---|---|
| $TM_{RG,h}$ | $m^3$ | |
| $GWP_{CH4}$ | - | 25 |
| $\eta_{flare,h}$ | fraction | 0 |
| h | hour | |
| $PE_{flare,y}$ | t $CO_2$ e | |

**2.3 $CO_2$ emissions from the use of electricity for the operation of the installed digester ( $PE_{power,y}$ )**

Project emission from onsite electricity use equals the quantity of electricity consumed under project activity times emission factor.

$$PE_{power,y} = EG_{P,y} * EF_{CO_2,y} \quad (10)$$

Where:

| | |
|---|---|
| $PE_{power,y}$ | Emissions from the use of electricity for the operation of the installed facilities in the year *y* ($tCO_2e$) |
| $EG_{P,y}$ | Quantity of electricity consumed under project activity in year y (MWh). $EG_{P,y}$ equals to quantity of electricity consumed by the project acticity adjusted by average technical transmission and distribution losses. $EG_{P,y} = EC_{PJ,y} \times (1 + TDL_y)$ . Default $TDL_y = 20\%$ according to "Tool to calculate baseline, project and/or leakage emissions from electricity consumption". |
| $EF_{CO2,y}$ | Emission factor ($tCO_2$/MWh). Project emissions from consumption of electricity will be calculated according to the latest version of "Tool to calculate the Emission Factor for an electricity system". It is the weighted average of $EF_{OM,y}$ and $EF_{BM,y}$ . $EF_{CO2,y}$=0.5* $EF_{OM,y}$ +0.5* $EF_{BM,y}$ . $EF_{OM,y}$ and $EF_{BM,y}$ will be determined at CPA level. |
| $EF_{OM,y}$ , $EF_{BM,y}$ | Operating and Build margin emission factor ($tCO_2$/MWh) of the North China |

Power Grid will be determined at CPA level.

Estimation of annual project $CO_2$ emissions from electricity purchased from the grid in year y was listed in table E11.

Table E11: Annual project $CO_2$ emissions from electricity purchased from the gridin year y

| Parameters | Unit | Value |
|---|---|---|
| $EG_{P,y}$ | MWh | |
| $EF_{OM,y}$ | $tCO_2$/MWh | |
| $EF_{BM,y}$ | $tCO_2$/MWh | |
| $EF_{CO2,y}$ | $tCO_2$/MWh | |
| $PE_{power,y}$ | t $CO_2$ e | |

**2.4 $CH_4$ emissions from manure storage ( $PE_{storage,y}$ )**

Project emissions on account of storage of manure before being fed into the anaerobic digester shall be accounted for if both condition (a) and condition (b) below are satisfied according to AMS III.D:

(a) The storage time of the manure after removal from the animal barns, including transportation, exceeds 24 hours before being fed into the anaerobic digester; and

(b) The dry matter content of the manure when removed from the animal barns is less than 20%.

The following method shall be used to calculate project emissions from manure storage:

$$PE_{storage,y} = GWP_{CH_4} * D_{CH_4} * \sum_{LT,l}\left[\frac{365}{AI_l}\sum_{d=1}^{AI}(N_{LT,y} * VS_{LT,d} * MS\%_l * (1-e^{-k\,(AI_l-d)}) * MCF_l * B_{0_{LT}})\right] \quad (11)$$

Where:

| | |
|---|---|
| $PE_{storage,y}$ | Project emissions on account of manure storage in year y ($tCO_2e$) |
| $AI_l$ | Annual average interval between manure collection and delivery for treatment at a given storage device l (days) |
| $VS_{LT,d}$ | Amount of volatile solid production by type of animal LT in a day (kg VS/head/d) |
| $MS\%_l$ | Fraction of volatile solids (%) handled by storage device l |
| k | Degradation rate constant (0.069) |
| d | Days for which cumulative methane emissions are calculated; d can vary from 1 to |

45 and to be run from 1 up to $AI_l$

$MCF_l$ Annual methane conversion factor for the project manure storage device l from Table 10.17, Chapter 10, Volume 4

Estimation of annual project $CO_2$ emissions from manure storage in year y was listed in table E12.

Table E12: Annual project $CO_2$ emissions from manure storagein year y

| Parameters | Unit | Livestock type 1 | Livestock type 2 | …… | Livestock type n |
|---|---|---|---|---|---|
| $GWP_{CH4}$ | - | 25 | 25 | 25 | 25 |
| $D_{CH4}$ | $t/m_3$ | 0.00067 | 0.00067 | 0.00067 | 0.00067 |
| $AI_l$ | days | | | | |
| $N_{LT,y}$ | head | | | | |
| $VS_{LT,d}$ | kgVS/head/d | | | | |
| $MS\%_l$ | % | | | | |
| $MCF_l$ | % | | | | |
| $B_{O,LT}$ | $m^3CH_4/kg\_dm$ | 0.29 | 0.29 | 0.29 | 0.29 |
| $PE_{storage,y}$ | $tCO_2e$ | | | | |
| Total emission from manure storage | $tCO_2e$ | | | | |

**3. Leakage**

The requirement for calculating leakage described in methodologies AMS III.D, AMS I.C, and AMS I.F is described in table E13 below. Therefore, for this PoA, leakage calculations are not required.

Table E13: The requirement for calculating leakage described in methodologies

| Methodology | Requirement for leakage calculation | Condition of the PoA |
|---|---|---|
| AMS III.D | 17. No leakage calculation is required. | - |
| AMS I.C | 47. If the energy generating equipment currently being utilised is transferred from outside the | No energy generating equipment is transferred from another activity or from outside the project boundary. |

| | | |
|---|---|---|
| | boundary to the project activity, leakage is to be considered.<br><br>48. In case collection/processing/transportation of biomass residues is outside the project boundary $CO_2$ emissions from collection/processing/transportation of biomass residues to the project site. | This has been included as the eligibility criteria 6d).<br><br>Each livestock farm will use its own livestock manure produced on site to feed the biogas digester. No manure will be collected/processed /transported from off-site. This has been included as eligibility criteria 5f) |
| AMS I.F | 21. If the energy generating equipment is transferred from another activity, leakage is to be considered. | Each livestock farm to be included in CPA will construct biogas digester and install energy generating equipment to utilize the biogas. No energy generating equipment is transferred from another activity.<br><br>This has been included as eligibility criteria 6d) |

**4. Emission reduction**

The emission reduction ERy by the project activity during a given year y is the difference between the baseline emissions (BEy) and project emissions (PEy), as follows:

$$ER_y = BE_y - PE_y \quad (12)$$

The emission reductions achieved by the project activity will be determined ex-post through direct measurement of the amount of methane fuelled, flared or gainfully used. It is likely that the project activity involves manure treatment steps with higher methane conversion factors (MCF) than the MCF for the manure treatment systems used in the baseline situation, therefore the emission reductions achieved by the project activity is limited to the ex-post calculated baseline emissions minus project emissions using the actual monitored data for the project activity. The emission reductions achieved in any year are the lower value of the following:

$$ER_{y,ex\ post} = \min[(BE_{y,ex\ post} - PE_{y,ex\ post}), (MD_y - PE_{power,y,ex\ post})] \quad (13)$$

Where:

$ER_{y,ex\ post}$ Emission reductions achieved by the project activity based on monitored values for year y ($tCO_2e$)

$BE_{y,ex\ post}$ Baseline emissions calculated using equation 2 (for projects using option in paragraph 9(a)) using ex post monitored values of $N_{LT,y}$ and if applicable $VS_{LT,y}$.

| | |
|---|---|
| $PE_{y,ex\ post}$ | Project emissions calculated using equation 7using ex-post monitored values of $N_{LT,y}$, $MS\%_y$, $AI_l$,and if applicable $VS_{LT,y}$ |
| $MD_y$ | Methane captured and used gainfully by the project activity in year y ($tCO_2e$) |
| $PE_{power,y,ex\ post}$ | Emissions from the use of fossil fuel or electricity for the operation of the installed facilities based on monitored values in the year y ($tCO_2e$) |

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

Table E14: Data and parameters are not monitored

| **Data / Parameter:** | $GWP_{CH4}$ |
|---|---|
| Data unit: | $tCO_2e/tCH_4$ |
| Description: | Global warming potential for $CH_4$ |
| Source of data used: | Fourth Assessment Report of IPCC |
| Value applied: | 25 |
| Justification of the choice of data or description of measurement methods and procedures actually applied: | - |
| Any comment: | It will be applied to all scenarios. |

| **Data / Parameter:** | $D_{CH4}$ |
|---|---|
| Data unit: | $t/m^3$ |
| Description: | Density of methane at room temperature (20℃ and 1 atm pressure) |
| Source of data used: | AMS-III. D |
| Value applied: | 0.00067 |
| Justification of the choice of data or description of measurement methods and procedures actually applied: | - |
| Any comment: | It will be applied to all scenarios. |

| **Data / Parameter:** | $UF_b$ |
|---|---|
| Data unit: | - |
| Description: | Model correction factor to account for model uncertainties |
| Source of data used: | AMS III.D |
| Value applied: | 0.94 |
| Justification of the choice of data or description of measurement methods and procedures actually applied: | - |

| | |
|---|---|
| Any comments: | It will be applied to all scenarios. |

| **Data / Parameter:** | *MCF* | | |
|---|---|---|---|
| Data unit: | Fraction | | |
| Description: | Methane conversion factor for baseline manure management system | | |
| Source of data used: | Obtained from 2006 IPCC Guidelines according to the site annual average temperature | | |
| Value applied: | Baodding | 13.4 | 71 |
| | Cangzhou | 13 | 71 |
| | Chengde | 8.0 | 40 |
| | Handan | 14.2 | 73 |
| | Henshui | 13.3 | 71 |
| | Langfang | 12.4 | 70 |
| | Qinghuangdao | 9.9 | 53 |
| | Shijiazhuang | 14.2 | 73 |
| | Tangshn | 11.1 | 68 |
| | Xingtai | 14.4 | 73 |
| | Zhangjiakou | 9.1 | 53 |
| Justification of the choice of data or description of measurement methods and procedures actually applied: | County specific data is not available, the factor MCF is taken from 2006 IPCC Guidelines. If annual average temperature is lower than 10℃, and higher than 5℃, annual MCF should be estimated using linear interpolation assuming that MCF=0 at the annual average temperature of 5℃. MCF was selected based on the annual average temperature which is from county meteorological station of the livestock farm located. | | |
| Any comments: | It will be applied to all scenarios. | | |

| **Data / Parameter:** | $B_{O,LT}$ |
|---|---|
| Data unit: | $m^3 CH_4$/kg dm |
| Description: | Maximum methane producing potential of VS generated for animal type LT |
| Source of data used: | Obtained from 2006 IPCC Guidelines, Table 10A-4, 10A-5, 10A-7,10A-8,10A-9 |
| Value applied: | Swine 0.29; Dairy cow: 0.24; Other cattle: 0.1; Broiler:0.01; Layers: 0.02 |
| Justification of the choice of data or description of measurement methods and procedures actually applied: | No specific country data available. |
| Any comments: | $B_0$ values for dairy cow, broilers, and layers applicable to developed countries can be used provided four conditions are satisfied mentioned in section E6.1 above. It will be applied to all scenarios. |

| **Data / Parameter:** | $VS_{default}$ |
|---|---|

| | |
|---|---|
| Data unit: | kg dm/animal/day |
| Description: | Volatile solids excreted for animal type per head per day |
| Source of data to be used: | Obtained from 2006 IPCC Guidelines, Table 10A-4, 10A-5, 10A-7,10A-8,10A-9 |
| Value applied: | Swine 0.30; Dairy cow:5.1; Other cattle: 2.3; Broilers: 0.36; Layers: 0.39 |
| Justification of the choice of data or description of measurement methods and procedures actually applied: | No specific country data available. |
| Any comment: | $VS_{default}$ values for dairy cow, broilers, and layers applicable to developed countries can be used provided four conditions are satisfied mentioned in section E6.1 above. It will be applied to all scenarios. |

| **Data / Parameter:** | $MS\%_{BL}$ |
|---|---|
| Data unit: | Fraction |
| Description: | Fraction of manure handled in anaerobic system in the baseline |
| Source of data used: | Project proponents |
| Value applied: | 100 percent |
| Justification of the choice of data or description of measurement methods and procedures actually applied: | All manure produced by the livestock farm was treated in anaerobic system, including anaerobic lagoon |
| Any comment: | It will be applied to all scenarios. |

| **Data / Parameter:** | $N_{LT,y}$ |
|---|---|
| Data unit: | Number of heads |
| Description: | Annual average number of animals of type LT in year y, |
| Source of data used: | Livestock farms |
| Value applied: | |
| Justification of the choice of data or description of measurement methods and procedures actually applied: | Calculated based on number of days animal is alive and number of animals produced annually in year y (equation (4) of this PoA-DD. |
| Any comments: | It will be applied to all scenarios. |

| **Data / Parameter:** | $W_{default}$ |
|---|---|
| Data unit: | Kg |
| Description: | Body weight of livestock |
| Source of data used: | Obtained from 2006 IPCC Guidelines, Table 10A-4, 10A-5, 10A-7,10A-8,10A-9 |
| Value applied: | Swine 28; Dairy cow:600; Other cattle: 319; Broilers: 0.9; |

| | |
|---|---|
| | Layers: 1.8 |
| Justification of the choice of data or description of measurement methods and procedures actually applied: | - |
| Any comments: | It will be applied to all scenarios. |

| | |
|---|---|
| Data / Parameter: | $\eta_{b,thermal,boiler}$ |
| Data unit: | Percent |
| Description: | The efficiency of the boiler using fossil fuel that would have been used in livestock farms in absence of the project activity |
| Source of data used: | Tool to determine the baseline efficiency of thermal or electric energy generation systems, Version 1 |
| Value applied: | - |
| Justification of the choice of data or description of measurement methods and procedures actually applied: | According to Tool to determine the baseline efficiency of thermal or electric energy generation systems, Version 01.Project proponents can choose Option E in the Tool to determine the baseline boiler efficiency to be the default efficiency of old coal fired boiler of 80% if the boiler has been in use for over 10 year, or to be the default efficiency of new coal fired boiler of 85% if the boiler has been in use for less than 10 year, |
| Any comment: | It will be applied to scenario A) and scenario C). |

| | |
|---|---|
| Data / Parameter: | $\eta_{householdstove,b}$ |
| Data unit: | Percent |
| Description: | Efficiency of the baseline equipment (household stove) being replaced |
| Source of data used: | Project proponents |
| Value applied: | - |
| Justification of the choice of data or description of measurement methods and procedures actually applied: | Because the output capacity is less than 45KW thermal and metering the thermal efficiency is not plausible, project proponents can choose either the highest of the efficiency values provided by two or more manufacturers for household stove with similar specifications using the baseline fuel or the highest efficiency from referenced literature values. If both options are not available, the project proponents can use default efficiency of 100%. |
| Any comment: | It will be applied to scenario A) and scenario C). |

| | |
|---|---|
| Data / Parameter: | $\eta_{biogasstove,p}$ |
| Data unit: | Percent |
| Description: | Efficiency of the project equipment (biogas stove) |

| | |
|---|---|
| Source of data used: | Project proponents |
| Value applied: | - |
| Justification of the choice of data or description of measurement methods and procedures actually applied: | Measured using representative sampling methods or based on referenced literature values. The efficiency tests shall be conducted following the guidance provided in the relevant national/international standards |
| Any comment: | It will be applied to scenario A) and scenario C). |

| | |
|---|---|
| Data / Parameter: | $NCV_{biogas}$ |
| Data unit: | $TJ/m^3$ |
| Description: | The net calorific value of the biomass |
| Source of data used: | Project proponents |
| Value applied: | - |
| Justification of the choice of data or description of measurement methods and procedures actually applied: | Measurement in laboratories according to relevant national/international standards. Measure quarterly, taking at least three samples for each measurement. The average value can be used for the rest of the crediting period. |
| Any comment: | |

| | |
|---|---|
| **Data / Parameter:** | $EF_{CO2,y}$ |
| Data unit: | $tCO_2/MWh$ |
| Description: | Emission factor of a grid |
| Source of data used: | It will be determined at CPA level |
| Value applied: | - |
| Justification of the choice of data or description of measurement methods and procedures actually applied: | |
| Any comment: | It will be applied to all scenarios. |

| | |
|---|---|
| **Data / Parameter:** | $EF_{OM,y}$ |
| Data unit: | $tCO_2/MWh$ |
| Description: | Operating Margin Emission Factor |
| Source of data used: | It will be determined at CPA level |
| Value applied: | - |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Released by Chinese government. |
| Any comment: | It will be applied to all scenarios. |

| **Data / Parameter:** | $EF_{BM,y}$ |
|---|---|
| Data unit: | $tCO_2/MWh$ |
| Description: | Build Margin Emission Factor |
| Source of data used: | It will be determined at CPA level |
| Value applied: | |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Released by government. |
| Any comment: | It will be applied to all scenarios. |

| **Data / Parameter:** | $TDL_y$, |
|---|---|
| Data unit: | Fraction |
| Description: | Average technical transmission and distribution losses |
| Source of data used: | Tool to calculate baseline, project and/or leakage emissions from electricity consumption |
| Value applied: | 20 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | It is used for calculate project electricity consumption sources; |
| Any comment: | It will be applied to all scenarios. |

| **Data / Parameter:** | $\eta_{flare,h}$ |
|---|---|
| Data unit: | Percent |
| Description: | Flare efficiency in hour h |
| Source of data used: | Tool to determine project emissions from flaring gases containing methane |
| Value applied: | 0 % |
| Justification of the choice of data or description of measurement methods and procedures actually applied: | This is conservative. |
| Any comment: | It will be applied to all scenarios. |

| **Data / Parameter:** | $\mathbf{W_{CH4,y}}$ |
|---|---|
| Data unit: | mass fraction |
| Description: | Methane content in biogas in year “y” |
| Source of data used: | Based on options provided in AMS III D version18 |
| Value applied: | 60% |

| | |
|---|---|
| Justification of the choice of data or description of measurement methods and procedures actually applied: | As per the methodology |
| Any comment: | -- |

| **Data / Parameter:** | $RL_{boiler}$ |
|---|---|
| Data unit: | Year |
| Description: | Remaining lifetime of boiler |
| Source of data used: | Manufacturer and project proponents |
| Value applied: | - |
| Justification of the choice of data or description of measurement methods and procedures actually applied: | According to the "General Guidelines to SSC CDM methodologies" and "Tool to determine the remaining lifetime of equipment", $RL_{boiler}$ equals the technical lifetime indicated in the manufacturer specification of boiler or default values of boiler life time minus the number of years that it has been in use since first commissioning. |
| Any comment: | -- |

| **Data / Parameter:** | $RL_{stove}$ |
|---|---|
| Data unit: | Year |
| Description: | Remaining lifetime of household stove |
| Source of data used: | Manufacturer and Project proponents |
| Value applied: | - |
| Justification of the choice of data or description of measurement methods and procedures actually applied: | According to the "General Guidelines to SSC CDM methodologies" and "Tool to determine the remaining lifetime of equipment", $RL_{stove}$ equals the end of lifetime indicated in the manufacturer specification minus the years that it was delivered. |
| Any comment: | -- |

## 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:** | $VS_{LT,y}$ |
|---|---|
| Data unit: | kg dm/animal/year |
| Description: | Volatile solids excreted for animal type per head per year |
| Source of data to be used: | Calculated according to equation $VS_{LT,y} = \left( \frac{W_{site}}{W_{default}} \right) * VS_{default} * nd_y$<br>$VS_{default}$ will be obtained from 2006 IPCC Guidelines, Table 10A-4, 10A-5, 10A-7,10A-8,10A-9 |

| | |
|---|---|
| | $W_{default}$ obtained from 2006 IPCC Guidelines, Table 10A-4, 10A-5, 10A-7,10A-8,10A-9 |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | $VS_{default}$: Swine 0.30; Dairy cow:5.1; Other cattle: 2.3; Broilers: 0.36; Layers: 0.39<br>$W_{default}$: Swine 28; Dairy cow:600; Other cattle: 319; Broilers: 0.9; Layers: 1.8 |
| Description of measurement methods and procedures to be applied: | Data type: Calculated according to equation<br>$VS_{LT,y} = \left( \frac{W_{site}}{W_{default}} \right) * VS_{default} * nd_y$<br>Review the new data from IPCC future guidelines<br>Monitoring frequency: annually |
| QA/QC procedures: | The genetic source, formulated feed rations (*FFR)*, use of *FFR*, specific animal weights will be checked to ensure applicability of default volatile solids for the specific animal type in the CPA |
| Any comment: | Archive electronically during the crediting period plus 2 years. It will be applied to all scenarios. |

| **Data / Parameter:** | $MS\%_y$ |
|---|---|
| Data unit: | Percentage |
| Description: | Fraction of manure handled in anaerobic digester |
| Source of data to be used: | Livestock farms |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | 100% |
| Description of measurement methods and procedures to be applied: | Data type: Daily measurement of manure that is not handled in digesters and monthly record<br>This value should be 100%, but any diversion of manure by other manure management will be measured using a scale suitable for carts or other carriers used for removal of manure from the livestock farm.<br>Monitor whenever there is other manure management. |
| QA/QC procedures: | Periodic calibration of the scale |
| Any comment: | Monthly recorded and archive electronically during the crediting period plus 2 years. It will be applied to all scenarios. |

| **Data / Parameter:** | $T_{air}$ |
|---|---|
| Data unit: | ℃ |
| Description: | Annual Average ambient temperature at weather station nearby project site. |
| Source of data to be used: | County meteorological station |
| Value of data applied for the purpose of calculating expected | - |

| | |
|---|---|
| emission reductions in section B.5 | |
| Description of measurement methods and procedures to be applied: | Monthly average ambient temperature at weather station nearby project site. |
| QA/QC procedures: | - |
| Any comment: | Used to select the annual MCF from 2006 IPCC Guidelines<br>Archive electronically during the crediting period plus 2 years.<br>It will be applied to all scenarios. |

| **Data / Parameter:** | $W_{site}$ |
|---|---|
| Data unit: | kg |
| Description: | Average animal weight of livestock by type and category |
| Source of data to be used: | Regular record by livestock farms |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | - |
| Description of measurement methods and procedures to be applied: | Monthly (for cattle and swine), or weekly (for broiler and layers) sample of each livestock type will be weighed on a typical scale and the results averaged for each species and type.<br>Types:<br>Swine: sow, boar, piglet, nursery, growing and/or finishing<br>Dairy cow: Breeding cow, Young cow (young than one year old), other cow<br>Other cattle: Breeding cattle, Young cattle (young than one year old), other cattle<br>Broilers<br>Layers<br>Monitoring frequency:<br>Swine: Monthly<br>Dairy cow: Monthly<br>Other cattle: Monthly<br>Broilers: Weekly<br>Layers: monthly |
| QA/QC procedures: | Periodic calibration of the scale, and sample will meet required level of reliability of 90/10 as per EB65 Annex 2. |
| Any comment: | Archive electronically during the crediting period plus 2 years<br>It will be applied to all scenarios. |

| **Data / Parameter:** | $nd_y$ |
|---|---|
| Data unit: | Day |
| Description: | Annual operational days of anaerobic digesters |
| Source of data to be | Regular farm record of project owner |

| | |
|---|---|
| used: | |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | 365 |
| Description of measurement methods and procedures to be applied: | This value will be calculated based on the length of period biogas digesters are not operating because of maintenance and repair.<br>Annual amount based on daily record taken throughout the year. |
| QA/QC procedures: | Cross check with gas production |
| Any comment: | This value is kept electronically during the crediting period plus 2 years.<br>It will be applied to all scenarios |

| **Data / Parameter:** | $N_{p,y}$ |
|---|---|
| Data unit: | Number |
| Description: | Number of animals produced annually of type LT in year y |
| Source of data to be used: | Regular record by livestock farms |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | - |
| Description of measurement methods and procedures to be applied: | Data type: measured<br>Monitoring frequency: monthly. |
| QA/QC procedures: | Annual average livestock population will be check based on monthly count and record number of livestock in stock by type. Checking consistency between the population value and indirect information (records of sales, records of food purchases) |
| Any comment: | Archive electronically during the crediting period plus 2 years.<br>It will be applied to all scenarios. |

| **Data / Parameter:** | $N_{da,y}$ |
|---|---|
| Data unit: | Days |
| Description: | Number of days livestock alive in the farm |
| Source of data to be used: | Regular record by livestock farms |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | - |
| Description of measurement methods and procedures to be | Data type: measured<br>Record the number of days livestock raised based on counts by type<br>Livestock types Swine= sow, boar, piglet, nursery, growing and finishing |

| | |
|---|---|
| applied: | Dairy cow=breeding cow, young cow, other cow<br>Other cattle=breeding cattle, young cattle, other cattle<br>Broilers<br>Layers<br>Monitoring frequency for swine and cattle: monthly;<br>Monitoring frequency for broilers and layers: weekly. |
| QA/QC procedures: | Annual average livestock population will be check based on monthly count and record number of livestock in stock by type. Checking consistency between the population value and indirect information (records of sales, records of food purchases) |
| Any comment: | Archive electronically during the crediting period plus 2 years.<br>It will be applied to all scenarios. |

| **Data / Parameter:** | $BG_{burnt,y}$ |
|---|---|
| Data unit: | $m^3$ |
| Description: | Biogas volume in year y |
| Source of data to be used: | Reading records of flow meters |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | - |
| Description of measurement methods and procedures to be applied: | The amount of biogas recovered and fuelled, flared or used gainfully biogas output of the project will be measured through several biogas flow meters continuouslywith weekly accumulated reading. First, a biogas flow meter with temperature and pressure measurement installed after the purification of biogas and before the biogas tank (biogas flow meter 1). In the meantime, two or three biogas flow meters (BF-2, BF-3, and BF-4) will be installed at the inlet of power generator and/or boiler as applicable, and flare system, respectively. |
| QA/QC procedures: | Biogas flow meters will undergo maintenance/calibration subject to appropriate national standards or manufacture's recommendations. |
| Any comment: | Archive electronically during the crediting period plus 2 years.<br>It will be applied to all scenarios. |

| **Data / Parameter:** | $T_{biogas}$ |
|---|---|
| Data unit: | ℃ |
| Description: | Biogas temperature |
| Source of data to be used: | Reading records of flow meter with temperature testing |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | 20 ℃ |

| | |
|---|---|
| Description of measurement methods and procedures to be applied: | The meter will be installed in the same point with the biogas flow meter in the outlet of digesters. It will be measured to determine the density of methane $D_{CH4}$. No separate monitoring of temperature is necessary when using flow meters that automatically measure the temperature and pressure of biogas, and expressing biogas volumes in normalized cubic meters.<br><br>Continuous at daily interval. |
| QA/QC procedures: | Measuring instruments should be subject to a regular maintenance and testing regime in accordance to appropriate national or international standards, or manufactures' recommendation. |
| Any comment: | Archive electronically during the crediting period plus 2 years.<br>It will be applied to all scenarios. |

| **Data / Parameter:** | $P_{biogas}$ |
|---|---|
| Data unit: | Pa |
| Description: | Biogas pressure |
| Source of data to be used: | Reading records of flow meters with pressure testing |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | - |
| Description of measurement methods and procedures to be applied: | The meter will be installed in the same point with the biogas flow meter in the outlet of digesters. Measured to determine the density of methane $D_{CH4}$<br>No separate monitoring of pressure is necessary when using flow meters that automatically measure the temperature and pressure of biogas, and expressing biogas volumes in normalized cubic meters.<br><br>Continuous at daily interval. |
| QA/QC procedures: | Measuring instruments should be subject to a regular maintenance and testing regime in accordance to appropriate national or international standards or manufactures' recommendation. |
| Any comment: | Archive electronically during the crediting period plus 2 years.<br>It will be applied to all scenarios. |

| **Data / Parameter:** | $EG_{BL,y}$ |
|---|---|
| Data unit: | MWh |
| Description: | Quantity of net electricity displaced as a result of the implementation of the CDM project activity in year y |
| Source of data to be used: | Reading records of electricity meters |
| Value of data applied for the purpose of calculating expected emission reductions in | - |

| | |
|---|---|
| section B.5 | |
| Description of measurement methods and procedures to be applied: | Measurements are undertaken usingelectricity meters.<br>Monitoring/recording Frequency: Continuous monitoring, and reported monthly. |
| QA/QC procedures: | Calibration should be undertaken in accordance to appropriate national or international standards:<br>In the case of electricity sold to a third party, measurement results shall be cross-checked with records of sold/purchased electricity, e.g., invoices/receipts. |
| Any comment: | Archive electronically during the crediting period plus 2 years.<br>It will be applied to scenario B and scenario C. |

| **Data / Parameter:** | $EG_{thermal,boiler,y}$ |
|---|---|
| Data unit: | TJ |
| Description: | The net quantity of steam/heat supplied by the project activity to displace steam/heat provided by boiler under baseline scenario during the year y |
| Source of data to be used: | Reading records of flow meters and temperature meters |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | - |
| Description of measurement methods and procedures to be applied: | $EG_{thermal,boiler,y}$ will be monitored as per AMSI.C. The flow and temperature of hot water generated from the boilers will be monitored at the outlet and returning point in order to measure the difference in the enthalpy. |
| QA/QC procedures: | The flow meter and temperature meter should be subject to a regular maintenance and calibration in accordance to appropriate national or international standards, or manufactures' recommendation. |
| Any comment: | It will be applied to scenario A and scenario C |

| **Data / Parameter:** | $B_{biogas,p,y}$ |
|---|---|
| Data unit: | $m^3$ |
| Description: | The net quantity of the biogas consumed by nearby households in year *y* |
| Source of data to be used: | Project proponents |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | - |

| | |
|---|---|
| Description of measurement methods and procedures to be applied: | The quantity of biogas shall be measured continuously. Adjust for the moisture content in order to determine the quantity of dry biomass. |
| QA/QC procedures: | Check the consistency of measurements *ex post* with annual data on energy generation, fossil fuels and biogas used and the efficiency of energy generation as determined *ex ante* |
| Any comment: | Archive electronically during the crediting period plus 2 years.<br>It will be applied to scenario A and scenario C. |

| **Data / Parameter:** | $EC_{PJ,y}$ |
|---|---|
| Data unit: | MWh |
| Description: | Quantity of electricity consumed under project activity in year y |
| Source of data to be used: | Livestock farms |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | - |
| Description of measurement methods and procedures to be applied: | The electricity consumed will be monitored by electricity meter (EM-2) continuously, and reported monthly. |
| QA/QC procedures: | Electricity meters will undergo maintenance/calibration subject to appropriate industry standards. The accuracy of the meter readings will be verified by receipts issued by the purchasing power company. Uncertainty of the meters to be obtained from the manufacturers. |
| Any comment: | Archive electronically during the crediting period plus 2 years.<br>It will be applied to all scenarios. |

| **Data / Parameter:** | Soil application of the residual waste |
|---|---|
| Data unit: | - |
| Description: | To record destination of digested sludge for land application |
| Source of data to be used: | Residue application log input by livestock farms |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | - |
| Description of measurement methods and procedures to be applied: | To record destination of digested sludge generated from anaerobic digester for each application. |
| QA/QC procedures: | - |
| Any comment: | Archive electronically during the crediting period plus 2 years<br>It will be applied to all scenarios. |

| **Data / Parameter:** | *AI* |
|---|---|
| Data unit: | Day |
| Description: | Annual average interval between manure collection and delivery for treatment in biogas digester |
| Source of data to be used: | Regular farm record of livestock farm owner |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | |
| Description of measurement methods and procedures to be applied: | When the storage time of the manure after removal from the animal barns, including transportation, exceeds 24 hours before being fed into the anaerobic digester; and the dry matter content of the manure when removed from the animal barns is less than 20%, then record *AI*. Annual amount based on record of *AI*. |
| QA/QC procedures: | - |
| Any comment: | This value is kept electronically during the crediting period plus 2 years. It will be applied to all scenarios. |

| **Data / Parameter:** | Genetic source |
|---|---|
| Data unit: | - |
| Description: | Genetic source of swine, dairy cow, other cattle, broilers and layers |
| Source of data to be used: | Project proponent, recorded certificate of genetic source |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | Genetic source from developed |
| Description of measurement methods and procedures to be applied: | NA |
| QA/QC procedures: | Genetic source of the livestock production operations was confirmed to originate from an Annex I Party. |
| Any comment: | It will be applied to all scenarios. |

| **Data / Parameter:** | FFR |
|---|---|
| Data unit: | - |
| Description: | Formulated feed ratio |
| Source of data to be used: | Project proponent, recorded amounts of FFR for farm and the ingredient of FFR |
| Value of data applied for the purpose of calculating expected | 100% |

| | |
|---|---|
| emission reductions in section B.5 | |
| Description of measurement methods and procedures to be applied: | Annually |
| QA/QC procedures: | NA |
| Any comment: | It will be applied to all scenarios. |

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

### 1. Implementation of monitoring plan

The implementation of the monitoring plan is to ensure real, measurable, long-term greenhouse gas emissions reduction. It is a crucial procedure to identify the final CERs of the proposed project. This monitoring plan for the proposed project activity will be implemented by individual livestock farms included under CPA of the PoA under the technical support from Hebei Green Agriculture Co. Ltd.The original records and electronic copy will be kept by the individual livestock farms. Hebei Green Agriculture Co. Ltd will keep the copy of original records and electronic data.

Individual livestock farms included under CPA of the PoA and Hebei Green Agriculture Co. Ltdmust maintain credible, transparent, and adequate data estimation, as well as measurement, collection, and tracking systems to maintain the information required for audit of an emissions reduction project. These records and monitoring systems are needed to allow the selected DOE to verify project performance as part of the verification and certification process.

### 2. Monitoring management

Individual livestock farm will appoint 3 staffs who will be responsible for the monitoring work. One is responsible for the monitoring related to biogas digester operation, one is responsible for biogas utilization system(s), and the third is responsible for the livestock production and land application. The management system in individual livestock farm is illustrated in figure E2. Technicians in Hebei Green Agriculture Co. Ltd will visit the livestock farms once a month to provide guidance and support if needed for the monitoring.

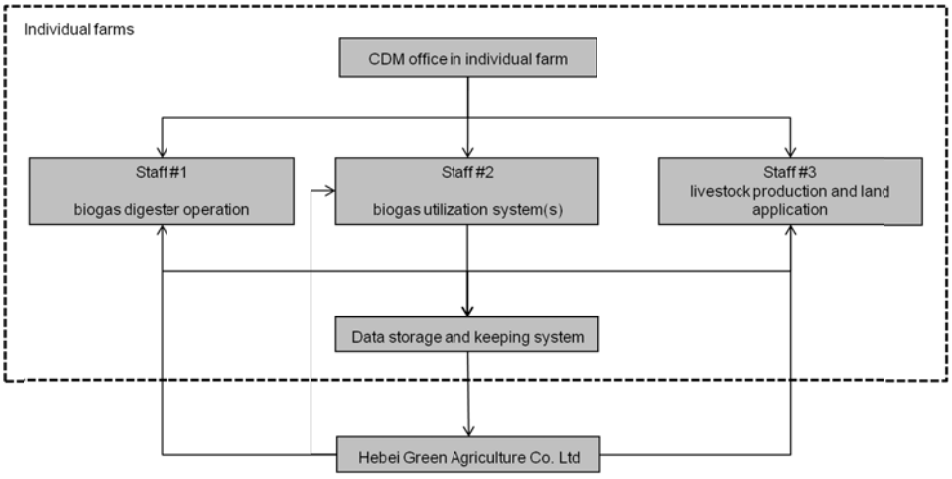


Figure E2：Management structure

## 3. Monitoring components

According to methodologies AMS III.D, AMS I.C, and AMS I.F, the data to be monitored are shown in Section E 7.1. The monitoring plan for different scenarios are as figure E3-1 to E3-3.

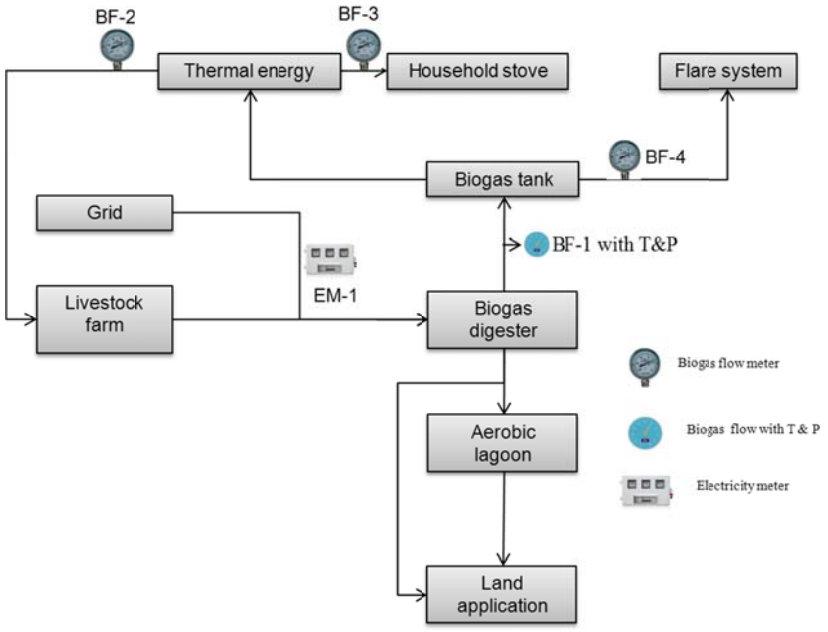


Figure E3-1：Monitoring plan for scenario A

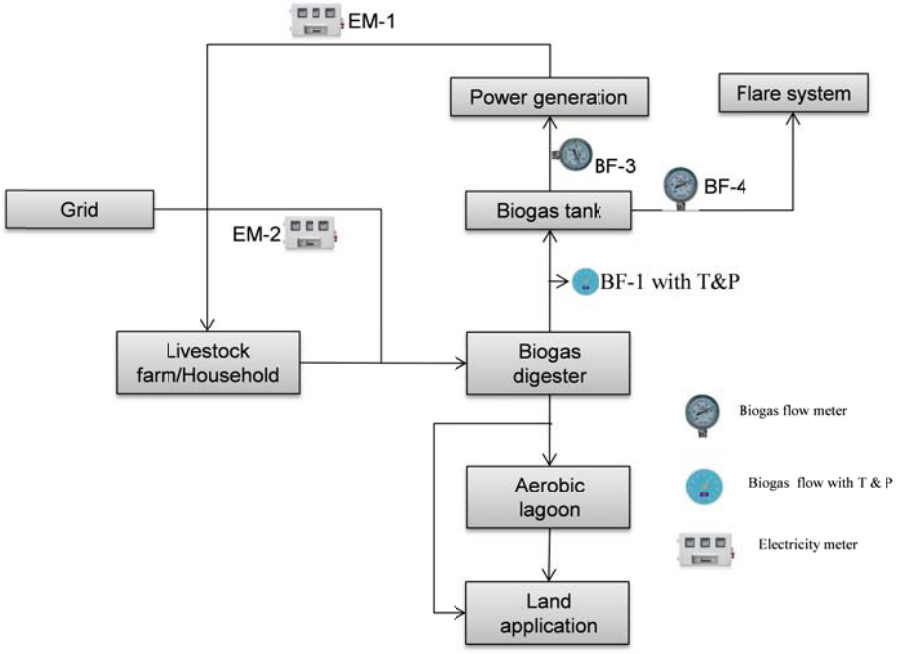


Figure E3-2：Monitoring plan for scenario B

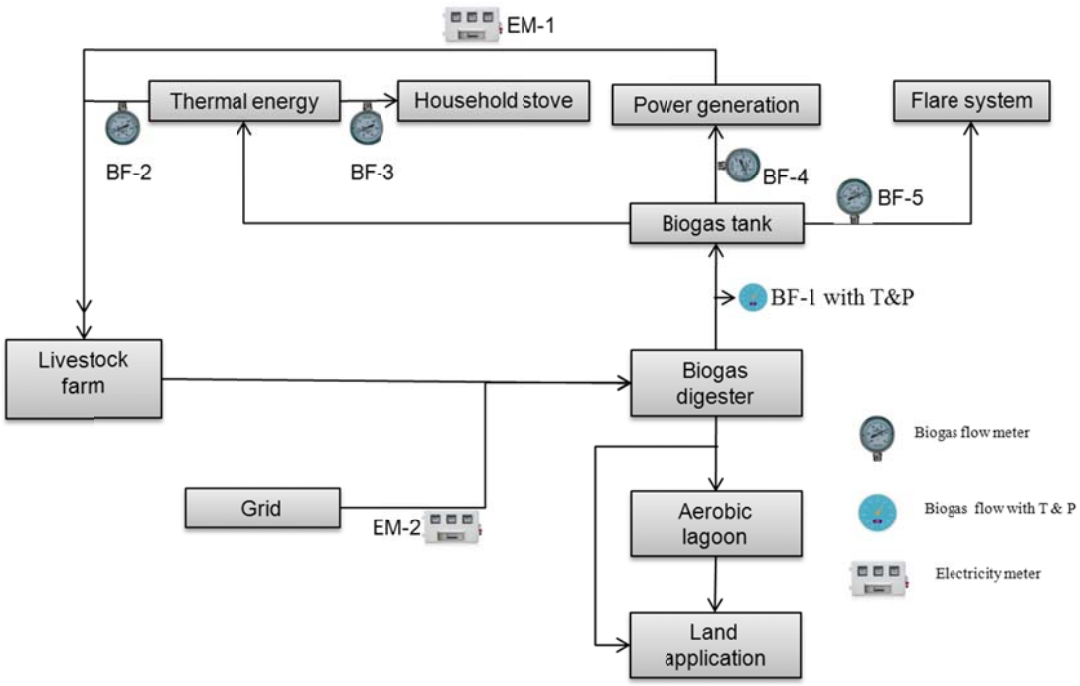


Figure E3-3：Monitoring plan for scenario C

As shown in figure E3-1 to figure E3-3, the PoA is composed by four main monitoring components:

- Biogas digester operation;
- Biogas utilization system(s);
- Livestock production
- Land application;

1) Biogas digester system;

The parameters to be monitored related to biogas digester system include the operation of biogas digesters, biogas production, biogas temperature and pressure. Training on the monitoring biogas digester system is performed by Hebei Green Agriculture Co. Ltd and outsourced experts. The training includes normal operation of the system and maintenance. Daily inspections are performed by technicians in individual livestock farm and monthly inspection by techniciansworking in Hebei Green Agriculture Co. Ltd. All data is saved on the computer and print out once a week.

2) Biogas utilization system(s)

The parameters to be monitored related to biogas utilization system(s) include the biogas used for thermal energy supply, and/or power generation, and flare of residual biogas. Training on the monitoring biogas utilization system(s) is performed by Hebei Green Agriculture Co. Ltd and outsourced experts. The training includes location of biogas flow meters and electrical meters to be installed, the monitor frequency and calibration of the meters. All data is archived in the computer upon being measured or collected and printed out once a week.

3) Livestock production

Training on livestock production is provided by the Hebei Green Agriculture Co. Ltd and outsourced experts. The training includes the method and frequency to monitor the livestock population, feed, percentage of manure management by biogas digesters.

4) Land application

Training on the biogas residual system is provided by the Hebei Green Agriculture Co. Ltd and outsourced experts. The training includes the how to ensure the aerobic condition of the biogas residual to avoid methane production and emission.

**4. Data collection and storage**

The CDM monitoring staff with proper training will monitor the parameters according to the monitoring plan, and all the records will be double checked. At the end of each month, the monitoring data and records will be filed in spreadsheet and kept in the electrical database and in paper document format by individual livestock farms and upload the electronic data to Hebei Green Agriculture Co. Ltd. Physical documentation such as paper-based maps, diagrams, and environmental impact assessments will be collected in Hebei Green Agriculture Co. Ltd..

All paper-based information and electronic database will be stored by the proposed project owner during the crediting period plus 2 years.

All meters used in the proposed project should be accorded with national standard or manufacture's recommendation, including precision requirement and calibration. All the equipments used should be serviced and maintained in accordance with the original manufacturers' instructions and complete records preservation.

**5. Calibration of Meters**

Biogas flow meters, electricity meters, scale will be subject to regular maintenance and testing according to technical specifications from the manufactures to ensure accuracy and good performance. Equipment calibration will be conducted periodically according to technical specifications. Biogas temperature and pressure meter will also need to be calibrated if they are applied in the monitoring of project activity.

**6. QA/QC**

The reliability of monitoring system is determined by precision, quality of measuring meters as well as the data collection procedure. All the meters shall be purchased from professional manufactures with certificate. Meters shall be calibrated according to national standard by qualified institutions or manufacture's recommendations. The monitoring staff shall follow the monitoring plan and second monitoring staff should double check the reading and records. QA/QC will assure the precision and steadiness of the metering results and correct reading and records.

Every month thetechnician ofHebei Green Agriculture Co. Ltd will visit the livestock farm which is included in the PoA to make sure the sustainable operation of the farm including the livestock production, biogas digesters system, biogas utilization facilities. He/she will also check the data recording, data collection and archiving, as well as calibration of meters undertaken by the monitoring staff.

**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 of baseline study: 18/04/2011

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**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

There is no public funding from Annex I Parties for the PoA.

**Annex 3**

**BASELINE INFORMATION**

Baseline scenario was identified in section E4 and baseline emission was described in section E6.

## Annex 4

## MONITORING INFORMATION

Monitoring information is described in section E7.

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