



**Component project activity design document form  
(Version 08.0)**

*Complete this form in accordance with the instructions attached at the end of this form.*

**BASIC INFORMATION**

<b>Title of the CPA</b>	CPA Nb. SCHHBG-2014-087
<b>Scale of the CPA</b>	<input type="checkbox"/> Large-scale <input checked="" type="checkbox"/> Small-scale
<b>Version number of the CPA-DD</b>	Version 1.4
<b>Completion date of the CPA-DD</b>	15/08/2017
<b>Title and UNFCCC reference number of the registered CDM PoA</b>	Sichuan Rural Poor-Household Biogas Development Programme – PoA 2898
<b>Title and reference number of the corresponding generic CPA</b>	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX
<b>Coordinating/managing entity</b>	Chengdu Oasis Science & Technology Co., Ltd.
<b>Host Party</b>	People's Republic of China
<b>Applied methodologies and standardized baselines</b>	AMS-I.I– Biogas/biomass thermal applications for households/small users (version 04) (EB68, Annex 25);  AMS-III.R– <i>Methane recovery in agricultural activities at household/small farm level</i> (version 02) (EB59, Annex 4)
<b>Sectoral scopes linked to the applied methodologies</b>	Scope 1 – Energy Industries (Renewable /non-Renewable Sources)  Scope 15 - Agriculture
<b>Estimated amount of annual average GHG emission reductions</b>	10,502 tCO <sub>2</sub> e.

## SECTION A. Description of component project activity (CPA)

### A.1. General description of CPA

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The CPA SCHHBG-2014-087 involves the installation and operation of 4,601 household biogas systems at low-income households located in Yibin, Ziyang and Zigong Cities, Sichuan Province, China.

The CPA builds on and integrates into the existing subsidy and implementation program for household bio digesters of the Sichuan Rural Energy Office (SREO) and its subsidiaries. The CPA consists of the extension of the existing program towards low-income households within Yibin, Ziyang and Zigong that are not able to participate under the SREO program without further support.

Following the scope of the PoA, the CPA involves two main components:

- a) **Financial support:** Although the existing subsidies promote the installation of household biogas digesters, the investment is not financially feasible. By offering an additional regular income generated by carbon credits, the PoA will support the households in closing the financial gap.
- b) **Technical support:** The proposed PoA will provide free technical service during start up and operation of the digesters. By this means low-income households, who much more than richer households cannot afford to allocate scarce financial resources in a sensitive technology, are guaranteed that they will actually receive long-term benefits of their investment in the biogas systems. Thereby, not only the barrier for the initial installation of the digesters is overcome, but also the stability of the digester operation is improved after the equipment has been installed.

Expected outcome of the proposed programme is an increased distribution of digesters on the one side and a more reliable operation of the installed systems on the other side. Both effects will contribute to the success of the existing subsidy programme and increase the achieved emission reductions.

As stated and explained above, the target group of the proposed PoA and its CPAs are low-income families. By focusing on these groups, the PoA clearly facilitates additional and sustainable development and will improve the living conditions of underprivileged farmers. Implementation, operation, maintenance and monitoring will be primarily executed by the SREO and its subsidiaries and supervised by the C/ME.

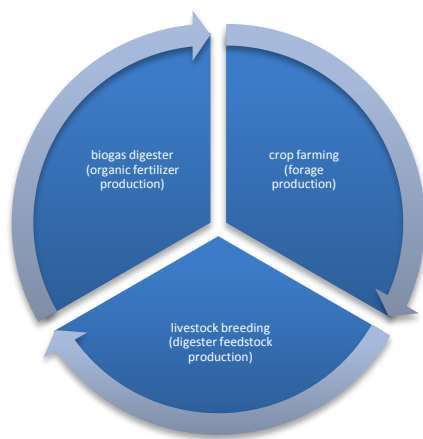
By installing biogas digesters in which all organic waste produced by the households can be used to generate biogas, the existing pit storages that are used to store the manure and other waste will be abandoned and GHG emissions will be avoided. All digesters within the CPA will be installed following the technology and technical standards as presented in section A.3 of the PoA-DD. As stated there, all digesters have to be installed by technicians, certified following the procedures described in the PoA-DD. After the successful installation and commission, technical service will be offered to the participating households on a regular basis to ensure a stable operation and prevent a relapse to old habits.

The biogas generated by the digesters will be fed into a newly built/bought biogas stove that can be used for cooking purposes. This will lead to a reduction consumption of coal that is used by most households for cooking. As the biogas is a renewable resource, this will lead to a further reduction of GHG emissions

The expected average annual emission reduction that is calculated according to the procedures described in the PoA-DD, using CPA specific input values from this CPA are 10,502 tCO<sub>2</sub>e.

In addition to the emission reduction aspect, the proposed PoA will contribute to local sustainable development in various ways, as by:

- Alleviating the national energy pressure: through the proposed CPA, biogas will be utilized by thousands of households as a renewable energy, thus the shortage of energy will be alleviated.
- Economic sustainability: Biogas is a renewable energy source and the bio digesters distributed through the CPA provide users with energetic autonomy. Households become independent from coal for cooking, leading to continuous and substantial expenditure savings.
- Improving local environment: the proposed PoA will replace traditional coal stoves and reduce coal consumption by installing biogas stoves for household cooking. Therefore, a significant source of indoor air pollution will be reduced. The concentrations of CO, SO<sub>2</sub>, PM<sub>10</sub> and NH<sub>3</sub> in the air will decrease.
- Improving living condition and public health: by reducing the indoor coal consumption and installing a proper animal manure management system, common diseases caused by coal burning and improper handling of manure, such as respiratory diseases, eye ailment etc. will be reduced to a great extent.
- Promoting sustainable development of local agriculture: a recycle economy model can be formed through the proposed CPA, i.e. crop farming (forage production) - livestock breeding (digester feedstock production) - biogas digester (organic fertilizer production) - crop farming (higher quality of agricultural products). Thus, a sustainable development of the rural agricultural production can be achieved.
- Reducing the risks of accidents: In the past, several deadly accidents have happened during the operation of household biogas digesters in Sichuan. The proposed CPA will provide technical service to the farmers and thereby reduce the risk of such accidents.



Through the effects described above, the proposed CPA will improve the rural living conditions and the financial situation of rural families and reduce GHG emissions by changing the existing manure management systems and by reducing coal consumption in remote areas.

The proposed CPA qualifies for micro-scale Type I (biogas generation) and Type III (methane avoidance). The total thermal capacity installed at all households of the CPA does not exceed 15 MW<sub>th</sub> (threshold of micro-scale Type I activity) and the annual emission reduction of the methane avoidance of the CPA is less than 20k tCO<sub>2</sub>e (threshold of micro-scale Type III activity).

## A.2. Location of CPA

>> The households bundled in this CPA are located in Yibin, Ziyang and Zigong City, Sichuan Province, China. The CPA covers the geographical coordinates of 103° 36' - 105° 16' E and 27° 50' - 29° 38' N.

The geographical boundary for the PoA is the administrative boundary of Sichuan province, China. Yibin, Ziyang and Zigong City is an administrative city of Sichuan Province, thus the CPA is located within the geographical boundary of the PoA.

The following figure shows the location of the CPA.



Figure 1: Location of the CPA within Sichuan

## A.3. Technologies/measures

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A typical biogas digester system consists of different components such as inlet, inlet pipe, fermentation chamber, gas chamber storage, hydraulic chamber, movable cover and gas tube. The typical structure of a biogas digester applied under the proposed PoA is displayed in Figure 2.

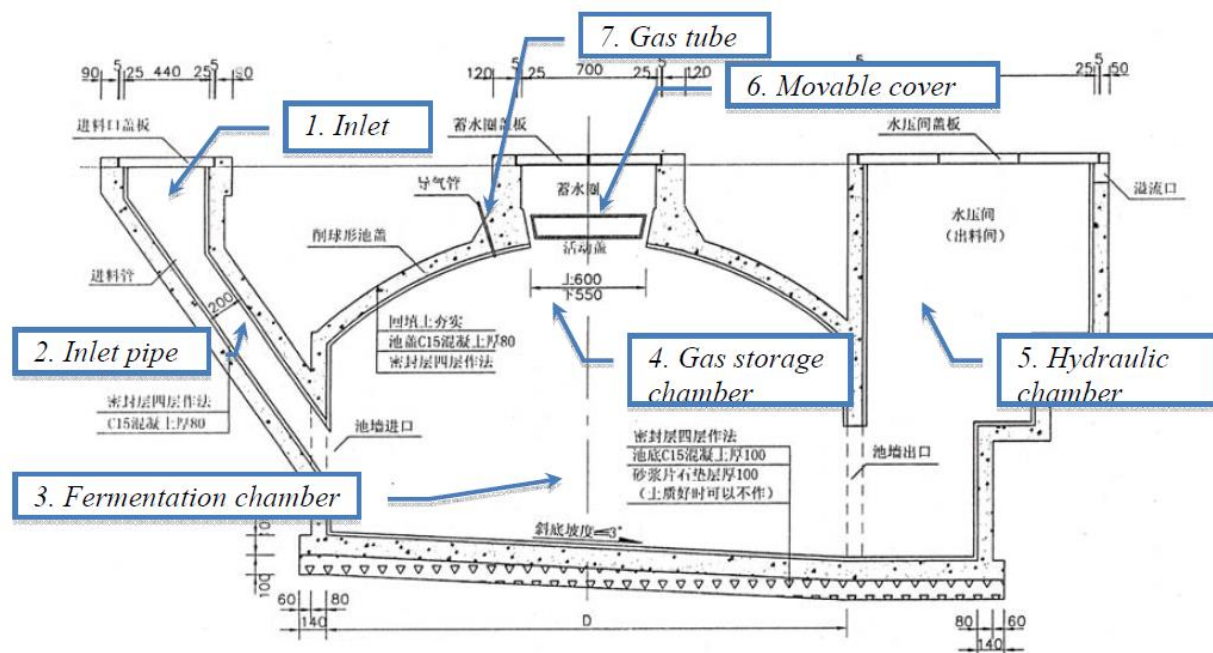


Figure 2: Typical design of a household biogas digester installed under the proposed PoA.

The technical flow is described in detail as follows:

1. Biogas generation and collection system

The design of biogas digesters will be based on national standards established by the Chinese government.

According to the national standard NY/T 465-2001, the standard designs comprise digesters of 6 m<sup>3</sup>, 8 m<sup>3</sup> and 10 m<sup>3</sup>. All digesters constructed in Sichuan and included into the PoA will follow either this standard or an applicable national or updated that replaced the current standard. The digesters will be constructed and finally approved by engineers accredited by the local Rural Energy System.

A list of the standards relevant for household biogas digesters in Sichuan province is shown in 错误!未找到引用源。 .

Table 1: Standards relevant for the construction of household biogas digesters in Sichuan

No.	Standard Code	Title
1.	GB/T 3606-2001	Domestic Biogas Stove
2.	GB/T 4750-2002	Collections of Standard Design Drawings of Household Anaerobic Digesters
3.	GB/T 4751-2002	Specification for Check and Acceptance of the Quality of Household Anaerobic Digesters
4.	GB/T 4752-2002	Operation Rules for Construction of Household Anaerobic
5.	NY/T 465-2001	Household-Scaled Biogas & Integrated Farming System-Specification on Design, Construction and Use for Southern
6.	NY/T 1496.1-2007	Biogas Transmission System for rural household_Part 1-Thermoplastic Pipes

		Biogas Transmission System for rural household_Part 2- Thermoplastic Pipe Fittings
		Biogas Transmission System for rural household_Part 3i=- Thermoplastic Waves
7.	NY/T 1639-2008	Technical Criterion on Rural Biogas Digesters and Three Renovations
8.	NY/T 858-2004	Biogas Pressure Meter
9.	NY/T 859-2004	Desulfuricer household biogas
10.	NY/T 860-2004	Digester sealing Coatings
11.	DB51/T 770-2008(Sichuan)	The Criterion of Supportive Installation on Rural Household Biogas Digester

The design and construction of the digesters is certified by technicians accredited by the Ministry of Agriculture. The digesters are usually installed below the pigpen and the inlet will be directly connected to livestock room so that the dung can be drained into the digester directly without being stored under anaerobic conditions before. Additionally, a toilet will be installed in each household next to the livestock room so that human excreta can be treated in the digester as well.

After being fed into the inlet of the whole system, the manure will reach the fermentation chamber where it is digested with a planned retention time of several months. Within the fermentation chamber, the main biogas generation takes place. The gas is stored in the upper part of fermentation chamber just above the slurry surface (the gas storage chamber). If more gas is generated than consumed, the pressure within the gas storage chamber will increase and press the liquids into the hydraulic chamber. When the gas is extracted for utilization via the gas tube, the pressure decreases again and allows the liquids to flow back into the fermentation chamber. This system guarantees a strict separation of the gas storage and the hydraulic chamber where the sludge can be extracted and used as organic fertilizer.

By placing the digester tank below the barns, a relatively stable temperature can be achieved within the digester. As the generation of biogas requires a warm environment, this is important to ensure the availability of gas without additional heating of the digestate.

## 2. Biogas utilization system

After the biogas is extracted from the gas storage chamber, it is led into desulphurization and dehydration units to purify the gas and extract harmful substances. Eventually, the gas will be fed into a biogas stove that can be used for cooking purposes, and thereby replace coal as fuel. The biogas stove meets the national standard and has the rated heating efficiency above 55%. To allow a proper gas flow control and completely shut the gas pipe when the stove is switched off, a pressure gauge will be installed.

Special maintenance procedures including cleaning the sulfide capture device and periodic controls and maintenance of the burners (cooking stoves, rice cookers, heaters, etc.) have been developed to ensure effective operation of the biogas system and proper utilization of digested slurry throughout the lifetime of the digester. To ensure the proper implementation of these methods, the technical service team that is set up during the Programme Activity will support the participating households.

All main equipment in the proposed PoA is domestically produced; the proposed PoA involves no technology and installations from abroad.

## 3. Qualification of the biogas technicians and technical acceptance of the digesters

According a rural biogas construction regulation (Rural Biogas Construction Project Management Regulation), issued by the Ministry of Agriculture in 2003, rural household biogas digesters have to be constructed by certified technicians. In order to get certified, the engineers have to complete a training following a regulation by the Ministry of Labor and Social Security (Profession Standard Number: 5-99-02-01).

After the construction, all biogas digesters have to pass a technical acceptance procedure to ensure that they have been constructed properly. This procedure of this acceptance is defined by the provincial standard DB51/T 271.3—2009. The acceptance is performed and recorded by the local Rural Energy Offices.

**4. Digester IDs**

The biogas digesters in Sichuan are identified by a system of ID numbers. To attach the ID numbers to the digesters, two different systems are used in Sichuan. The IDs are either engraved into the wet concrete of the digesters during construction or are painted on the digesters itself or the wall of the rural household next to the digester. These ID numbers are universal to each digester and will be used to clearly identify the single units for the PoA and this CPA .

The ID numbers are to be given to the digesters by the Rural Energy Offices after the final check and will be listed on the technical acceptance records.

**A.4. Coordinating/managing entity**

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Chengdu Oasis Science & Technology Co., Ltd. (also acting as the C/ME)

**A.5. Parties and CPA implementers**

<b>Parties involved</b>	<b>CPA implementers</b>	<b>Indicate if the Party involved wishes to be considered as CPA implementer (Yes/No)</b>
People's Republic of China(host)	Chengdu Oasis Science & Technology Co., Ltd.	No
United Kingdom of Great Britain and Northern Ireland	UPM Umwelt-Projekt-Management GmbH	No
People's Republic of China (host)	Sichuan Rural Energy Office	No

**A.6. Public funding of CPA**

>> No public funding from Annex-I countries is involved in the implementation of the CPA.

**A.7. History of CPA**

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- 1) This CPA is neither registered as an individual CDM project activity, nor is it part of another registered PoA.
- 2) The proposed CPA is not a project activity that has been deregistered;
- 3) The proposed CPA is not a CPA that has been excluded from a registered CDM PoA;
- 4) There is not a registered CDM project activity or a CPA under a registered CDM PoA whose crediting period has or has not expired exists in the same geographical location as the proposed CPA.

## A.8. Debundling of small-scale component project activities

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The *Guidelines On Assessment Of Debundling For SSC Project Activities* states:

10. *If each of the independent subsystems/measures (e.g., biogas digester, solar home system) included in the CPA of a PoA is no larger than 1% of the small-scale thresholds defined by the methodology applied, then that CPA of PoA is exempted from performing de-bundling check i.e., considering as not being a de-bundled component of a large scale activity.*

The thermal capacity of each biogas stove is below 150 kW and the emission reduction resulting from methane avoidance is well below 600 tCO<sub>2</sub>e. The quantifiable values are presented and compared against the eligibility criteria of the PoA in section F. Therefore, the CPA is considered as not being a de-bundled component of a large scale activity.

## SECTION B. Application of selected methodologies and standardized baselines

### B.1. Reference of methodologies and standardized baselines:

>> The CPAs included in the proposed Programme will apply the following combination of methodologies:

AMS-I.I– *Biogas/biomass thermal applications for households/small users* (version 04) (EB68, Annex 25);

AMS-III.R– *Methane recovery in agricultural activities at household/small farm level* (version 02) (EB59, Annex 4).

Both methodologies are approved for use in a PoA.

Furthermore, AMS-III.R refers to AMS-III.D - *Methane recovery in animal manure management systems* (version 17) to calculate baseline and project emissions. Both methodologies, AMS I.I and AMS III.R have specific applicability criteria that will be discussed separately to ensure the correct application of the methodologies.

Table 2: Relevant applicability criteria for AMS I.I

AMS I.I	
Criteria	Applicability of the proposed CPA
1. This category comprises activities for generation of renewable thermal energy using renewable biomass or biogas for use in residential, commercial, institutional applications (e.g. for supply to households, small farms or for use in built environment of institutions such as schools). Examples of these technologies that displace or avoid fossil fuel use include but are not limited to biogas cook stoves, biomass briquette cook stoves, small scale baking and drying systems, water heating, or space heating systems	This CPA is generation of renewable thermal energy using biogas for households. Methodology is applicable.
2. The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW	As per the eligibility criteria for CPAs presented in



AMS I.I	
Criteria	Applicability of the proposed CPA
thermal	section F it will be safeguarded that the number of biogas systems installed under each individual CPA does not lead to a total installed thermal energy generation capacity above 45 MW thermal. Methodology is applicable.
3. Each unit (e.g. cook stove, heater) shall have a rated capacity equal to or less than 150 kW thermal.	As per the eligibility criteria for CPAs presented in section F it will be safeguarded that the thermal capacity of a single stove is far below the threshold of 150 kWthermal. Methodology is applicable.

Table 3: Relevant applicability criteria for AMS III.R

AMS III.R	
Criteria	Applicability of the proposed CPA
<p>1. This project category comprises recovery and destruction of methane from manure and wastes from agricultural activities that would be decaying anaerobically emitting methane to the atmosphere in the absence of the project activity. Methane emissions are prevented by:</p> <p>(a) Installing methane recovery and combustion system to an existing source of methane emissions, or</p> <p>(b) Changing the management practice of a biogenic waste or raw material in order to achieve the controlled anaerobic digestion equipped with methane recovery and combustion system.</p>	As per the eligibility criteria for CPAs presented in section F a CPA covers the installation of methane recovery and combustion systems to an existing source of methane emissions. Methodology is applicable.
2. The category is limited to measures at individual households or small farms (e.g. Installation of a domestic biogas digester). Methane recovery systems that achieve an annual emission reduction of less than or equal to 5 tonnes of CO <sub>2</sub> e per system are included in this category. Systems with annual emission reduction higher than 5 tonnes of CO <sub>2</sub> e are eligible under AMS III.D.	As per the eligibility criteria for CPAs presented in section F a CPA comprises the installation of biogas digesters at individual households and small farms. The individual devices will achieve emission reductions of less than 5 tCO <sub>2</sub> e. Methodology is applicable.
3. This project category is only applicable in combination with AMS-I.C, AMS-I.I and/or AMS-I.E.	The proposed CPA combines methodologies AMS I.I and AMS III.R. Methodology is applicable.
4. The project activity shall satisfy the following conditions:	As per the eligibility criteria for CPAs presented in

<b>AMS III.R</b>	
<b>Criteria</b>	<b>Applicability of the proposed CPA</b>
<p>(a) The sludge must be handled aerobically. In case of soil application of the final sludge the proper conditions and procedures that ensure that there are no methane emissions must be ensured.</p> <p>(b) Measures shall be used (e.g. combusted or burnt in a biogas burner for cooking needs) to ensure that all the methane collected by the recovery system is destroyed.</p>	<p>section F under a CPA the digester effluent (sludge) will be handled aerobically; the biogas will be destroyed efficiently. Methodology is applicable.</p>
<p>5. Aggregated annual emission reductions of all systems included shall be less than or equal to 60 kt CO<sub>2</sub> equivalent.</p>	<p>As per the eligibility criteria for CPAs presented in section F it will be safeguarded that annual emission reduction of all systems included in one CPA will be less than or equal to 60 ktCO<sub>2</sub>e. Methodology is applicable.</p>

After this comprehensive analysis of all applicability criteria of the involved methodologies, it can be concluded that the methodologies are applicable to the proposed PoA and can be used to calculate the expected emission reductions.

**B.2. Project boundary, sources and greenhouse gases (GHGs)**

>> The geographic sites of all individual biogas systems included in the CPA define the SSC-CPA boundary. A biogas system consists of a bio digester and a cooking/combustion unit. The figure below visualizes the SSC-CPA boundary:

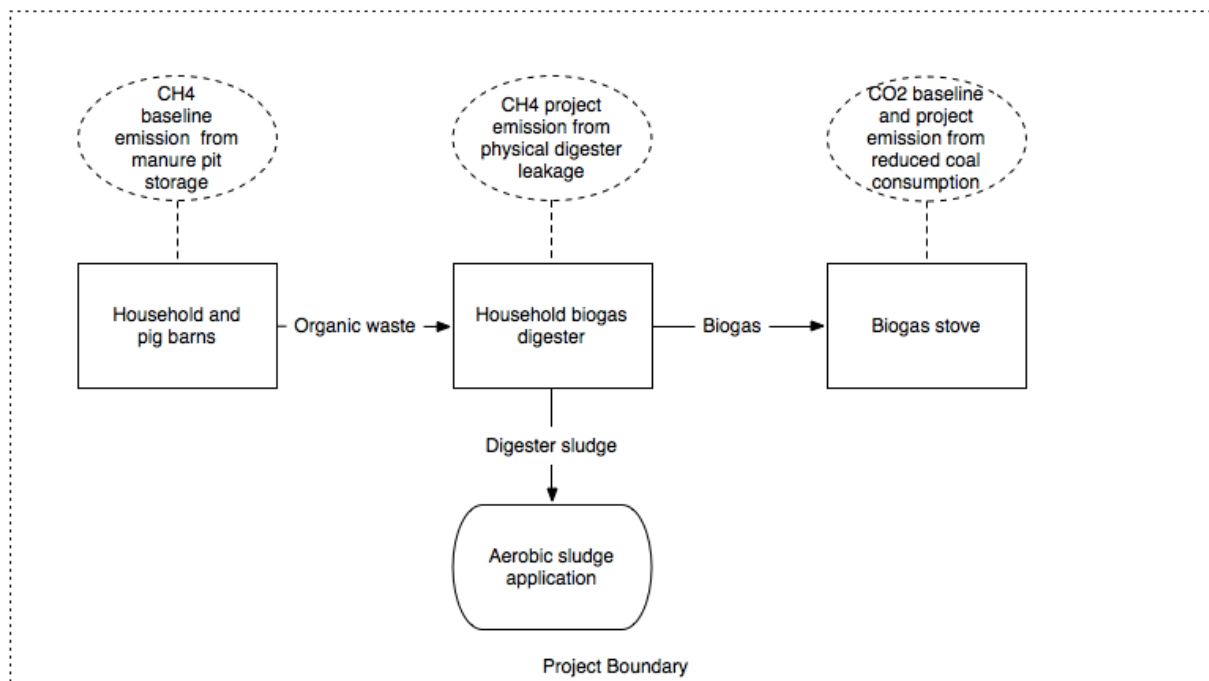


Figure 3: Project boundary for one sample household.

Two different sources of GHG emissions are relevant for the proposed PoA and therefore included in its boundary:

- a) **Methane emissions from existing manure management systems:** Most farmers and rural households with pigs use a deep pit as manure management system in the rural Sichuan Province. The storage in the pit for a retention time of 3 – 6 months improves the fertilizer capacity of the manure and is the easiest way of handling the manure problem. However, this leads to the emission of methane that is generated due to the anaerobic conditions within the pit. By installing biogas digesters, the generated methane will be captured and stored within the digester until it is utilized as energy source for cooking. Thereby, the methane will be destroyed efficiently and its emission will be avoided.
- b) **Carbon dioxide emissions from fossil fuel consumption:** The predominant source of energy for cooking in rural Sichuan is coal. Except for occasional events where straw or crop residues are available in little amounts, coal is used as main fuel for household purposes. As the biogas generated by the digesters can be stored within the device until it is used, the biogas can replace the coal as main fuel. Thereby, significant amounts of CO<sub>2</sub> emission will be reduced.

Additional to these explanations, Table 4 gives an overview on the emission sources included and excluded.

Table 4: Sources of GHG emissions included and excluded in the project boundary

GHG emission source	Gas	Included?	Justification/Explanation
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Baseline emission	Thermal energy used for cooking by burning coal	CO <sub>2</sub>	Yes	Major source of baseline emission.
		CH <sub>4</sub>	No	Excluded for simplification. This is conservative.
		N <sub>2</sub> O	No	Excluded for simplification. This is conservative.
	Existing manure management system	CO <sub>2</sub>	No	Excluded as the CO <sub>2</sub> generated during the decomposition of organic waste has been extracted from the atmosphere during the generation of the organic material. Therefore, this circle is CO <sub>2</sub> neutral.
		CH <sub>4</sub>	Yes	Major source of baseline emission.
		N <sub>2</sub> O	No	Excluded for simplification. This is conservative.
Project emission	Thermal energy used for cooking by burning coal	CO <sub>2</sub>	Yes	Major source of emission.
		CH <sub>4</sub>	No	Not applicable; in line with the applied methodologies.
		N <sub>2</sub> O	No	Not applicable; in line with the applied methodologies.
	Leakage from biogas digester	CO <sub>2</sub>	No	Excluded as the CO <sub>2</sub> generated during the decomposition of organic waste has been extracted from the atmosphere during the generation of the organic material. Therefore, this circle is CO <sub>2</sub> neutral.
		CH <sub>4</sub>	Yes	10% leakage assumed in accordance with methodology AMS III.R
		N <sub>2</sub> O	No	Not applicable; in line with the applied methodologies.

All households included in the proposed CPA are located within Yibin, Ziyang and Zigong City. Yibin, Ziyang and Zigong City is located in Sichuan Province, China, that is defined as the geographical boundary of the PoA, as defined in section A.2 of the PoA-DD. Therefore, the small-scale CPA is located within the geographical boundary of the PoA.

### B.3. Establishment and description of baseline scenario

>> The baseline emissions will be determined separately for both type of GHG emissions, each described in the related methodologies AMS I.I and AMS III.R.

#### Baseline of AMS III.R:

9. *The baseline scenario is the situation where, in the absence of the project activity, biomass and other organic matter are left to decay anaerobically within the project boundary and methane is emitted to the atmosphere. Baseline emissions (BE<sub>y</sub>) are calculated ex ante using the amount of the waste or raw material that would decay anaerobically in the absence*

*of the project activity, with the most recent IPCC tier 2 approach (please refer to the chapter “Emissions from Livestock and Manure Management” under the volume “Agriculture, Forestry and other Land use” of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories). Country/regional-specific values shall be used if available. The option in paragraph 9 (a) and relevant formulae shown in paragraph 10 of AMS-III.D “Methane recovery in animal manure management systems” shall be used to calculate baseline emissions.*

Among small pig-raising farms in Sichuan province, it is common practice to store the pig manure within pit storage, typically below a slatted floor in a small-enclosed animal housing<sup>1,2</sup>. Two to three times a year, the stored manure is then scooped out and applied on the fields as fertilizer. By only including households with such pit manure storage, that’s existence has been confirmed by the local Rural Energy Office staff, it is ensured, that this baseline is applicable for all included households. Households to which the baseline situation described above does not apply are not included in the proposed CPA and do not contribute to the overall achieved emission reduction.

The equations and input parameters used to calculate the quantitative baseline emissions are introduced in section B.4.

#### **Baseline of AMS I.I:**

*6. The baseline is the fuel consumption of the thermal application used or that would have been used in the absence of the project activity times an emission factor for the fossil fuel displaced.*

As coal offers a high availability throughout the entire year and provides an easy obtainable fuel to meet the household energy demand, coal is the main fuel used in rural areas in Sichuan<sup>3,4</sup>. To ensure that this baseline scenario is applicable to all programme households, the proposed PoA does not include households that do not have any coal consumption. Following the household inclusion criteria, households without any coal consumption cannot join the programme and are not taken into account for the calculation of emission reduction.

The equations and input parameters used to calculate the quantitative baseline emissions are introduced in section B.4.

## **B.4. Estimation of emission reductions**

### **B.4.1. Explanation of methodological choices**

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#### **1. Baseline emissions**

#### **AMS-III.R - Methane recovery in agricultural activities at household/small farm level**

<sup>1</sup>J. P. Henderson, Anaerobic Digestion in Rural China, 2007

<sup>2</sup>See Section 1.4.2, Dong Hongmin, Li Yu’e: Feasibility study – Rural Household Biogas and Conservation Tillage CDM Project Development, 2010, UNESCAP

<sup>3</sup> See Section 1.4.3, Dong Hongmin, Li Yu’e: Feasibility study – Rural Household Biogas and Conservation Tillage CDM Project Development, 2010, UNESCAP

<sup>4</sup>Jin Jiamen - Situation and trends in China’s rural energy consumption, 2010, Global Environmental Institute

To calculate the baseline emissions covered by AMS-III.R, paragraphs 9 and 10 are applied:

9. The baseline scenario is the situation where, in the absence of the project activity, biomass and other organic matter are left to decay anaerobically within the project boundary and methane is emitted to the atmosphere. Baseline emissions (BE<sub>y</sub>) are calculated ex ante using the amount of the waste or raw material that would decay anaerobically in the absence of the project activity, with the most recent IPCC tier 2 approach (please refer to the chapter 'Emissions from Livestock and Manure Management' under the volume 'Agriculture, Forestry and other Land use' of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories). Country/regional-specific values shall be used if available. The option in paragraph 9 (a) and relevant formulae shown in paragraph 10 of AMS-III.D "Methane recovery in animal manure management systems" shall be used to calculate baseline emissions.

10. The amount of waste or raw materials that would decay anaerobically in the absence of the project activity is determined by survey of a sample group of households/small farms with a 90% confidence interval and 10% margin of error. The survey should determine the baseline animal manure management practices applied. This small-scale methodology is only applicable to the portion of the manure, which would decay anaerobically in the absence of the project activity established by the survey.

In the cited paragraph 9 of methodology AMS-III-D, the first option (9 (a)) is chosen to calculate the emissions. Therefore, the formulas provided in paragraph 10 are applied for the calculation. To distinguish the baseline methane emissions from the baseline carbon dioxide emissions (which are covered under AMS-I.C), an additional index CH<sub>4</sub> is applied to BE<sub>y</sub>:

$$BE_{CH_4,y} = GWP_{CH_4} \cdot D_{CH_4} \cdot UF_b \cdot \sum_{j,LT} MCF_j \cdot B_{0,LT} \cdot N_{LT,y} \cdot VS_{LT,y} \cdot MS\%_{BL,j} \quad 1$$

Where:

$BE_{CH_4,y}$	Baseline methane emissions in year y (tCO <sub>2</sub> e)
$GWP_{CH_4}$	Global Warming Potential for CH <sub>4</sub> (25)
$D_{CH_4}$	CH <sub>4</sub> density (0.00067 t/m <sup>3</sup> at room temperature (20 °C) and 1 atm pressure)
$UF_b$	Model correction factor to account for model uncertainties (0.94)
$j$	Index for animal manure management system. As – according to the applicability criteria - all households use pits to store the animal manure, this index is used for the different climate conditions on a city basis.
$LT$	Index for all types of livestock
$MCF_j$	Annual methane conversion factor (MCF) for the baseline animal manure management system j. To pay respect to different annual mean temperatures in the covered region, the pits in different cities are considered different manure management systems with different MCF values.
$B_{0,LT}$	Maximum methane producing capacity for the volatile solid generated for animal type LT (m <sup>3</sup> CH <sub>4</sub> (kgdm) <sup>-1</sup> )
$N_{LT,y}$	Annual average number of animals of type LT in year y (numbers). The number of animals will be determined based on city averages of the number of pigs per households and the number of households in each city (=climatic region).
$VS_{LT,y}$	Volatile solids for livestock LT entering the animal manure management system in year y (on a dry matter weight basis, kg dm/animal/year)
$MS\%_{BL,j}$	Fraction of manure handled in baseline animal manure management system j. As the index j is covered the different climate conditions of the cities, this fraction reflects the share of animals in a climatic region to the total number of animals.

**AMS I.I - Biogas/biomass thermal applications for households/small users**

Following paragraph 6 of AMS I.I, version 04, the simplified baseline is defined as:

*6. The baseline is the fuel consumption of the thermal application used or that would have been used in the absence of the project activity times an emission factor for the fossil fuel displaced.*

The Option 1 is chosen to determine emission reductions of the project activity:

**Option 1: Based on avoided quantity of fossil fuel consumption (applicable only to biogas projects)**

Following paragraph 10 of AMS I.I, version 04, the baseline emissions are calculated as:

$$BE_{CO_2,y} = \sum_k \sum_j N_{k,0} * n_{k,y} * FC_{BL,k,j} * NCV_j * EF_{FF,j}$$

Where:

$BE_{CO_2,y}$	Baseline carbon dioxide emissions from fossil fuel combustion in year y (tCO <sub>2</sub> e)
$K$	Index for the type of thermal applications introduced by the project activity (e.g. cook stove, water heater). Only one type of thermal application, i.e. cook stove is considered.
$J$	Index for the type of baseline fossil fuel consumed. Here J is 1 as only coal is considered. This is conservative.
$N_{k,0}$	Number of thermal applications k commissioned;
$n_{k,y}$	Proportion of $N_{k,0}$ that remain operating in year y (fraction)
$FC_{BL,k,j}$	Annual consumption of baseline fossil fuel j (mass or volume unit). For this project, only baseline emissions from coal consumption are considered in the calculation of emission reductions. This is a conservative approach.
$NCV_j$	Net calorific value of the fossil fuel j (GJ/mass or volume unit). According to national data published by NDRC <sup>5</sup> , at the time of PDD writing, the NCV of raw coal is 20.908 GJ/t.
$EF_{FF,j}$	Is the CO <sub>2</sub> emission coefficient of fuel j in year y (tCO <sub>2</sub> /GJ). National data of coal is applied. According to the national data <sup>6</sup> , the emissions factor for raw coal is 87.3 tCO <sub>2</sub> /TJ.

Following paragraph 10 of AMS I.I, version 04, the Annual consumption of baseline fossil fuel j ( $FC_{BL,k,j}$ ) could be determined using method a Option (ii):

*Option (ii):  
Determining the average quantity of fossil fuel consumption in a year from a representative sample survey of targeted households prior to the installation/commissioning of the project equipment. This data on annual baseline fuel consumption obtained from households shall be cross checked with purchase receipt(s) submitted by the household. The value obtained is multiplied by 0.89 to account for uncertainties. This option can only be applied for residential applications.*

<sup>5</sup> <http://cdm.ccchina.gov.cn/archiver/cdmcn/UpFile/Files/Default/20150511145355964897.pdf>

<sup>6</sup> <http://cdm.ccchina.gov.cn/archiver/cdmcn/UpFile/Files/Default/20150511145355964897.pdf>

## 2. Project emissions

### AMS-III.R - Methane recovery in agricultural activities at household/small farm level

To calculate the project emissions, methodology, paragraphs 7 and 8 of AMS-III.R (version 02) are used.

Paragraph 7 states:

*7. Project emissions consist of CO<sub>2</sub> emissions from use of fossil fuels or electricity for the operation of the system and the physical leakages of methane from the recovery system.*

In this specific case, no fossil fuel or electricity is consumed during the operation of the project. Therefore, the project emissions (covered by AMS-III.R) only comprise the physical leakage from the methane recovery system. These calculation method to determine the project emissions are referred to in paragraph 8:

*8. Project emissions due to physical leakage of biogas digester is estimated using one of the two options using the method indicated in paragraph 13 of AMS-III.D "Methane recovery in animal manure management systems".*

In the cited paragraph 13 of AMS-III.D, the first option (13 (a)) is chosen to calculate the project emissions. Following this paragraph, a physical leakage of 10% of the maximum methane producing potential of manure fed into the management systems implemented by the project activity is assumed.

$$PE_{CH_4,y} = 0.10 \cdot GWP_{CH_4} \cdot D_{CH_4} \cdot \sum_{i,LT} B_{0,LT} \cdot N_{LT,y} \cdot VS_{LT,y} \cdot MS\%_{i,y} \quad 2$$

Where:

$PE_{CH_4,y}$	Project methane emissions in year y (tCO <sub>2</sub> e)
$GWP_{CH_4}$	Global Warming Potential for CH <sub>4</sub> (25)
$D_{CH_4}$	CH <sub>4</sub> density (0.00067 t/m <sup>3</sup> at room temperature (20 °C) and 1 atm pressure)
$i$	Index for animal manure management system. As – according to the applicability criteria - all households use pits to store the animal manure, this index is used for the different climate conditions on a city basis.
$LT$	Index for all types of livestock
$B_{0,LT}$	Maximum methane producing capacity for the volatile solid generated for animal type $LT$ (m <sup>3</sup> CH <sub>4</sub> (kg dm) <sup>-1</sup> )
$N_{LT,y}$	Annual average number of animals of type $LT$ in year y (numbers). The number of animals will be determined based on city averages of the number of pigs per households and the number of households in a given city.
$VS_{LT,y}$	Volatile solids for livestock $LT$ entering the animal manure management system in year y (on a dry matter weight basis, kg dm/animal/year)
$MS\%_{i,j}$	Fraction of manure handled in system $i$ in year y. As the index $i$ covers the different climate conditions of the cities, this fraction reflects the share of household in a given city.

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Similar to the baseline emissions from fossil fuel, the project emissions will be calculated:



$$PE_{CO_2,y} = \sum_m \sum_j N_{m,y} * FC_{m,j} * NCV_j * EF_{FF,j}$$

3

Where:

$PE_{CO_2,y}$	Project carbon dioxide emissions from fossil fuel combustion in year y (tCO <sub>2</sub> e)
m	Index for thermal application (e.g. cook stove, water heater) not decommissioned by the project activity. In this POA, only cook stove is involved, here m is 1.
$N_{m,y}$	Number of thermal application m remaining in use in year y
$FC_{m,j}$	Annual consumption of fossil fuel type j (physical units, mass/volume) by application m (use 90/10 precision for sampling and sampling requirements specified for baseline sampling described in paragraph 10(a) above may be applied). Option (ii) under paragraph 10(a) is chosen, the value obtained is multiplied by 1.12 to account for uncertainties. Here, coal as fossil fuel is accounted for.
$NCV_j$	Net calorific value of the fossil fuel j (GJ/mass or volume unit). According to national data published by NDRC, at the time of PDD writing, the NCV of raw coal is 20.908 GJ/t.

### 3. Leakage

The leakage will be determined by paragraph 11 of AMS III.R and paragraph 15 of AMS I.I:

*11. If the methane recovery and combustion equipment is transferred from another activity or if the existing equipment is transferred to another activity, leakage is to be considered.*

*15. If the energy generating equipment introduced by the project activity is transferred from outside the boundary to the project activity, leakage is to be considered.*

Both paragraphs are not applicable to the proposed project as no equipment will be transferred from or to another activity and no collection/processing/transportation takes place outside the project boundary.

### 4. Emission Reduction

#### AMS-III.R - Methane recovery in agricultural activities at household/small farm level

The emission reduction due to avoided methane emissions is calculated as:

$$ER_{CH_4,y} = BE_{CH_4,y} - PE_{CH_4,y} - Leakage$$

4

Where:

$ER_{CH_4,y}$	Emission reduction due to methane avoidance in year y (tCO <sub>2</sub> e)
$BE_{CH_4,y}$	Baseline methane emissions in year y (tCO <sub>2</sub> e)
$PE_{CH_4,y}$	Project methane emissions in year y (tCO <sub>2</sub> e)

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The emission reduction due to reduced coal consumption is calculated as:

$$ER_{CO_2,y} = BE_{CO_2,y} - PE_{CO_2,y} - Leakage \quad 5$$

Where:

$ER_{CH_4,y}$	Emission reduction due to reduced coal consumption in year y (tCO <sub>2</sub> e)
$BE_{CH_4,y}$	Baseline carbon dioxide emissions from coal combustion in year y (tCO <sub>2</sub> e)
$PE_{CH_4,y}$	Project carbon dioxide emissions from coal combustion in year y (tCO <sub>2</sub> e)

Finally, the combined emission reduction due to methane avoidance and reduced coal consumption can be calculated:

$$ER_y = ER_{CH_4,y} + ER_{CO_2,y} \quad 6$$

Where:

$ER_y$	Total emission reduction year y (tCO <sub>2</sub> e)
$ER_{CH_4,y}$	Emission reduction due to methane avoidance in year y (tCO <sub>2</sub> e)
$ER_{CO_2,y}$	Emission reduction due to reduced coal consumption in year y (tCO <sub>2</sub> e)

The following parameters will be fixed for all CPAs included during the first crediting period of the PoA.

#### B.4.2. Data and parameters fixed ex-ante

<b>Data / Parameter</b>	$VS_{LT,y}$
<b>Unit</b>	kg dry matter animal-1 year-1
<b>Description</b>	Daily volatile solid excreted per animal.
<b>Source of data</b>	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, and Chapter 10, Table 10A-7 (swine).
<b>Value(s) applied</b>	109.5
<b>Choice of data or Measurement methods and procedures</b>	The applied value reflects the 2006 IPCC value for the daily solid excreted by Asian swines multiplied with 365 days in a year. ( $VS_{LT,y} = 0.3 * 365 \text{ kg dry matter animal}^{-1} \text{ year}^{-1}$ )
<b>Purpose of data</b>	Calculation of baseline emissions; Calculation of project emissions;
<b>Additional comment</b>	

<b>Data / Parameter</b>	$B_{0,LT}$
<b>Unit</b>	$m^3 CH_4 kg^{-1}$
<b>Description</b>	Maximum methane producing capacity for manure produced by livestock, of VS excreted.
<b>Source of data</b>	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, Volume 4, and Chapter 10, Table 10A-7 (swine).
<b>Value(s) applied</b>	0.29
<b>Choice of data or Measurement methods and procedures</b>	The applied value reflects the 2006 IPCC value for Asian swine. Although animals of western genetic origin account for a large share of the pigs in Sichuan province, the more conservative standard value for Asian swine is applied for all animals in the calculations of emission reduction of the proposed PoA.
<b>Purpose of data</b>	Calculation of baseline emissions; Calculation of project emissions;
<b>Additional comment</b>	

<b>Data / Parameter</b>	$GWP_{CH_4}$
<b>Unit</b>	1
<b>Description</b>	Global Warming Potential for $CH_4$ .
<b>Source of data</b>	Methodology AMS III.D, v.17, Equation 1
<b>Value(s) applied</b>	25 from 01/01/2013 onwards
<b>Choice of data or Measurement methods and procedures</b>	
<b>Purpose of data</b>	Calculation of baseline emissions; Calculation of project emissions;
<b>Additional comment</b>	

<b>Data / Parameter</b>	$D_{CH_4}$
<b>Unit</b>	$kg/m^3$
<b>Description</b>	Conversion factor of $m^3CH_4$ to kilogram $CH_4$ .
<b>Source of data</b>	2006 IPCC guidelines, Volume 4, Chapter 10, Page 10.42.
<b>Value(s) applied</b>	0.67
<b>Choice of data or Measurement methods and procedures</b>	
<b>Purpose of data</b>	Calculation of baseline emissions; Calculation of project emissions;
<b>Additional comment</b>	

<b>Data / Parameter</b>	$UF_b$
<b>Unit</b>	
<b>Description</b>	Model correction factor to account for model uncertainties (0.94)
<b>Source of data</b>	Methodology AMS III.D
<b>Value(s) applied</b>	0.94
<b>Choice of data or Measurement methods and procedures</b>	Fixed parameter listed in methodology AMS III.D
<b>Purpose of data</b>	Calculation of baseline emissions; Calculation of project emissions;
<b>Additional comment</b>	

### B.4.3. Ex-ante calculation of emission reductions

>> In this section, only the input values will be applied and the result calculated. For a detailed description of the calculation methods, see the related PoA-DD.

#### 1. Baseline emissions

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$$BE_{CH_4,y} = GWP_{CH_4} \cdot D_{CH_4} \cdot UF_b \cdot \sum_{j,LT} MCF_j \cdot B_{0,LT} \cdot N_{LT,y} \cdot VS_{LT,y} \cdot MS\%_{BL,j}$$

7

Where:

$BE_{CH_4,y}$	Baseline methane emissions in year y (tCO <sub>2</sub> e)	4,297 tCO <sub>2</sub> e
$GWP_{CH_4}$	Global Warming Potential for CH <sub>4</sub> (tCO <sub>2</sub> e)	25
$D_{CH_4}$	CH <sub>4</sub> density (0.00067 t/m <sup>3</sup> at room temperature (20 °C) and 1 atm pressure)	0.00067 t/m <sup>3</sup>
$UF_b$	Model correction factor to account for model uncertainties	0.94
$j$	Index for animal manure management system. As – according to the applicability criteria – all households use pits to store the animal manure, this index is used for the different climate conditions on a city basis. For CPAs with households of only one city, this index reduces to one element.	
$LT$	Index for all types of livestock. As only pigs are considered for the calculation of emission reductions, this index is reduced to one element.	
$MCF_j$	Annual methane conversion factor (MCF) for the baseline animal manure management system j. To pay respect to different annual mean temperatures in the covered region, the pits in different cities are considered different manure management systems with different MCF values.	Yibin: 39; Ziyang: 39; Zigong: 39 % <sup>7</sup>
$B_{0,LT}$	Maximum methane producing capacity for the volatile solid generated for animal type LT (m <sup>3</sup> CH <sub>4</sub> (kgdm) <sup>-1</sup> )	0.29

<sup>7</sup> Source: Sichuan Statistical Yearbook 2016

$N_{LT,y}$	Number of animals of type LT in year y for the entire CPA (numbers). (The average number of pigs per household multiplied with the number of households.)	22,038.79
$VS_{LT,y}$	Volatile solids for livestock LT entering the animal manure management system in year y (on a dry matter weight basis, kg dm/animal/year)	109.5
$MS\%_{BL,j}$	Fraction of manure handled in baseline animal manure management system j. As the index j is covered the different climate conditions of the cities, this fraction reflects the share of animals in a climatic region to the total number of animals.	100

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$$BE_{CO_2,y} = \sum_k \sum_j N_{k,0} * n_{k,y} * FC_{BL,k,j} * NCV_j * EF_{FF,j}$$

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Where:

$BE_{CO_2,y}$	Baseline carbon dioxide emissions from fossil fuel combustion in year y (tCO <sub>2</sub> e)	7,377 tCO <sub>2</sub> e
$K$	Index for the type of thermal applications introduced by the project activity (e.g. cook stove, water heater). Only one type of thermal application, i.e. cook stove is considered.	Cook stove
$J$	Index for the type of baseline fossil fuel consumed. Here J is 1 as only coal is considered. This is conservative.	Coal
$N_{k,0}$	Number of thermal applications k commissioned;	4,601
$n_{k,y}$	Proportion of $N_{k,0}$ that remain operating in year y (fraction)	100%
$FC_{BL,k,j}$	Annual consumption of baseline fossil fuel j (mass or volume unit). For this project, only baseline emissions from coal consumption are considered in the calculation of emission reductions. This is a conservative approach.	0.987t * 0.89 (uncertainty factor)
$NCV_j$	Net calorific value of the fossil fuel j (GJ/mass or volume unit). According to national data published by NDRC <sup>8</sup> , at the time of PDD writing, the NCV of raw coal is 20.908 GJ/t.	20.908 GJ/t
$EF_{FF,j}$	Is the CO <sub>2</sub> emission coefficient of fuel j in year y (tCO <sub>2</sub> /GJ). National data of coal is applied. According to the national data <sup>9</sup> , the emissions factor for raw coal is 87.3 tCO <sub>2</sub> /TJ.	87.3 tCO <sub>2</sub> /TJ

<sup>8</sup> <http://cdm.ccchina.gov.cn/archiver/cdmcn/UpFile/Files/Default/20150511145355964897.pdf>

<sup>9</sup> <http://cdm.ccchina.gov.cn/archiver/cdmcn/UpFile/Files/Default/20150511145355964897.pdf>

## 2. Project emissions

### AMS-III.R – Methane recovery in agricultural activities at household/small farm level

$$PE_{CH_4,y} = 0.10 \cdot GWP_{CH_4} \cdot D_{CH_4} \cdot \sum_{i,LT} B_{0,LT} \cdot N_{LT,y} \cdot VS_{LT,y} \cdot MS\%_{i,y} \quad 9$$

Where:

$PE_{CH_4,y}$	Project methane emissions in year y (tCO <sub>2</sub> e)	1,172 tCO <sub>2</sub> e
$GWP_{CH_4}$	Global Warming Potential for CH <sub>4</sub> (tCO <sub>2</sub> e)	25
$D_{CH_4}$	CH <sub>4</sub> density (0.00067 t/m <sup>3</sup> at room temperature (20 °C) and 1 atm pressure)	0.00067 t/m <sup>3</sup>
$i$	Index for animal manure management system. As – according to the applicability criteria – all households use pits to store the animal manure, this index is used for the different climate conditions on a city basis.	
$LT$	Index for all types of livestock	
$B_{0,LT}$	Maximum methane producing capacity for the volatile solid generated for animal type $LT$ (m <sup>3</sup> CH <sub>4</sub> (kg dm) <sup>-1</sup> )	0.29
$N_{LT,y}$	Number of animals of type $LT$ in year y for the entire CPA (numbers). (The average number of pigs per household multiplied with the number of households.)	22,038.79
$VS_{LT,y}$	Volatile solids for livestock $LT$ entering the animal manure management system in year y (on a dry matter weight basis, kg dm/animal/year)	109.5
$MS\%_{i,j}$	Fraction of manure handled in system $I$ in year y. As the index $I$ covers the different climate conditions of the cities, this fraction reflects the share of household in a given city.	100%

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$$PE_{CO_2,y} = \sum_m \sum_j N_{m,y} * FC_{m,j} * NCV_j * EF_{FF,j} \quad 10$$

Where:

$PE_{CO_2,y}$	Project carbon dioxide emissions from fossil fuel combustion in year y (tCO <sub>2</sub> e)	0 tCO <sub>2</sub> e
$m$	Index for thermal application (e.g. cook stove, water heater) not decommissioned by the project activity. In this POA, only cook stove is involved, here $m$ is 1.	Cook Stove
$N_{m,y}$	Number of thermal application $m$ remaining in use in year y	4,601
$FC_{m,j}$	Annual consumption of fossil fuel type $j$ (physical units, mass/volume) by application $m$ (use 90/10 precision for sampling and sampling requirements specified for baseline sampling described in paragraph 10(a) above may be applied). Option (ii) under paragraph 10(a) is chosen, the value obtained is multiplied by 1.12 to account for uncertainties. Here, coal as fossil fuel is accounted for. For ex ante calculation, 0 is used. It will be monitored during crediting period.	0 t *1.12

$NCV_j$	Net calorific value of the fossil fuel $j$ (GJ/mass or volume unit). According to national data published by NDRC, at the time of PDD writing, the NCV of raw coal is 20.908 GJ/t.	20.908 GJ/t
$EF_{FF,j}$	Is the CO <sub>2</sub> emission coefficient of fuel $j$ in year $y$ (tCO <sub>2</sub> /GJ). National data of coal is applied. According to the national data, the emissions factor for raw coal is 87.3 tCO <sub>2</sub> /TJ.	87.3 tCO <sub>2</sub> /TJ

### 3. Leakage

According to the PoA-DD, leakage emissions are assumed 0.

### 4. Emission Reduction

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$$ER_{CH_4,y} = BE_{CH_4,y} - PE_{CH_4,y} - Leakage \quad 11$$

Where:

$ER_{CH_4,y}$	Emission reduction due to methane avoidance in year $y$ (tCO <sub>2</sub> e)	3,125 tCO <sub>2</sub> e
$BE_{CH_4,y}$	Baseline methane emissions in year $y$ (tCO <sub>2</sub> e)	4,297 tCO <sub>2</sub> e
$PE_{CH_4,y}$	Project methane emissions in year $y$ (tCO <sub>2</sub> e)	1,172 tCO <sub>2</sub> e

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$$ER_{CO_2,y} = BE_{CO_2,y} - PE_{CO_2,y} - Leakage \quad 12$$

Where:

$ER_{CO_2,y}$	Emission reduction due to reduced coal consumption in year $y$ (tCO <sub>2</sub> e)	7,377tCO <sub>2</sub> e
$BE_{CO_2,y}$	Baseline carbon dioxide emissions from coal combustion in year $y$ (tCO <sub>2</sub> e)	7,377 tCO <sub>2</sub> e
$PE_{CO_2,y}$	Project carbon dioxide emissions from coal combustion in year $y$ (tCO <sub>2</sub> e)	0 tCO <sub>2</sub> e

Finally, the combined emission reduction due to methane avoidance and reduced coal consumption can be calculated:

$$ER_y = ER_{CH_4,y} + ER_{CO_2,y} \quad 13$$

Where:

$ER_y$	Total emission reduction year $y$ (tCO <sub>2</sub> e)	10,502tCO <sub>2</sub> e
$ER_{CH_4,y}$	Emission reduction due to methane avoidance in year $y$ (tCO <sub>2</sub> e)	3,125 tCO <sub>2</sub> e
$ER_{CO_2,y}$	Emission reduction due to reduced coal consumption in year $y$ (tCO <sub>2</sub> e)	7,377 tCO <sub>2</sub> e

With the input values used for this CPA, the estimated annual emission reduction is 10,502 tCO<sub>2</sub>e.

#### B.4.4. Summary of ex-ante estimates of emission reductions

Year	Baseline emissions (t CO <sub>2</sub> e)	Project emissions (t CO <sub>2</sub> e)	Leakage (t CO <sub>2</sub> e)	Emission reductions (t CO <sub>2</sub> e)
Year 1	11,675	1,172	0	10,502
Year 2	11,675	1,172	0	10,502
Year 3	11,675	1,172	0	10,502
Year 4	11,675	1,172	0	10,502
Year 5	11,675	1,172	0	10,502
Year 6	11,675	1,172	0	10,502
Year 7	11,675	1,172	0	10,502
Year 8	11,675	1,172	0	10,502
Year 9	11,675	1,172	0	10,502
Year 10	11,675	1,172	0	10,502
<b>Total</b>	116,750	11,720	0	105,020
<b>Total number of crediting years</b>	10			
<b>Annual average over the crediting period</b>	11,675	1,172	0	10,502

#### B.5. Monitoring plan

##### B.5.1. Data and parameters to be monitored



<b>Data / Parameter</b>	$FC_{BL,k,j}$
<b>Data Unit</b>	Tonnes
<b>Description</b>	Annual consumption of baseline fossil fuel j
<b>Source of data</b>	Comprehensive baseline survey.
<b>Value(s) applied</b>	0.987*0.89
<b>Measurement methods and procedures</b>	As per Paragraph 10 (a) of AMS I.I (version 04), data will be determined from a representative sample survey of targeted households prior to the installation/commissioning of the project equipment. The value obtained is multiplied by 0.89 to account for uncertainties.
<b>Monitoring frequency:</b>	N/A as per paragraph 10(a) AMS I.I (version 04). The value is fixed <i>ex ante</i> in the whole crediting period of each CPA in the CPA-DD.
<b>QA/QC procedures:</b>	This data on annual baseline fuel consumption obtained from households shall be cross-checked with purchase receipt(s) submitted by the household. The data collected through sample-based measurements shall comply with the 95% confidence interval and 10% margin of error requirement, in line with the latest version of "Standard for sampling and surveys for CDM project activities and programme of activities".
<b>Purpose of data</b>	Calculation of baseline emissions;
<b>Additional comment</b>	

<b>Data / Parameter</b>	$FC_{m,j}$
<b>Data Unit</b>	Tonnes
<b>Description</b>	Annual consumption of fossil fuel type j (physical units, mass/volume) by application m  Here, only coal as fossil fuel is involved, so j refers to coal. Regarding the application m, only biogas stove is involved in the proposed POA, therefore, m refers to biogas stove
<b>Source of data</b>	Monitoring survey
<b>Value(s) applied</b>	0
<b>Measurement methods and procedures</b>	Data will be collected via monitoring survey of targeted households after the installation/commissioning of the project equipment. The value obtained is multiplied by 1.12 to account for uncertainties.
Monitoring frequency:	Once every two years (biennial) during the crediting period
QA/QC procedures:	As per paragraph 11 of AMS I.I (version 04), the difference between $FC_{BL,k,j}$ and $FC_{m,j}$ shall be cross-checked with biogas generation estimated as per relevant national standard.  When biennial inspection is chosen, a 95% confidence interval and 10% margin of error requirement shall be achieved for the sampling parameter.
<b>Purpose of data</b>	Calculation of project emissions;
<b>Additional comment</b>	

<b>Data / Parameter:</b>	$N_{k,0}$
Data unit:	1
Description:	Number of thermal applications k commissioned.
Source of data:	Commission record
Value(s) applied	4,601
Measurement methods and procedures:	After the installation of the bio-digesters and biogas stoves, they shall be inspected as acceptance testing (commissioning) for proper operation in compliance with specifications. The acceptance check date of each subsystem shall be recorded.
Monitoring frequency:	Once at the time of commission
QA/QC procedures:	The systems should be operated in compliance with manufacturer required maintenance.
Purpose of data	Baseline emission calculation
Additional comment:	

<b>Data / Parameter:</b>	$n_{k,y}$
Data unit:	%

Description:	Proportion of $N_{k,0}$ that remain operating at year y (fraction)
Source of data:	Monitoring sampling study
Value(s) applied	100
Measurement methods and procedures:	<p>The CME will inspect that the biogas units are operational and in compliance with the required maintenance procedures from the manufacturers at least once every two years during the crediting period.</p> <p>Monitoring will be done through a statistically valid sample of the households where the systems are installed as per the relevant requirements for sampling in the latest standard for sampling and surveys using a 95% confidence interval and a 10% margin of error.</p>
Monitoring frequency:	Once every two years
QA/QC procedures:	<p>The systems should be operated in compliance with manufacturer required maintenance at least once every two years (biennial) during the crediting period.</p> <p>A statistically valid sample of the residences where the systems are installed, with consideration, in the sampling design, of occupancy and demographic differences can be used to determine the percentage of systems operating, as per the relevant requirements for sampling in the General guidelines for sampling and surveys for small-scale CDM project activities.</p>
Purpose of data	
Additional comment:	

<b>Data / Parameter:</b>	$N_{m,y}$
Data unit:	1
Description:	Number of thermal application m remaining in use in year y Here, m refers to biogas stove.
Source of data:	Monitoring sampling study
Value(s) applied	4,601
Measurement methods and procedures:	<p>Sampling monitoring survey with a sampling size determined following the latest guidelines and the applied methodologies.</p> <p>The CME will inspect that the biogas stoves remaining in use in year y, in compliance with the required maintenance procedures from the manufacturers annually during the crediting period.</p> <p>Monitoring will be done through a statistically valid sample of the households where the systems are installed as per the relevant requirements for sampling in the latest standard for sampling and surveys using a 95% confidence interval and a 10% margin of error.</p>
Monitoring frequency:	Annually
QA/QC procedures:	This monitoring parameter will be determined through a comprehensive monitoring survey that follows the latest guidelines of the EB. Currently, the <i>Standard For Sampling And Surveys For CDM Project Activities And Programme Of Activities, version 02</i> , the level of confidence should be at least 95%, while the acceptable error is 10%.
Purpose of data	Project emissions calculation
Additional comment:	

<b>Data / Parameter</b>	t
<b>Unit</b>	hours
<b>Description</b>	Mean annual operation hours of the digesters.
<b>Source of data</b>	Monitoring sampling study
<b>Value(s) applied</b>	8,424 hours (351 days)
<b>Measurement methods and procedures</b>	The figure will be obtained through a sampling monitoring survey with a sampling size determined following the latest guidelines and the applied methodologies. To determine the annual running hours, the number and lengths of times when the digesters where not providing sufficient gas supply (during maintenance, cleaning, etc.) will be recorded and with this input, the final value can be calculated.
<b>Monitoring frequency</b>	Annually
<b>QA/QC procedures</b>	This monitoring parameter will be determined through a comprehensive monitoring survey that follows the latest guidelines of the EB. Currently, the <i>Standard For Sampling And Surveys For CDM Project Activities And Programme Of Activities, version 02</i> , the level of confidence should be at least 95%, while the acceptable error is 10%.
<b>Purpose of data</b>	-
<b>Additional comment</b>	

<b>Data / Parameter</b>	T
<b>Unit</b>	°C
<b>Description</b>	Mean annual temperature in city k. This parameter determines the emission factors of the existing manure management systems.
<b>Source of data</b>	Data from official sources (e.g. the Sichuan Statistical Yearbook). Should the Sichuan Statistical Yearbook be not available for certain years, or in case this publication is renamed, etc. other official data will be used.
<b>Value(s) applied</b>	Yibin: 19.2; Ziyang: 18.6; Zigong: 19.1
<b>Measurement methods and procedures</b>	This value will be obtained each year from the latest officially published data available. City-specific date will be taken to guarantee a precise and suitable value to be applied for each manure management system.
<b>Monitoring frequency</b>	Annually
<b>QA/QC procedures</b>	
<b>Purpose of data</b>	Calculation of baseline emissions.
<b>Additional comment</b>	

<b>Data / Parameter</b>	$MCF_{j,k}$
<b>Unit</b>	%
<b>Description</b>	Methane conversion factors for each manure management system j in climate region k.
<b>Source of data</b>	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, Volume 4, Chapter 10, Table 10.17. The MCF values for the most likely mean annual temperatures (refer to mean annual temperature in 2015, displayed in Annex 3, Section 1) are shown in Annex 3, Section 2
<b>Value(s) applied</b>	Yibin: 39; Ziyang: 39; Zigong: 39
<b>Measurement methods and procedures</b>	This value will be determined annually for CITIES based on the mean annual temperature and the standard values provided in IPCC 2006 Guidelines for National Greenhouse Gas Inventories, Volume 4, Chapter 10, Table 10.17 (swine). While the temperature ranges listed there, should cover most climate conditions, the guideline advises the PP to utilize the end-of-range (i.e., 10 or 28 degree) for areas that have extreme high or low annual average temperatures outside the 10 to 28 degree Celsius range. Therefore, the end-of-range will be applied for such cases. The value applied will be chosen depending on the mean annual temperature (Parameter ID M04) in the specific climate region for each manure management system.
<b>Monitoring frequency</b>	Annually
<b>QA/QC procedures</b>	
<b>Purpose of data</b>	Calculation of baseline emissions.
<b>Additional comment</b>	

<b>Data / Parameter</b>	$N_{LT,y}$
<b>Unit</b>	1
<b>Description</b>	Annual average number of animals of type LT in year y (numbers).
<b>Source of data</b>	Monitoring sampling study.
<b>Value(s) applied</b>	Ex-ante values are taken from the comprehensive baseline survey conducted prior to validation.
<b>Measurement methods and procedures</b>	The number of animals will be determined based on the number of pigs per households and the number of households in a given CPA.
<b>Monitoring frequency</b>	Annually
<b>QA/QC procedures</b>	This monitoring parameter will be determined through a comprehensive monitoring survey that follows the latest guidelines of the EB. Currently, the <i>Standard For Sampling And Surveys For CDM Project Activities And Programme Of Activities, version 02</i> , the level of confidence should be at least 95%, while the acceptable error is 10%.
<b>Purpose of data</b>	Calculation of baseline emissions; Calculation of project emissions;
<b>Additional comment</b>	

<b>Data / Parameter</b>	$MS\%_{i,y}$
<b>Unit</b>	1
<b>Description</b>	Fraction of manure handled in project animal manure management system i (i.e. digestion in the newly installed biogas digester)
<b>Source of data</b>	Monitoring sampling study.
<b>Value(s) applied</b>	100%
<b>Measurement methods and procedures</b>	The CPA only covers one animal manure management system, i.e. the newly built biogas digester. As indicated in the section A.3, all the manure generated will be fed into biogas digesters directly. The amount of pig manure fed into the biogas digesters is same to what the pig manure generated.
<b>Monitoring frequency</b>	Annually
<b>QA/QC procedures</b>	This monitoring parameter will be determined through a comprehensive monitoring survey that follows the latest guidelines of the EB. Currently, the <i>Standard For Sampling And Surveys For CDM Project Activities And Programme Of Activities, version 02</i> , the level of confidence should be at least 95%, while the acceptable error is 10%.
<b>Purpose of data</b>	Calculation of project emissions;
<b>Additional comment</b>	

<b>Data / Parameter</b>	Proper sludge application ratio
<b>Unit</b>	N/A
<b>Description</b>	Land application of digestate from biogas digesters to avoid anaerobic digestion.
<b>Source of data</b>	Monitoring sampling study.
<b>Value(s) applied</b>	1
<b>Measurement methods and procedures</b>	Sampling monitoring survey with a sampling size determined following the latest guidelines and the applied methodologies. By interviewing the sample households, a factor of correct sludge application (not resulting in methane emissions) will be determined. In case a single application has not been carried out according to the requirements, the respective household will not claim any emission reductions for the respective households. After the monitoring sample survey, a factor between 0 and 1 will be determined to reduce the claimed emission reductions by the share of households that did not apply the sludge according to the requirements.
<b>Monitoring frequency</b>	Annually
<b>QA/QC procedures</b>	This monitoring parameter will be determined through a comprehensive monitoring survey that follows the latest guidelines of the EB. Currently, the <i>Standard For Sampling And Surveys For CDM Project Activities And Programme Of Activities, version 02</i> , the level of confidence should be at least 95%, while the acceptable error is 10%.
<b>Purpose of data</b>	Calculation of baseline emissions; Calculation of project emissions;
<b>Additional comment</b>	

<b>Data / Parameter</b>	$EF_{CO_2,i,y}$
<b>Unit</b>	tCO <sub>2</sub> /TJ
<b>Description</b>	Emission Factor of raw coal
<b>Source of data</b>	Official data from Chinese DNA: <a href="http://qhs.ndrc.gov.cn/qjzjz/W020090703644238739485.xls">http://qhs.ndrc.gov.cn/qjzjz/W020090703644238739485.xls</a> .
<b>Value(s) applied</b>	87.3
<b>Measurement methods and procedures</b>	National publications of emission factors will be followed every monitoring period. If the Chinese DNA should publish updated or changed data, this value will be updated.
<b>Monitoring frequency</b>	Annually
<b>QA/QC procedures</b>	
<b>Purpose of data</b>	Calculation of baseline emissions; Calculation of project emissions;
<b>Additional comment</b>	

<b>Data / Parameter</b>	$NCV_{i,y}$
<b>Unit</b>	GJ/t
<b>Description</b>	Net Calorific Value of raw coal
<b>Source of data</b>	Official data from Chinese DNA: <a href="http://qhs.ndrc.gov.cn/qjzjz/W020090703644238739485.xls">http://qhs.ndrc.gov.cn/qjzjz/W020090703644238739485.xls</a> .
<b>Value(s) applied</b>	20.908
<b>Measurement methods and procedures</b>	National publications for the Net Calorific Value will be followed every monitoring period. If the Chinese DNA should publish updated or changed data, this value will be updated.
<b>Monitoring frequency</b>	Official data publications will be followed including a cross-check prior to the end of each monitoring period. If new data are published, it shall be checked if this data is within the range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements.
<b>QA/QC procedures</b>	
<b>Purpose of data</b>	Calculation of baseline emissions; Calculation of project emissions;
<b>Additional comment</b>	

### B.5.2. Sampling plan

Several monitoring parameters will be determined using a sampling study. The details of this sampling approach are discussed and described in the Monitoring Sampling Plan that is provided to the DOE.

### B.5.3. Description of the monitoring plan

>>

## 1. Organizational setup

The Sichuan Rural Energy Office will be responsible for the monitoring management of the CPAs. The conduction of the monitoring and collection of the data will be forwarded to the city and county level REOs. Thereby, a decentralized data collection system will compile the data and submit it to the Chinese Academy of Agricultural Engineering (CAAE) for statistical analysis. The complete data will finally be submitted to the C/ME, which evaluates the data and compiles the monitoring reports for the single CPAs.

## 2. Data monitored

One special monitoring parameter is the proper sludge application ratio (M07), required by the methodology AMS III.R. This parameter is monitored to avoid the issuance of any credits for households that caused project emissions. Therefore, a household that had a single application of sludge that was not carried out in a way that avoids project emissions, will be excluded from the respective monitoring period. Therefore, the emission reductions from each monitoring period will be multiplied with the fraction of households that applied the sludge correctly.

## 3. Data Management and Quality Control.

The tentative system of data management and quality control is described below. As the system is improved constantly, improvements to increase the data accuracy might be implemented. In such case, all improvements will be documented and clearly described in all subsequent documents such as CPA-DDs and Monitoring Reports and provided to all involved stakeholders.

### a) Step 1: Supervisor Check

When the monitoring data is collected, the supervisor of the county needs to review all questionnaires collected from each interviewer. Data on the questionnaires need to be subject to five kinds of checks: range checks (outlier data), checks against reference data, skip checks, consistency checks and typographic checks.

### b) Step 2: Data Entry

A data entry program should be used with suspect range and logical consistency triggers. One simple solution is to set up a spreadsheet data entry template with validity check triggers.

### c) Step 3: Data Check Algorithms

A project data management software will check for inconsistencies, missing values, identification numbers, double data entry. One simple solution is to use sort and filter function of spreadsheet.

### d) Step 4: Analytical Checks:

By basic descriptive statistics, the outliers can be easily figured out. Further statistical analysis can work out more characteristics of the data by professional analysis tools.



#### 4. Data Archives

The Chinese Academy of Agricultural Engineering will collect electronic data from the local Rural Energy Offices. The data will be structured and forwarded to the C/ME.

Together with the hard copies that will be collected by the SREO and forwarded to the C/ME, all data and documents will be archived by the C/ME and provided to the verifying DOE on demand.

All data and documents will be archived by the C/ME at two different locations to avoid data loss and allow a data restore in the unlikely event of a data loss. All data will be stored until at least two years after the CPA crediting period is finished.

### SECTION C. Start date, crediting period type and duration

#### C.1. Start date of CPA

>> 11/06/2010

The starting date marks the date at which implementation of biogas units under the CPA will start or has started.

#### C.2. Expected operational lifetime of CPA

>>20 years

#### C.3. Crediting period of CPA

##### C.3.1. Type of crediting period

>> Fixed crediting period

##### C.3.2. Start date of crediting period

>> 01/02/2015 or the date of inclusion of the CPA to the PoA, whichever is later.

##### C.3.3. Duration of crediting period

>>10 years, 0 months

### SECTION D. Environmental analysis

#### D.1. Analysis of environmental impacts

>>The analysis of environmental impacts has been carried out on the PoA level. Therefore, this section is not applicable.

#### D.2. Environmental impact assessment

>>The analysis of environmental impacts has been carried out on the PoA level. Therefore, this section is not applicable.

### SECTION E. Local stakeholder comments

#### E.1. Modalities for local stakeholder consultation

>> Comments of local stakeholders have been invited on the PoA level. Therefore, this section is not applicable.

**E.2. Summary of comments received**

>> Comments of local stakeholders have been invited on the PoA level. Therefore, this section is not applicable.

**E.3. Consideration of comments received**

>> Comments of local stakeholders have been invited on the PoA level. Therefore, this section is not applicable.

## SECTION F. Eligibility for inclusion

&gt;&gt;

Nb	Eligibility criterion -Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
1.	The C/ME manages the CDM implementation of the proposed PoA. It shall therefore approve the CPA in a written statement.	The CPA has been approved by the C/ME.	<ul style="list-style-type: none"> <li>• Written approval letter of the C/ME for CPA SCHHBG-2014-087</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>• CPA Nb. SCHHBG-2014-087 has been approved by the C/ME.</li> </ul>
2.	The boundary of each CPA shall be a subset of and not exceed the PoA boundary.	The geographic boundary of the CPA lies within Sichuan province.	<ul style="list-style-type: none"> <li>• CPA-DD for CPA SCHHBG-2014-087</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>• The geographical boundary of the CPA is limited to Yibin, Ziyang and Zigong, which lies within Sichuan.</li> </ul>
3.		Measures to avoid double counting are implemented.		

Nb	Eligibility criterion -Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
3.1.	The written statements of the CPA implementer compose the first layer of measures to avoid double counting.	<p>The CPA implementers confirm in written statements that:</p> <p>a)All biogas systems to be newly installed under the CPA are not and will not be part of another CDM project or program activity and that no CERs will be claimed for the biogas system other than those to be claimed by the C/ME on behalf of the CPA implementer and the participating households respectively; and</p> <p>That he is aware and agrees with the inclusion of the CPA to the proposed PoA.</p>	<ul style="list-style-type: none"> <li>CPA inclusion letters by the two CPA implementers for CPA SCHHBG-2014-087</li> </ul>	<p><input checked="" type="checkbox"/></p> <p>Both CPA implementers confirmed that:</p> <p>a) All biogas systems to be newly installed under the CPA are not and will not be part of another CDM project or program activity and that no CERs will be claimed for the biogas system other than those to be claimed by the C/ME on behalf of the CPA implementer and the participating households respectively; and</p> <ul style="list-style-type: none"> <li>That he is aware and agrees with the inclusion of the CPA to the proposed PoA.</li> </ul>

Nb	Eligibility criterion -Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
3.2.	A written statement of the technology implementer comprises the second layer of measures to avoid double counting.	The biogas systems for all involved households is to be newly installed under the CPA is not and will not be part of another CDM project or program activity and that no CERs will be claimed for the biogas system other than those to be claimed by the C/ME on behalf of the CPA implementer and the participating households respectively;	<ul style="list-style-type: none"> <li>• Written statement by the implementer of the technology (SREO) for CPA SCHHBG-2014-087</li> </ul>	<input checked="" type="checkbox"/> <p>SREO confirmed in a written statement that:</p> <p>a) The biogas systems that are to be newly installed under the CPA are not and will not be part of another CDM project or program activity and that no CERs will be claimed for the biogas system other than those to be claimed by the C/ME on behalf of the CPA implementer and the participating households respectively; and</p> <ul style="list-style-type: none"> <li>• That the households are aware and agree with the inclusion of the household to the proposed PoA.</li> </ul>

Nb	Eligibility criterion -Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
3.3.	The check performed by the C/ME (procedures described in section B of PoA DD) composes the third layer of measures.	A check for double counting of single households came to a negative result.	<ul style="list-style-type: none"> <li>• CPA household databases of all previously included CPAs.</li> <li>• CPA household database of CPA SCHHBG-2014-087</li> <li>• Exclusive agreement between SREO and the C/ME.</li> <li>• Documented outcome of the double counting check performed by the C/ME. This report should cover the source of information used (documents available on unfccc.int and household databases in case of overlapping regions).</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>• The double counting check came to a negative result and all the relevant evidences are provided with this CPA-DD.</li> </ul>
4.		All relevant applicability criteria of methodology AMS-III.R shall be met.		
4.1.	Applicability criterion 1 (a) of methodology AMS-III.R.	The project installs methane recovery and combustion systems to existing sources of methane emissions.	<ul style="list-style-type: none"> <li>• Written statement by the technology implementer (SREO).</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>• The proposed CPA will install household biogas digesters at rural household with existing methane emissions from manure storage.</li> </ul>

Nb	Eligibility criterion -Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
4.2.	<p>Applicability criterion 2 of methodology AMS-III.R. The calculations and explanations carried out in Appendix 4 demonstrate that for an average annual temperature of 21°C and below, the maximum number of pigs for which the emission reductions stay below 5 tCO<sub>2</sub>e is 33.7. Therefore, these two figures will be used as a simplified criterion. In case the mean annual temperature should exceed 21°C for a new CPA, the detailed calculation will be provided during the inclusion.</p> <ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>The installed methane recovery systems achieve annual emission reductions of less than 5 tCO<sub>2</sub>e. (This can be shown by demonstrating that the annual average temperature does not exceed 21°C and the annual average number of pigs is no larger than 33.7 for the project households.</li> </ul>	<ul style="list-style-type: none"> <li>Baseline survey (annual average number of pigs)</li> <li>Temperature data from the Sichuan Statistical Yearbook.</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>Both, temperature and average number of pigs are below the threshold values of 21°C and 33.7 heads (specific values: average annual temperature: Yibin: 19.2; Ziyang: 18.6; Zigong: 19.1; average number of pigs: 4.79). Therefore, the annual emission reduction from methane avoidance is less than 5 tCO<sub>2</sub>e.</li> </ul>
4.3.	<ul style="list-style-type: none"> <li>Applicability criterion 3 of methodology AMS-III.R.</li> </ul>	<ul style="list-style-type: none"> <li>Methodology AMS-III.R is used in combination in with methodology AMS-I.I.</li> </ul>	<ul style="list-style-type: none"> <li>CPA-DD for CPA SCHHBG-2014-087</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>As per the description in the PoA-DD, all CPAs, including SCHHBG-2014-087 apply both, AMS-III.R and AMS-I.I.</li> </ul>

Nb	Eligibility criterion -Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
4.4.	<p>Applicability criterion 4 (a) of methodology AMS-III.R.</p> <ul style="list-style-type: none"> <li>The households are advised on the aerobic sludge handling according to a guideline from the Sichuan Biogas Society. To confirm the compliance with this criterion, the claimed emission reductions are reduced by the share of households that do not apply the correct procedures after the monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>The sludge must be handled aerobically. In case of soil application of the final sludge the proper conditions and procedures that ensure that there are no methane emissions must be ensured.</li> </ul>	<ul style="list-style-type: none"> <li>Statement on aerobic application by the Sichuan Biogas Society</li> </ul>	<p><input checked="" type="checkbox"/></p> <ul style="list-style-type: none"> <li>The households are advised on the aerobic sludge handling according to a guideline from the Sichuan Biogas Society. To confirm the compliance with this criterion, the claimed emission reductions are reduced by the share of households that do not apply the correct procedures after the monitoring.</li> </ul>
4.5.	<ul style="list-style-type: none"> <li>Applicability criterion 4 (b) of methodology AMS-III.R.</li> </ul>	<ul style="list-style-type: none"> <li>Measures shall be used (e.g. combusted or burnt in a biogas burner for cooking needs) to ensure that all the methane collected by the recovery system is destroyed.</li> </ul>	<ul style="list-style-type: none"> <li>Written statement on household advice by the technology implementer (SREO).</li> <li>Technical standard NY_T 1639-2008 that describes the necessity of a biogas stove to be installed with the biogas digester.</li> </ul>	<p><input checked="" type="checkbox"/></p> <ul style="list-style-type: none"> <li>All households are not only equipped with a digester, but also a stove for combusting the biogas.</li> </ul>
4.6.	<ul style="list-style-type: none"> <li>Applicability criterion 5 of methodology AMS-III.R.</li> </ul>	<ul style="list-style-type: none"> <li>Aggregated annual emission reductions of all systems included shall be less than or equal to 60 kt CO<sub>2</sub> equivalent.</li> </ul>	<ul style="list-style-type: none"> <li>CPA-DD for CPA SCHHBG-2014-087 and Emission reduction sheet</li> </ul>	<p><input checked="" type="checkbox"/></p> <ul style="list-style-type: none"> <li>The aggregated annual emission reduction is 10,502tCO<sub>2</sub>e.</li> </ul>



Nb	Eligibility criterion -Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
5.		All relevant applicability criteria of methodology AMS-I.I shall be met.		
5.1.	Applicability criterion 1 of methodology AMS-I.I.	This category comprises activities for generation of renewable thermal energy using renewable biomass or biogas for use in residential, commercial, institutional applications (e.g. for supply to households, small farms or for use in built environment of institutions such as schools). Examples of these technologies that displace or avoid fossil fuel use include but are not limited to biogas cook stoves, biomass briquette cook stoves, small scale baking and drying systems, water heating, or space heating systems.	<ul style="list-style-type: none"> <li>• CPA-DD for CPA SCHHBG-2014-087</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>• All CPAs comprise the same technology: biogas, which is considered a renewable energy that will replace fossil fuels for cooking used in residential.</li> </ul>
5.2.	Applicability criterion 2 of methodology AMS-I.I.	The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW thermal.	<ul style="list-style-type: none"> <li>• CPA-DD for CPA SCHHBG-2014-087 and ER sheet</li> <li>• Biogas stove test reports</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>• The total installed capacity of the proposed CPA is 14.99926 MW. This value is the result from the number of households (4,601) multiplied with the stove capacity (3.26 kW).</li> </ul>

Nb	Eligibility criterion -Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
5.3.	Applicability criterion 3 of methodology AMS-I.I.	Each unit (e.g. cook stove, heater) shall have a rated capacity equal to or less than 150 kW thermal	<ul style="list-style-type: none"> <li>• CPA-DD for CPA SCHHBG-2014-087 and ER sheet</li> <li>• Biogas stove test reports</li> </ul>	<ul style="list-style-type: none"> <li>• Each biogas stove has capacity of 3.26 kW thermal, far less than 150kW thermal.</li> </ul>
6.		All households meet the inclusion criteria for households to be included in a certain CPA. They		
6.1.	<ul style="list-style-type: none"> <li>• No household should be located outside the defined CPA boundary.</li> </ul>	<ul style="list-style-type: none"> <li>• are located within the geographic boundary of the CPA.</li> </ul>	<ul style="list-style-type: none"> <li>• CPA household database for CPA SCHHBG-2014-087</li> <li>• CPA-DD for CPA SCHHBG-2014-087</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>• All households are located within the geographic boundary of Yibin, Ziyang and Zigong.</li> </ul>
6.2.	<ul style="list-style-type: none"> <li>• To allow the identical application of the baseline and monitoring methodologies to all households, only households with an existing pit for manure storage are accepted.</li> </ul>	<ul style="list-style-type: none"> <li>• generate animal manure and wastes from agricultural activities that are currently stored under anaerobic conditions in deep pits.</li> </ul>	<ul style="list-style-type: none"> <li>• Written statement from SREO after choosing the households for the PoA.</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>• All included households meet the requirement of storing animal manure in pit storages.</li> </ul>
6.3.	<ul style="list-style-type: none"> <li>• To allow the identical application of the baseline and monitoring methodologies to all households, only households with an existing pit for manure storage are accepted.</li> </ul>	<ul style="list-style-type: none"> <li>• currently use coal as source of energy for cooking.</li> </ul>	<ul style="list-style-type: none"> <li>• Written statement from SREO after choosing the households for the PoA.</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>• All included households meet the requirement of using coal as source of energy for cooking.</li> </ul>

Nb	Eligibility criterion -Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
6.4.	<ul style="list-style-type: none"> <li>To ensure that all households actually generate emission reductions, it has to be ensured that the planned technology is actually installed at the programme's households.</li> </ul>	<ul style="list-style-type: none"> <li>install a new household biogas system, considering the relevant technical standards.</li> </ul>	<ul style="list-style-type: none"> <li>Written statement by the technology implementer (SREO).</li> <li>All applicable and latest versions of the standards listed in Table 1 of the PoA-DD.</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>All included households will install a new biogas system within the scope of the national subsidy scheme.</li> </ul>
6.5.	<ul style="list-style-type: none"> <li>The PoA focuses on poor households. Therefore, only low-income households should be chosen for the PoA.</li> </ul>	<ul style="list-style-type: none"> <li>are considered low-income households.</li> </ul>	<ul style="list-style-type: none"> <li>Written statement from SREO after choosing the households for the PoA.</li> </ul>	<ul style="list-style-type: none"> <li>The PoA focuses on poor households. Therefore, only low-income households should be chosen for the PoA.</li> </ul>
6.6.	<ul style="list-style-type: none"> <li>Leakage due to replacement of equipment should be avoided. The transferring of an existing digester from one activity to another is technically not feasible as the digesters are built of bricks and concrete.</li> </ul>	<ul style="list-style-type: none"> <li>No recovery or combustion equipment is transferred from or to other activities</li> </ul>	<ul style="list-style-type: none"> <li>Written statement on household advice by the technology implementer (SREO).</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>All digesters are newly constructed; no combustion equipment is transferred from or to other sites.</li> </ul>

Nb	Eligibility criterion -Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
7.	<p>This criterion is applied to discuss whether the CPAs are a de-bundled component of a large scale CDM project.</p> <p>To check the thermal capacity, a biogas stove test report will provide the stove capacity.</p> <p>To emission reductions calculated using the formulas derived in Appendix 4 will be compared to the limit of 600 tCO<sub>2</sub>e. According to the analysis carried out in Section B of PoA DD, this criterion is automatically fulfilled, if no household raises more than 2,060 pigs at the same time (which is far beyond the technical capacity of household biogas digesters). This will be demonstrated using a representative survey.</p>	<p>Each of the independent subsystems (the digesters and biogas stoves) is no larger than 1% of the small-scale thresholds defined by the methodologies applied (600 tCO<sub>2</sub>e emission reduction from methane avoidance, 150 kW thermal installed capacity of the stoves).</p>	<ul style="list-style-type: none"> <li>• CPA-DD for CPA SCHHBG-2014-087</li> <li>• Thermal capacity:               <ul style="list-style-type: none"> <li>○ Biogas stove test report</li> </ul> </li> <li>• Methane avoidance:               <ul style="list-style-type: none"> <li>○ Baseline survey</li> </ul> </li> <li>• ER calculation</li> </ul>	<p>☒</p> <ul style="list-style-type: none"> <li>• All digesters and stoves at all households are far below the thresholds of 600 tCO<sub>2</sub>e and 150 kW thermal (2.283 tCO<sub>2</sub>e and 3.26 kW thermal).</li> </ul>

Nb	Eligibility criterion -Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
8.	Avoidance of CDM leading to a diversion of official development assistance.	The proposed project and the new CPA do not lead to a diversion of official development assistance (ODA).	<ul style="list-style-type: none"> <li>Written letters to state that the sources of any applicable national biogas subsidy are not funded by ODA.</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>Neither the CDM development process, nor the sources of any applicable national biogas subsidy are funded by ODA.</li> </ul>
9.	The monitoring plan of each CPA should be in line with the monitoring plan validated by the DOE and registered with the PoA.	The CPA implements a monitoring plant that is in line with the monitoring plan described in the PoA-DD (section I.7)	<ul style="list-style-type: none"> <li>PoA-DD</li> <li>CPA-DD for CPA SCHHBG-2014-087</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>The monitoring plan of each CPA is in line with the monitoring plan validated by the DOE and registered with the PoA.</li> </ul>
10.		The starting date of the CPA is determined and not prior to the Global Stakeholder Consultation of the PoA.		
10.1	Requirement of EB 93, Annex 7 (CDM project standard for programmes of activities)	The start date of the CPA can be determined with suitable evidence.	<ul style="list-style-type: none"> <li>Household database including the dates of digester commissioning.</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>The start date of the CPA is determined to be 11/06/2010, the earliest digester construction date of all households.</li> </ul>

Nb	Eligibility criterion -Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
10.2	Requirement of EB 93, Annex 7 (CDM project standard for programmes of activities)	The start date of the CPA is not before the date of public web hosting of the PoA documentation (28/10/2010).	<ul style="list-style-type: none"> <li>Household database including the dates of digester commissioning.</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>The start date of the CPA (11/06/2010) is after the date of public web hosting of the PoA (28/10/2010).</li> </ul>
11.	The CPAs will automatically be terminated when the PoA reached the end of its end date.	The end date of the CPA does not exceed the PoA end date.	<ul style="list-style-type: none"> <li>CPA-DD for CPA SCHHBG-2014-087</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>The CPAs will automatically be terminated when the PoA reached the end of its end date.</li> </ul>
12.		The CPA meets the additionality criteria relevant for Type I.		
12.1	F.1.1.1. A test record of the typical biogas stoves will be provided as evidence during the inclusion. The number of households should not exceed the maximum capacity of 15 MW <sub>th</sub> divided by the capacity of one stove.	The total thermal capacity installed at all households of the CPA does not exceed 15 MW <sub>th</sub> .	<ul style="list-style-type: none"> <li>Test record of implemented stoves</li> <li>CPA household list of CPA SCHHBG-2014-087</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>The total thermal capacity, calculated from the stove capacity of a single unit and the number of households, is 14.99926 MW.</li> </ul>
12.2	Requirement of the <i>Guidelines for demonstrating additionality of microscale project activities</i> .	The thermal capacity of a single stove does not exceed 4,500 kW <sub>th</sub> .	<ul style="list-style-type: none"> <li>Test record of implemented stoves</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>The thermal capacity of a single stove is 3.26 kW, far below the threshold of</li> </ul>

Nb	Eligibility criterion -Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
				4,500 kW.
12.3	Requirement of the <i>Guidelines for demonstrating additionality of microscale project activities.</i>	The users of the subsystems will be households.	<ul style="list-style-type: none"> <li>CPA household list of CPA SCHHBG-2014-087</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>All users of the digesters will be households.</li> </ul>
13.	Requirement of the <i>Guidelines for demonstrating additionality of microscale project activities.</i>	The CPA meets the additionality criteria relevant for Type III.		
13.1	Requirement of the <i>Guidelines for demonstrating additionality of microscale project activities.</i>	The total annual emission reduction from methane avoidance (type III activity) aimed by the CPA does not exceed 20 ktCO <sub>2</sub> e in any year of the crediting period.	<ul style="list-style-type: none"> <li>CPA-DD for CPA SCHHBG-2014-087</li> <li>Baseline survey</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>The total annual emission reduction from methane avoidance is 3,125 tCO<sub>2</sub>e. Well below the threshold of 20 ktCO<sub>2</sub>e.</li> </ul>
13.2	To emission reductions calculated using the formulas derived in Appendix 4 will be compared to the limit of 600 tCO <sub>2</sub> e.	The annual emission reduction from methane avoidance (type III activity) of one single household does not exceed 600 tCO <sub>2</sub> e.	<ul style="list-style-type: none"> <li>CPA-DD for CPA SCHHBG-2014-087</li> <li>Baseline survey</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>The annual emission reduction from methane avoidance of a single household is 0.679 tCO<sub>2</sub>e. Well below the threshold of 600 tCO<sub>2</sub>e.</li> </ul>
13.3	Requirement of the <i>Guidelines for demonstrating additionality of microscale project activities.</i>	The users of the subsystems will be households.	<ul style="list-style-type: none"> <li>CPA household list of CPA SCHHBG-2014-087</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>All users of the digesters</li> </ul>

Nb	Eligibility criterion -Category	Eligibility criterion - Required condition	Supporting evidence for inclusion	Description of this CPA in relation to the criterion and supporting evidence
				will be households.
14.	The data quality of the sampling survey should meet the minimum requirements.	All CPA specific input parameters that are determined by sampling have been determined by a survey that is based on the validated sampling plan and fulfils the minimum confidence/error of 95/10 for surveys combining several CPAs or 90/10 for surveys that cover only single CPAs.	<ul style="list-style-type: none"> <li>CPA baseline survey</li> </ul>	<input checked="" type="checkbox"/> <ul style="list-style-type: none"> <li>The baseline survey for the later CPAs covers several CPAs. Therefore the minimum confidence/error of 95/10 applies and is met by the statistics.</li> </ul>



## Appendix 1. Contact information of CPA implementers

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## Appendix 2. Affirmation regarding public funding

NA

### **Appendix 3. Applicability of methodologies and standardized baselines**

NA

### **Appendix 4. Further background information on ex ante calculation of emission reductions**

NA

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

NA

### **Appendix 6. Summary report of comments received from local stakeholders**

NA

### **Appendix 7. Summary of post registration changes**

This CPA is a component of PoA (UNFCCC Ref no. 2898).

The PoA has been registered as CDM POA on 11 Apr 2012. The applied methodologies are AMS-III.R (version 02) and AMS-I.C (version 19).

As per Paragraph 239, CDM Project Standard for programmes of activities (version 01), the post-registration change is voluntary change to other methodologies, provided that all requirements in the updated/changed methodologies are met.

This change is a voluntary change by PP and no reasons are included.

This PoA voluntary change AMS-I.C. (version 19) to AMS-I.I. (version 04), the impacts of such change to the registered PoA and included CPA are as follows:

- a) The applicability conditions of AMS-I.C (version 19) have been updated to be the ones of AMS-I.I (version 04). AMS I.I (version 04) is applicable to the PoA and included CPAs;
- b) Fixed parameters  $FC_{BL,y}$  and  $FC_{PE,y}$  have been moved to be monitoring parameters  $FC_{BL,k,j}$  and  $FC_{m,j}$  in line with the AMS-I.1. Furthermore, additional monitoring parameters  $N_{k,o}$ ,  $n_{k,y}$  (formerly  $N_k$ ),  $N_{m,y}$  &  $MS\%_{i,y}$  have been added in line with the new methodology

- AMS-I.I (version 04) See section I.6.2 and I.7.1 of PoA DD and section B.4.2 and B.5.1 of the of CPA DD for more details;
- c) The additionality is not affected. Requirement of the *Guidelines for demonstrating additionality of microscale project activities* are fully met, as indicated in section F of CPA DD;
  - d) Scale is not affected, still small scale;
  - e) Level of accuracy and conservativeness of the monitoring of the CPA is not affected. All CPA specific input parameters that are determined by sampling will be determined by a sampling survey that fulfils the minimum confidence/error as per the latest sampling standard;
  - f) Eligibility criteria for inclusion of CPAs in the PoA is updated to include the applicability conditions of AMS-I.I (instead of applicability conditions of AMS-I.C in the registered PoA DD and CPA DD), the remaining criteria is not affected. See section K of PoA DD and section F of CPA DD for more details.

Based on above, in each CPA, AMS-III.R (version 19) and AMS-I.I (version 04) will be applied.

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**Document information**

<i>Version</i>	<i>Date</i>	<i>Description</i>
08.0	28 June 2017	Revision to: <ul style="list-style-type: none"> <li>• Remove appendix “Applicability of methodologies and standardized baselines” as the appendix is not relevant at the CPA level;</li> <li>• Make editorial improvement.</li> </ul>
07.0	7 June 2017	Revision to: <ul style="list-style-type: none"> <li>• Improve consistency with the “CDM project standard for programmes of activities” and with the PDD and PoA-DD forms;</li> <li>• Make editorial improvement.</li> </ul>
06.0	24 May 2017	Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with the “Standard: CDM project standard for programme of activities” (CDM-EB93-A07-STAN) (version 01.0);</li> <li>• Incorporate the “Component project activity design document form for small-scale component project activities” (CDM-SSC-CPA-DD-FORM);</li> <li>• Make editorial improvement.</li> </ul>
05.0	15 April 2016	Revision to ensure consistency with the “Standard: Applicability of sectoral scopes” (CDM-EB88-A04-STAN) (version 01.0).
04.0	9 March 2015	Revision to: <ul style="list-style-type: none"> <li>• Include provisions related to statement on erroneous inclusion of a CPA;</li> <li>• Include provisions related to delayed submission of a</li> </ul>

<i>Version</i>	<i>Date</i>	<i>Description</i>
		monitoring plan; • Provisions related to local stakeholder consultation; • Provisions related to the Host Party; • Make editorial improvement.
03.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the component project activity design document form for CDM component project activities (these instructions supersede the "Guidelines for completing the component project activity design document form" (Version 01.0)); • Include provisions related to standardized baselines; • Add contact information on a CPA implementer and/or responsible person/ entity for completing the CDM-CPA-DD-FORM in A.13. and Appendix 1; • Add general instructions on post-registration changes in paragraph 4 and 5 of general instructions and Appendix 6; • Change the reference number from F-CDM-CPA-DD to CDM-CPA-DD-FORM; • Make editorial improvement.
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the component project activity design document form" (EB 66, Annex 16).
01.0	27 July 2007	EB 33, Annex 42 Initial adoption.
Decision Document Business		Class: Type: Function:
		Regulatory Form Registration
Keywords: component project activity, project design document		