NAME /TITLE OF THE PoA: Sichuan Rural Poor-Household Biogas
Development Programme

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

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Annexes

NOTE:

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

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

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

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

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

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

>>

Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXXX-XX

Version: 01.0
Date: 26/10/2010

Document history:
Version 1.0: Submitted to DOE, 26/10/2010

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

The CPA SCHHBG-XXXX-XX involves the instalment and operation of approximately XX,XXX household biogas systems at low-income households located in GEOGRAPHICAL AREA, 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 that are not able to participate under the SREO program without further support.

Therefore, the CPA involves:

   a) The installation of bio digesters at low-income households
   b) Free technical support to facilitate continuous operation of the installed systems

Implementation, operation, maintenance and monitoring will be primarily executed by the SREO and its subsidiaries and supervised by the CPA Implementer.

By installing biogas digesters in which all organic waste produced by the households can be used to generate biogas, the existing deep pits 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 by qualified and certified technicians from SREO. 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 average annual emission reductions expected from this CPA are XX,XXX tCO$_2$e.

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

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The residue effluent can be extracted from the biogas digesters easily. It can be used as organic fertilizer thereby resulting in an aerobic application of the sludge instead of additional CH_4 emissions, which are generally experienced in conventional manure treatment.

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

>>

The CPA implementer is CPA Implementer.

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

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

>>

A.4.1.1.	Host Party:

>> People's Republic of China

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

>>The households bundled in this CPA are located in GEOGRAPHICAL AREA, which covers the geographical coordinates of XX°XX′XX″N - XX°XX′XX″N and XXX°XX′XX″E - XXX°XX′XX″E.

The following figure shows the location of the CPA.

[MAP WITH THE LOCATION OF THE CPA]
Figure 1: Location of the CPA within Sichuan

A spreadsheet with all digesters installed and monitored under SCHHBG-XXXX-XX until the respective date will be submitted to the DOE at the start of each periodic verification along with the monitoring report. By crosschecking the data of listed households including the serial number of the digester and the household location, all devices can be uniquely identified and attributed to the CPA.

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

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

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

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

>>
20 years

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A.4.3.   Choice of the <u>crediting period</u> and related information:

Fixed crediting period

A.4.3.1. Starting date of the <u>crediting period</u>:

>>
The later of XX/XX/XXXX and the date of inclusion of the CPA to the PoA.

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

>>

10 years

A.4.4.   Estimated amount of emission reductions over the chosen <u>crediting period</u>:

>>
The estimated yearly emission reduction is calculated based on the equations listed in the PoA-DD of the Sichuan Rural Poor-Household Biogas Development Programme.

The estimated average annual emission reductions are XX,XXX tCO_2e. Over the chosen crediting period of 10 years, the total emission reductions are therefore expected to amount to XXX,XXX tCO_2e.

A breakdown of estimated yearly ERs is given in the table below:

Year	Estimation of annual emission reductions in tonnes of CO_2e
20XX	XX.XXX
20XX	XX,XXX
20XX	XX,XXX
20XX	XX,XXX
20XX	XX,XXX
20XX	XX,XXX
20XX	XX,XXX
20XX	XX,XXX
20XX	XX,XXX
20XX	XX,XXX
20XX	XX,XXX
Total estimated reductions (tonnes of CO_2e)	XXX,XXX
Total number of crediting years	10
Annual average of the estimated reductions over the crediting period	XX,XXX

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A.4.5. Public funding of the CPA:

>>

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

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

>>

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 15 kW and the emission reduction resulting from methane avoidance is well below 600 tCO_2e. Therefore, it is not necessary to perform a de-bundling check. The CPA is considered as not being a de-bundled component of a large scale activity.

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

>>

In order to avoid double accounting and to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA, the implementing entity of a CPA has, in accordance with the eligibility criteria stipulated in section A.4.2.2 of the PoA-DD, confirmed with a written statement that:

1.   The CPA and all biogas systems to be installed under the CPA have not been and will not be registered as a single CDM project activity nor as a CPA under another PoA.
2.   The implementing entity is aware that the CPA will be subscribed to the present PoA.

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

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

>>
Sichuan Rural Poor-Household Biogas Development Programme

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

>>

Eligibility criteria of the PoA and justification why they are fulfilled by the CPA:

1)   *The geographic boundary of the CPA lies within Sichuan province;*

   The geographic boundary of the CPA comprises all households participating. As all households are located in Sichuan, the geographical boundary of the CPA lies within Sichuan province.

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2)   *In case the CPA implementer is distinct from the C/ME it has entered into a CER Ownership Transfer Contract with the C/ME.*

☐ The CPA implementer is the C/ME itself.

☐ The CPA implementer has entered into a CER Ownership Transfer Contract with the C/ME.

3)   *The CPA implementer confirms in a written statement that:*
   a)   *All biogas system 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*
   b)   *That he is aware and agrees with the inclusion of the CPA to the proposed PoA.*

A written statement fulfilling the two criteria was provided by the C/ME.

4)   *All participating households of the CPA:*
   a)   *Are located within the geographic boundary of the CPA.*
   b)   *Have a household income below the latest available average household income of Sichuan province.*
   c)   *Generate animal manure and wastes from agricultural activities that are currently stored under anaerobic conditions in deep pits.*
   d)   *Currently use coal as source of energy for cooking and heating.*
   e)   *Have directly or indirectly entered into a CER Ownership Transfer Contract with the C/ME. The CER ownership transfer contract contains confirmation by the household that the biogas system to be newly installed 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 household.*
   f)   *Install a new household biogas system of the same or a similar design as the system described in section A.4.2.1, involving methane recovery (bio digester) and combustion (biogas stove). Per design, biogas systems must not have a methane emission reduction potential above 5 tCO_2e.*
   g)   *Commit to not vent any excess methane freely into the atmosphere but to destroy it via the combustion system.*
   h)   *Commit to utilize or dispose the sludge generated by the new biogas system exclusively under aerobic conditions.*

According to the criteria of household inclusion, the local Rural Energy Offices only consider households that fulfill all above-listed criteria for the inclusion in the proposed PoA. All households attached to the present CPA are required to sign a contract with the C/ME indicating:

   i.   Name of the head of the household
   ii.   Location of the household
   iii.   that the household cedes the right to claim and commercialize CERs with respect to the newly installed biogas systems to the C/ME and that it has not and will not become part of another CDM project or programme activity;

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    iv.   that the household will install a new household biogas system of the same or a similar design as the system described in section A.4.2.1 of the PoA DD, involving methane recovery (bio digester) and combustion (biogas stove);

    v.   that the household commits to not vent any excess methane freely into the atmosphere but to destroy it via the combustion system; and

    vi.   that the household commits to utilize or dispose the sludge generated by the new biogas system exclusively under aerobic conditions.

Furthermore, for each participating household the local Rural Energy Office in charge of the community to which the household belongs witnesses and confirms in a written statement that:

    i.   the household's income is below average;

    ii.   the household is generating manure and/or wastes from agricultural activities that are currently stored under anaerobic conditions in deep pits; and

    iii.   the household currently uses coal as source of energy for cooking and heating.

For the avoidance of doubt, as not all participating households under the CPA are known at the time of its inclusion to the PoA it is not feasible nor necessary to provide the evidences above at the time of inclusion. The evidences shall only be provided at the time of periodic verification for each household for which emission reductions are claimed in the monitoring report.

5)   *The annual average temperature of each CPA location is higher than 5°C;*

According to the 2009 Sichuan Statistical Yearbook the minimum annual average temperature within the CPA boundary is XX.X° C.

6)   *The aggregated annual methane-recovery-and-destruction related emission reductions of all biogas systems included in the CPA are less than or equal to 60 ktCO$_2$e.*

The projected number of systems deployed is XX,XXX. Therefore, the projected aggregated annual methane-recovery-and-destruction related emission reductions of all biogas systems included in the CPA are XX,XXX tCO$_2$e. The final number of systems included in the CPA is still uncertain but it will be ensured that it will not surpass the threshold of 60 ktCO$_2$e/year.

7)   *The aggregated installed/rated thermal energy generation capacity of all biogas systems included in the CPA is equal to or less than 45 MW thermal.*

The aggregated capacity of all subsystems can be calculated based on the methane production capacity of the digesters:

Item	Value	Unit
Biogas production capacity	350	m^3/year
Concentration of biogas	0.60	%
Density of methane	0.67	kg/m^3
NCV	13.92	kwh/kg

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Annual energy production	1958.54	kWh/year
Capacity of one digester	0.23	kW

With a projected total number of XX,XXX installed digesters, the projected total capacity is XX.X MW thermal. The final number of systems included in the CPA is still uncertain but it will be ensured that it will not surpass the threshold of 45 MW thermal.

8) *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$_2$e emission reduction from methane avoidance, 450 kW thermal installed capacity of the stoves).*

As the subsystems are built according to the design described in section A.4.2.1 of the PoA DD each of the independent subsystems is smaller than 1% of each small-scale threshold. The emission maximum emission reduction from methane avoidance is X.XX tCO$_2$e and the thermal capacity of each system is 0.23 kW.

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

>>
The criteria listed in Section E.5.2. of the PoA-DD are as follows:

Criteria related to the investment analysis

1) *To demonstrate that the installation of a biogas digester is financially not attractive to the farmers, the following three steps have been carried out in the CPA-DD:*

  a) *The equity IRR of the digester investment for an average household is calculated based on the investment analysis provided in the PoA-DD. The latest available input values should be used and listed together with suitable evidence.*

  The IRR has been calculated based on the latest available input values. The input values are:

Item	Value	Unit
Total Investment	X,XXX	RMB
Subsidy	1,500	RMB
Equity	X,XXX	RMB
Coal saving	0.800	tons
Coal costs	XXX	RMB/ton
Annual maintenance costs	89	RMB
Investment horizon	10	years
Carbon Revenue/HH	250	RMB
Share for HHs	60%	

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Share for technical service	10%	
Annual CER Income	150	RMB
Annual service value	25	RMB

Table 1: Input parameters for the financial analysis.

b)   *A suitable and applicable IRR benchmark is quantified in the CPA-DD.*

The benchmark used for this CPA is defined by XXX. The value applied is X.X%.

c)   *The financial additionality is demonstrated by showing that the calculated IRR (excluding CDM) is below the applied investment benchmark.*

The results of the financial analysis are:

IRR without CDM	X.XX%
IRR with CDM	X.XX%

The CPA is therefore regarded as financially additional.

Criteria related to the technological barrier

2)   *Contractual evidence of the technological servicing and financing agreement between the C/ME and the implementer and operator of the technical servicing network shall be provided. I.a. the agreement shall include:*

a)   *The description of the kind of services that can be assessed by the farmers.*

b)   *Clear rulings on the financial contribution of the C/ME. The financial contribution of the C/ME shall cover at least 10% of the carbon revenues.*

A contract has been signed between the C/ME and the TECHNICAL SERVICE PROVIDER that defines the type of services and the funds that will be allocated by the C/ME.

The participating households can thus assess the following services:

- LIST OF SERVICES

The share of carbon revenues allocated to finance the free service is XX%.

3)   *Evidence shall be provided that the households included in the CPA have been informed about the possibility of assessing free technical service. Therefore, the contractual agreement that the households have entered with the C/ME shall be provided. It shall include*

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a)   *The description of the kind of services that can be assessed by the farmers.*

The contractual agreements between the C/ME and the households are provided to the DOE. For the avoidance of doubt, as not all participating households under the CPA are known at the time of its inclusion to the PoA it is not feasible nor necessary to provide the evidences above at the time of inclusion. The evidences shall only be provided at the time of periodic verification for each household for which emission reductions are claimed in the monitoring report.

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

\>>

The 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:
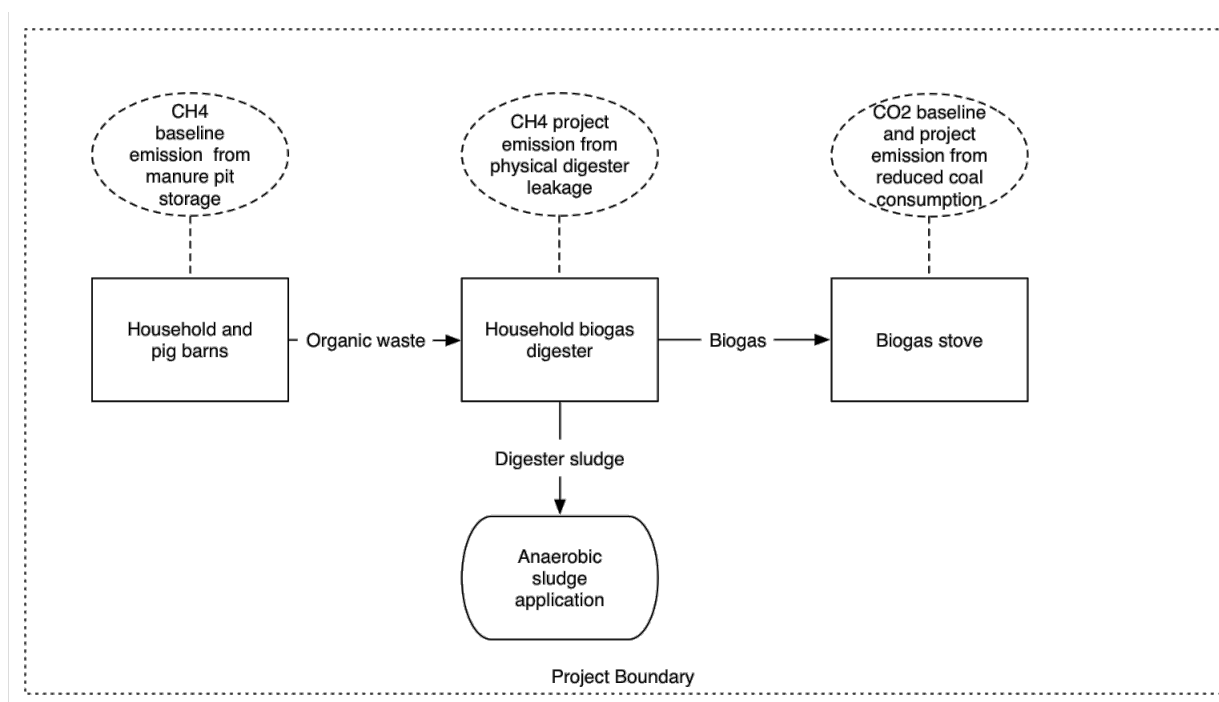

Table 2: Project boundary for one sample household.

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

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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 several 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 or heating. 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 and heating 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_2 emission will be reduced.

Additional to these explanations, Table 3 gives an overview on the emission sources included and excluded.

	GHG emission source	Gas	Included?	Justification/Explanation
Baseline emission	Thermal energy used for cooking/heating by burning coal	CO_2	Yes	Major source of baseline emission.
		CH_4	No	Excluded for simplification. This is conservative.
		N_2O	No	Excluded for simplification. This is conservative.
	Thermal energy used for cooking/heating by burning other fuels (straw, firewood, crop residues, etc.)	CO_2	No	Excluded for simplification. This is conservative.
		CH_4	No	Excluded for simplification. This is conservative.
		N_2O	No	Excluded for simplification. This is conservative.
	Existing manure management system	CO_2	No	Excluded as decomposition of organic waste is CO_2 neutral.
		CH_4	Yes	Major source of baseline emission.
		N_2O	No	Excluded for simplification. This is conservative.
Project emission	Thermal energy used for cooking by burning biogas	CO_2	No	Excluded as biogas is a renewable form of energy and its generation and destruction is CO_2 neutral.
		CH_4	No	Not applicable; in line with the applied methodologies.
		N_2O	No	Not applicable; in line with the applied methodologies.
	Thermal energy used for cooking by burning coal	CO_2	Yes	Major source of emission.
		CH_4	No	Not applicable; in line with the applied methodologies.
		N_2O	No	Not applicable; in line with the applied methodologies.

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Thermal energy used for cooking by burning straw and firewood	CO_2	No	Not applicable; in line with the applied methodologies.
	CH_4	No	Not applicable; in line with the applied methodologies.
	N_2O	No	Not applicable; in line with the applied methodologies.
Leakage from biogas digester	CO_2	No	Excluded as decomposition of organic waste is CO_2 neutral.
	CH_4	Yes	10% leakage assumed in accordance with methodology AMS III.R
	N_2O	No	Not applicable; in line with the applied methodologies.

Table 3: Sources of GHG emissions included and excluded in the project boundary.

B.5.	**Emission reductions:**

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

>>

The following parameters are the global parameters that are defined in the PoA-DD and are fix for all CPAs:

Data / Parameter:	*VS*
Data unit:	kg dry matter animal^{-1} day^{-1}
Description:	Daily volatile solid excreted per animal.
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, and Chapter 10, Table 10A-7 (swine).
Value applied:	0.3
Justification of the choice of data or description of measurement methods and procedures actually applied :	The applied value reflects the 2006 IPCC value for Asian swine.
Any comment:	Parameter ID: F01

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Data / Parameter:	B_0
Data unit:	$m^3\,CH_4\,kg^{-1}$
Description:	Maximum methane producing capacity for manure produced by livestock, of VS excreted.
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, Volume 4, and Chapter 10, Table 10A-7 (swine).
Value applied:	0.29
Justification of the choice of data or description of measurement methods and procedures actually applied :	The applied value reflects the 2006 IPCC value for Asian swine.
Any comment:	Parameter ID: F02

Data / Parameter:	GWP_{CH_4}
Data unit:	1
Description:	Global Warming Potential for CH_4.
Source of data used:	IPCC 2006 Guidelines
Value applied:	21
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	Parameter ID: F03

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Data / Parameter:	LF_{AD}
Data unit:	%
Description:	Methane leakages from anaerobic digesters.
Source of data used:	Table 10A-8 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, and Chapter 10.
Value applied:	10
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	Parameter ID: F04

Data / Parameter:	D_{CH_4}
Data unit:	kg/m^3
Description:	Conversion factor of m^3 CH$_4$ to kilogram CH$_4$.
Source of data used:	2006 IPCC guidelines, Volume 4, Chapter 10, Page 10.42.
Value applied:	0.67
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	Parameter ID: F05

Data / Parameter:	$BG_{Coal,k}$
Data unit:	t CO$_2$e/t coal
Description:	Emission factor of raw coal.
Source of data used:	Official data from Chinese DNA.
Value applied:	1.98
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated using the net calorific value and the carbon content per mass of coal.
Any comment:	Parameter ID: F06

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The following parameters are defined specifically for this CPA:

Data / Parameter:	$BG_{Coal,k}$
Data unit:	Tonnes of coal
Description:	Average annual coal consumption for each household before the installation of the digester in city k.
Source of data used:	Comprehensive baseline survey.
Value applied:	X.XXX
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data was collected in comprehensive baseline surveys on city levels. The sample size will be determined in line with the latest requirements by methodologies and EB. Currently, the highest precision requirement is defined by methodology AMS III.R, where a minimum level of confidence of 95% and a maximum error of 10% is demanded.
Any comment:	Parameter ID: S01

Data / Parameter:	$PG_{Coal,k}$
Data unit:	Tonnes of coal
Description:	Average annual coal consumption for each household after the installation of the digester in city k.
Source of data used:	Comprehensive baseline survey.
Value applied:	X.XXX
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data was collected in comprehensive baseline surveys on city levels. The sample size will be determined in line with the latest requirements by methodologies and EB. Currently, the highest precision requirement is defined by methodology AMS III.R, where a minimum level of confidence of 95% and a maximum error of 10% is demanded.
Any comment:	Parameter ID: S02

B.5.2. 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 emission**

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

The methane baseline emissions in tonnes of CH_4 per pig are defined as:

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$$EF_{k,y} = (VS \cdot 365) \cdot \left[B_0 \cdot D_{CH_4} \sum_{S,k} \frac{MCF_{S,k}}{100} \cdot MS_{(S,k)} \right]$$

1

With the applied input values:

VS	Daily volatile solid excreted for livestock, [kg dry matter animal^{-1} day^{-1}].	0.3
B_0	Maximum methane producing capacity for manure produced by livestock, [m^3 CH$_4$ kg^{-1}] of VS excreted.	0.29
D_{CH_4}	Conversion factor of m^3 CH$_4$ to kilogram CH$_4$ (as per 2006 IPCC guidelines, see Volume 4, Chapter 10, Page 10.42).	0.67
$MCF_{S,k}$	Methane conversion factors for each manure management system S by climate region k, [%].	XX
$MS_{(S,k)}$	Fraction of livestock's manure handled using manure management system S in climate region k, [1].	1

And the methane emissions per household [tCO$_2$e]:

$$BE_{CH_4,k,y} = GWP_{CH_4} \cdot \frac{1}{1000} \cdot LN_k \cdot EF_{k,y}$$

2

Where:

GWP_{CH_4}	Global Warming Potential for CH$_4$.	1
LN_k	Average swine population at the households in city k, before the installation of the biogas digesters.	X.XX

AMS I.C - *Thermal energy for the user with or without electricity*

$$BE_{CO_2,k,y} = BG_{Coal,k} \cdot EF_{RC}$$

3

With the applied input values:

$BG_{Coal,k}$	Average annual coal consumption for each household before the installation of the digester in city k, [t coal].	X.XXX
EF_{RC}	Emission factor of raw coal, [t CO$_2$e/t coal].	1.98

Total baseline emissions per household

The total annual baseline emission per household is the sum of methane baseline emission and carbon dioxide baseline emission:

$$BE_{k,y} = BE_{CO_2,k,y} + BE_{CH_4,k,y}$$

4

Based on the input values listed above, the total annual baseline emission per household is X.X tCO$_2$e.

This template shall not be altered. It shall be completed without modifying/adding headings or logo, format or font.

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Bundled baseline emissions per CPA

With the projected number of XX,XXX households in the CPA, the expected average annual baseline emissions are XX,XXX tCO_2e.

2. Project emission

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

The project emission due to physical leakage from the digesters is defined by the methodology as:

$$PE_{l,k,y} = \frac{LF_{AD} \cdot \left[GWP_{CH_4} \cdot D_{CH_4} \cdot B_0 \cdot VS_{m,y,k}\right]}{1000}$$

5

With the applied input values:

LF_{AD}	Methane leakages from anaerobic digesters, [%].	10
B_0	Maximum methane producing capacity for manure produced by livestock, $[m^3\, CH_4\, kg^{-1}]$ of VS excreted.	0.29
GWP_{CH_4}	Global Warming Potential for CH_4.	1
D_{CH_4}	Conversion factor of $m^3\, CH_4$ to kilogram CH_4 (as per 2006 IPCC guidelines, see Volume 4, Chapter 10, Page 10.42).	0.67

$VS_{m,y,k}$ can be calculated as:

$$VS_{m,k,y} = VS \cdot 365 \cdot LN_k$$

6

With:

VS	Daily volatile solid excreted for livestock, [kg dry matter $animal^{-1}\, day^{-1}$].	0.3
LN_k	Average swine population at the households in city k, before the installation of the biogas digesters.	X.XX

AMS I.C - *Thermal energy for the user with or without electricity*

As derived in the PoA-DD, the project emission from sources relevant for AMS I.C is calculated as:

$$PE_{CO_2,k,y} = PG_{Coal,k} \cdot EF_{RC}$$

7

With:

$PG_{Coal,k}$	Average annual coal consumption for each household after the installation of the digester in city k, [t coal].	X.XXX

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EF_{RC}	Emission factor of raw coal, [t CO_2e/t coal].	1.98

Total project emissions per household

The total annual project emission per household is the sum of methane project emission and carbon dioxide project emission:

$$PE_{k,y} = PE_{CO_2,k,y} + PE_{l,k,y}$$ 8

Based on the input values listed above, the total annual project emission per household is X.X tCO$_2$e.

Bundled project emissions per CPA

With a projected number of XX,XXX households in the CPA, the expected annual project emission is XX,XXX tCO$_2$e.

3. Emission reduction

Based on baseline emission and project emission, the annual emission reduction can be calculated:

$$ER_y = \sum_k N_k \cdot (BE_{k,y} - PE_{k,y})$$ 9

With the input values used for this CPA, the estimated annual emission reduction is XX,XXX tCO$_2$e.

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

Year	Estimation of project activity emissions (tonnes of CO$_2$ e)	Estimation of baseline emissions (tonnes of CO$_2$ e)	Estimation of leakage (tonnes of CO$_2$ e)	Estimation of overall emission reductions (tonnes of CO$_2$ e)
20XX	XX,XXX	XX,XXX	XX,XXX	XX,XXX
20XX	XX,XXX	XX,XXX	XX,XXX	XX,XXX
20XX	XX,XXX	XX,XXX	XX,XXX	XX,XXX
20XX	XX,XXX	XX,XXX	XX,XXX	XX,XXX
20XX	XX,XXX	XX,XXX	XX,XXX	XX,XXX
20XX	XX,XXX	XX,XXX	XX,XXX	XX,XXX
20XX	XX,XXX	XX,XXX	XX,XXX	XX,XXX
20XX	XX,XXX	XX,XXX	XX,XXX	XX,XXX
20XX	XX,XXX	XX,XXX	XX,XXX	XX,XXX
20XX	XX,XXX	XX,XXX	XX,XXX	XX,XXX
20XX	XX,XXX	XX,XXX	XX,XXX	XX,XXX

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Total (tonnes of CO_2 e)	XXX,XXX	XXX,XXX	XXX,XXX	XXX,XXX

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

	B.6.1.	**Description of the monitoring plan:**

>>

1. Organizational setup

The Sichuan Rural Energy Office will be responsible for the 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 CE, which evaluates the data and compiles the monitoring reports for the single CPAs.

2. Data monitored

The Rural Energy Offices will conduct a survey for each CPA. The data collected are listed in the tables below:

Data / Parameter:	$N_{k,total}$
Data unit:	1
Description:	Total number of households with biogas digester located in city k, included in the CPA.
Source of data to be used:	Household-C/ME contracts
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Number of digesters planned to be installed: XX,XXX.
Description of measurement methods and procedures to be applied:	All participating households enter into a CER Ownership Transfer Contract with the C/ME as described in detail in section B.2 of this document. Households are uniquely identified by name of the household principal, household address and serial number of the biogas digester.
QA/QC procedures to be applied:	Officers of the Rural Energy Offices confirm the identity and data of households on site.
Any comment:	Parameter ID: M01

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Data / Parameter:	N_k
Data unit:	1
Description:	Number of households with active biogas digester located in city k, included in the CPA.
Source of data to be used:	Monitoring sampling study
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Number of digesters planned to be installed: XX,XXX.
Description of measurement methods and procedures to be applied:	Sampling monitoring survey with a sampling size determined following the latest guidelines and the applied methodologies.
QA/QC procedures to be applied:	To determine the monitoring parameters, a sample study will be for each CPA. In line with methodology AMS III.R, the level of confidence should be at least 95%, while the acceptable error is 10%.
Any comment:	Parameter ID: M02

Data / Parameter:	t
Data unit:	hours
Description:	Mean annual operation hours of the digesters.
Source of data to be used:	Monitoring sampling study
Value of data applied for the purpose of calculating expected emission reductions in section B.5	8640 hours (360 days)
Description of measurement methods and procedures to be applied:	Sampling monitoring survey with a sampling size determined following the latest guidelines and the applied methodologies. This value will be determinate based on information on the length and period of phases, where the digesters are discharged and restarted.
QA/QC procedures to be applied:	To determine the monitoring parameters, a sample study will be for each CPA. In line with methodology AMS III.R, the level of confidence should be at least 95%, while the acceptable error is 10%.
Any comment:	Parameter ID: M03

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Data / Parameter:	T
Data unit:	˚C
Description:	Mean annual temperature in city k. This parameter determines the emission factors of the existing manure management systems.
Source of data to be used:	Data from the latest Sichuan Statistical Yearbook.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	The exact value depends on the mean annual temperature. For 2008, the 2009 Sichuan Statistical Yearbook gave the figures displayed in Table 4 (Annex 3).
Description of measurement methods and procedures to be applied:	This value will be obtained from the Sichuan Statistical Yearbook annually for each city.
QA/QC procedures to be applied:	
Any comment:	Parameter ID: M04

Data / Parameter:	$MCF_{S,k}$
Data unit:	%
Description:	Methane conversion factors for each manure management system S in climate region k.
Source of data to be used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, Volume 4, Chapter 10, Table 10A-7 and Table 10.17 (swine).
Value of data applied for the purpose of calculating expected emission reductions in section B.5	The MCF values for the most likely mean annual temperatures (refer to mean annual temperature in 2008, given above) _see table below_
Description of measurement methods and procedures to be applied:	This value will be determined annually for each city based on the mean annual temperature.
QA/QC procedures to be applied:	
Any comment:	Parameter ID: M05

Manure Management System	Retention time	Annual mean temperature ˚C				
		15	16	17	18	19
Pit storage	> 1 month	27%	29%	32%	35%	39%

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Data / Parameter:	LN_k
Data unit:	1
Description:	Average swine population at the households in city k, before the installation of the biogas digesters.
Source of data to be used:	Monitoring sampling study.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	X.XX
Description of measurement methods and procedures to be applied:	Sampling monitoring survey with a sampling size determined following the latest guidelines and the applied methodologies.
QA/QC procedures to be applied:	To determine the monitoring parameters, a sample study will be for each CPA. In line with methodology AMS III.R, the level of confidence should be at least 95%, while the acceptable error is 10%.
Any comment:	Parameter ID: M06

Data / Parameter:	Soil application of the final sludge
Data unit:	N/A
Description:	Land application of digestate from biogas digesters to avoid anaerobic digestion.
Source of data to be used:	Monitoring sampling study.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	N/A
Description of measurement methods and procedures to be applied:	Sampling monitoring survey with a sampling size determined following the latest guidelines and the applied methodologies.
QA/QC procedures to be applied:	To determine the monitoring parameters, a sample study will be for each CPA. In line with methodology AMS III.R, the level of confidence should be at least 95%, while the acceptable error is 10%.
Any comment:	Parameter ID: M07

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3. Monitoring sampling study

The applied methodologies require different parameters for a sampling study. While AMS I.C requires a minimum level of confidence of 90% and precision of 10%, AMS III.R requires a level of confidence of 95%, without mentioning the precision. The CE therefore chose to apply a 95% confidence and a precision of 10%. The G*eneral Guidelines for Sampling and Surveys for Small-Scale CDM Project Activities* , defines a minimum confidence/precision of 90/10 for all cases, where no explicit values are given. The parameters chosen by the CE therefore comply with the relevant CDM regulations and procedures.

The maximum required number of households included in the sample to achieve the chosen confidence/precision is calculated according to the following formula:

1.
$$n_1 = \frac{z^2 \cdot P(1 - P)}{e^2}$$
10

Where:

z	Critical value depending on the chosen confidence. For a desired level of confidence of 95% and a one-sided analysis (exclusion of non-conservative results), this value is 1.64.
P	Accuracy of the survey result. P is assumed as 0.5 to maximize the standard deviation. This will result in the maximum necessary number of samples to reach the desired confidence.
e	Maximum allowed sampling error (10%).

The households that participate in the sample surveys are determined randomly and without favouring size, number of pigs or any other factor that might influence the emission reduction.

4. Data management

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 CE.

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

All data and documents will be archived by the CE until at least two years after the CPA crediting period is finished.

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

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

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

>>

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

>>

SECTION D. Stakeholders' comments

>>

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

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

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

>>

D.3. Summary of the comments received:

>>

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

>>

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Annex 1

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

Organization:	Chengdu Oasis Science & Technology Co. Ltd.
Street/P.O.Box:	Renmin South Road, Section 4, No. 27 (Sun Dynasty International)
Building:	Building 2, Entrance 1, 1841
City:	Chengdu
State/Region:	Sichuan Province
Postfix/ZIP:	610041
Country:	P.R. China
Telephone:	+86 10 6468 8669
E-Mail:	hyptpmc@gmail.com
Represented by:	Wang Hai
Title:	General Manager
Salutation:	Mr.
Last Name:	Wang
First Name:	Hai

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

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Annex 3

BASELINE INFORMATION

Average Temperature of Project Cities(˚C)(2008)

Source: Sichuan Statistical Yearbook 2009,Page 310

No.	City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Average
1	Mianyang	4.2	5.7	13.9	17.5	22.6	25	26.7	24.9	22.6	18.4	12.5	7.5	16.8
2	Guang'an	5	6.3	14.4	18.1	22.8	25	27.9	24.8	24	18.6	13.1	8	17.3
3	Suining	4.2	6.3	14.5	18	22.7	25	27.8	24.5	23.3	18.6	12.6	7.7	17.1
4	Dazhou	4.6	6.5	14.2	18	22.9	25.5	28.5	25.5	23.8	18.2	12.7	7.6	17.3
5	Ziyang	4.2	6.1	14.8	18.3	23.3	25.6	27.1	24.6	23.3	18.7	13	8.2	17.3
6	Meishan	4.7	6.4	14.6	18.4	23.4	25.7	27.1	25.1	23.4	19.3	13.2	8.5	17.5
7	Neijiang	4.7	6.3	14.8	17.9	22.5	24.9	27.4	24.7	23.6	18.9	13	8.4	17.3
8	Leshan	5	6.7	15.1	18.7	23.3	25.3	27	24.5	23.3	19.1	13.3	8.8	17.5
9	Zigong	5.5	7	15.6	18.9	23.4	25.7	27.9	25	23.6	19.7	14	9.3	18
10	Yibin	5.7	7	15.5	19.1	23.7	26.1	28.3	25.8	24.7	20	14.4	10	18.4
11	Luzhou	5.5	6.8	15.3	18.6	22.8	25.1	27.2	24.9	24.3	19.2	13.7	9.2	17.7
12	Chengdu	3.8	5.5	13.5	17.2	22.1	24.5	25.7	24.1	22.2	18.2	12.2	7.1	16.3
13	Panzhihua	14.9	14.3	19.7	25.5	23.8	25.2	24.8	24.4	24.2	21.4	16.0	13.3	20.6
14	Deyang	4.1	5.9	14.0	17.7	22.6	25.1	26.8	25.2	23.1	18.7	12.8	7.2	16.9
15	Guangyuan	3.4	5.8	13.8	17.2	22.9	25.3	26.7	25.1	21.8	17.5	10.9	6.4	16.4
16	Nanchong	4.7	6.8	14.6	18.3	23.2	25.5	28.3	25.1	24.0	18.8	12.7	7.8	17.5
17	Yaan	4.2	5.7	14	17.3	21.9	24.3	25.8	23.9	22.4	18	12.2	8.3	16.5
18	Bazhou	4.0	6.0	13.7	17.2	22.7	24.8	27.5	25.1	22.9	17.8	12.0	6.8	16.7
19	Maerkang	1.8	0.8	5.7	10.9	13.4	14.6	17.3	16	14.8	9.6	3.7	0.1	9.1
20	Kangding	-3.5	-3.8	4.4	8.8	11.6	13.8	15.8	13.8	13.6	9.5	3.2	0.4	7.3

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No.	City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Average
21	Xichang	12.4	6.7	15.4	21.4	20.6	21.8	22.9	21.8	22,1	18.3	13.3	10.9	17.3

Table 4: Temperature data for the Sichuan Province (2008).

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Annex 4

MONITORING INFORMATION