



**Monitoring report form for CDM programme of activities
(Version 02.0)**

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

MONITORING REPORT

Title of the PoA	Sichuan Rural Poor-Household Biogas Development Programme
UNFCCC reference number of the PoA	UNFCCC Ref no: 2898

GS Ref No:
GS1239: PoA
GS1288: 2898-0001
GS1693: 2898-0002
GS1694: 2898-0003
GS1695: 2898-0004
GS1696: 2898-0005
GS1697: 2898-0006
GS1698: 2898-0007
GS1699: 2898-0008
GS1700: 2898-0009
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GS2566: 2898-0054
GS2567: 2898-0055

	GS2568: 2898-0056 GS2569: 2898-0057 GS2570: 2898-0058 GS2571: 2898-0059 GS2572: 2898-0060 GS2573: 2898-0061 GS2574: 2898-0062 GS2575: 2898-0063 GS2576: 2898-0064 GS2577: 2898-0065 GS2578: 2898-0066 GS2579: 2898-0067 GS2580: 2898-0068 GS2581: 2898-0069 GS2582: 2898-0070 GS2583: 2898-0071 GS2584: 2898-0072 GS2585: 2898-0073 GS3588: 2898-0074 GS3589: 2898-0075 GS3590: 2898-0076 GS3591: 2898-0077 GS3592: 2898-0078 GS3593: 2898-0079 GS3594: 2898-0080 GS3595: 2898-0081 GS3596: 2898-0082 GS3597: 2898-0083 GS3598: 2898-0084 GS3599: 2898-0085 GS3600: 2898-0086 GS3601: 2898-0087
Version numbers of the PoA-DD applicable to this monitoring report	2
Version number of this monitoring report	2
Completion date of this monitoring report	15/08/2018
Monitoring period number	5 th monitoring period
Duration of this monitoring period	01/01/2016 – 31/12/2016
Monitoring report number for this monitoring period	2898-MP5-MRP1 ¹ Single monitoring report is prepared for all covered CPAs for this monitoring period
Coordinating/managing entity	Chengdu Oasis Science & Technology Co., Ltd.

¹ https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/5BGM96VOK3ATN4JPR70XSWIQ8CZH2F/view

Host Parties	Host Party of the PoA	Is this the host Party of a CPA covered in this monitoring report? (yes/no)
	People's Republic of China	Yes
Sectoral scopes	Scope 1: Energy industries (renewable - / non-renewable sources) Scope 13: Waste handling and disposal ²	
Applied methodologies and standardized baselines	AMS-I.I.– <i>Biogas/biomass thermal applications for households/small users</i> (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) Standardized baseline is not applied.	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by all CPAs covered in this monitoring report in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	0	816,778tCO ₂ e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the CPA-DDs for the CPAs covered in this monitoring report	876,123tCO ₂ e	

PART I Monitoring of programme of activities (PoA)

SECTION A. Description of PoA

A.1. General description of PoA

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1. General operating and implementing framework of PoA

The Sichuan Rural Poor-Household Biogas Development Programme (hereafter referred to as “The PoA”) aims to reduce a large amount of greenhouse gases (GHG) by facilitating the installation of a large number of household biogas digesters. To achieve this target, the PoA generates additional incentives to install digesters to households that are supported by existing subsidy schemes. Target group of the PoA are low-income households located in Sichuan Province, China. The primarily targeted areas are thirteen cities (however, the PoA shall not be limited to this thirteen cities exclusively): Yibin, Neijiang, Suining, Ziyang, Zigong, Luzhou, Leshan, Meishan, Mianyang, Guang’An, Ganzi, Aba and Dazhou, all of which are located in Sichuan.

Currently, households in the area of the PoA store animal manure produced by micro-scale animal husbandries in deep pits for several months before applying it to their farmland. In the meantime, coal is used as source of energy for cooking in daily life. During the project activity, each household

² In the methodology AMS III.R, the sectoral scope is 15, however, as per the EB standard “Applicability of sectoral scopes” (version 01.0, EB88, Annex 04), the scope of AMS III.R is 13.

is equipped with a household biogas digester that treats the manure anaerobically and recovers the generated methane. After installation of the biogas systems, both sources of emissions are reduced: No methane is emitted from the existing manure management systems, as the manure is treated within the biogas digesters and furthermore, all recovered methane is utilized for cooking to reduce the coal consumption of each household.

Furthermore, technical difficulties that occur during the operation of household biogas digesters resulted in a low rate of successful long-term operation among the digesters that have been installed in the past. A fundamental reason is that technical support and maintenance of the digesters and related equipment are not covered by the subsidy schemes. Individual technical support for households is expensive and difficult to obtain in remote areas. Therefore, the acceptance of the technology and the willingness to pay for the installation of bio digesters without guaranteed, regular and proper maintenance is very low.

The PoA is managed, implemented, operated and monitored by the Coordinating Entity (CME) Chengdu Oasis Science & Technology Co., Ltd.. The CME takes care of all CDM related tasks. This includes the writing of all related documents, quantitative calculation of emission reductions, the management of CDM related procedures like validation, registration and verification, and the allocation of CER revenues for the distribution to the farmers and the technical service network.

The technical implementation of the digesters, the operation of the service network, as well as all necessary surveys and monitoring are undertaken by the Sichuan Rural Energy Office and their subsidiaries, the city, county and village level Rural Energy Offices. After the CER revenue has been provided by the CME, the Sichuan Rural Energy Office also ensures the distribution of the revenues to the individual households and the service network.

Each CPA under the PoA has two CPA implementers:

- Chengdu Oasis Science & Technology Co., Ltd. (also acting as the CME)
- The Sichuan Rural Energy Office

2. Policy measure or stated goal of the PoA

Stated goal of the PoA is to enable the poor population of the rural areas in Sichuan to participate in the existing biogas subsidy programme provided by the Sichuan Rural Energy Office. The approach adopted to achieve this is twofold:

- 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 supports the households in closing the financial gap.
- b) **Technical support:** The PoA provides 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 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 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 PoA are low-income families. By focusing on these groups, the PoA clearly facilitates additional and sustainable development and improves the living conditions of underprivileged farmers.

The total emission reduction achieved during this monitoring period is 816,778 tCO_{2e}.

A.1.1. Corresponding generic component project activities (CPAs)

Title and reference number of the corresponding generic CPA	Version of the PoA-DD	Sectoral scopes	Applied methodologies and standardized baselines
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	Scope 1: Energy industries (renewable - / non-renewable sources) Scope 13: Waste handling and disposal	AMS-I.I.– <i>Biogas/biomass thermal applications for households/small users</i> (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). Furthermore, AMS-III.R refers to AMS-III.D – “ <i>Methane recovery in animal manure management systems</i> ” (version 17) ³ to calculate baseline and project emissions.

A.1.2. CPAs included in the PoA

Title and UNFCCC reference number of the CPA	Title and reference number of the corresponding generic CPA	Version of the PoA-DD	Crediting period type and duration	Covered in this monitoring report? (yes/no)
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2010-001 (2898-0001)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	10/05/2012 - 09/05/2022	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-002 (2898-0002)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-003 (2898-0003)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb.	Sichuan Rural Poor-Household Biogas Development	2	11/04/2013 - 10/04/2023	Yes

³ <http://cdm.unfccc.int/methodologies/DB/2C25M4WA2W2XCMG5ETXE2CBHZOPRZU>

SCHHBG-2012-004 (2898-0004)	Programme, CPA Nb. SCHHBG-XXX-XXX			
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-005 (2898-0005)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-006 (2898-0006)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-007(2898-0007)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-008(2898-0008)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-009(2898-0009)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-010(2898-0010)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-011(2898-0011)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-012(2898-0012)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb.	Sichuan Rural Poor-Household Biogas Development	2	11/04/2013 - 10/04/2023	Yes

SCHHBG-2012-013(2898-0013)	Programme, CPA Nb. SCHHBG-XXX-XXX			
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-014(2898-0014)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-015(2898-0015)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-016(2898-0016)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-017(2898-0017)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-018(2898-0018)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-019(2898-0019)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-020(2898-0020)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-021(2898-0021)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb.	Sichuan Rural Poor-Household Biogas Development	2	11/04/2013 - 10/04/2023	Yes

SCHHBG-2012-022(2898-0022)	Programme, CPA Nb. SCHHBG-XXX-XXX			
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-023(2898-0023)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-024(2898-0024)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-025(2898-0025)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-026(2898-0026)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-027(2898-0027)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-028(2898-0028)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-029(2898-0029)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-030(2898-0030)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb.	Sichuan Rural Poor-Household Biogas Development	2	11/04/2013 - 10/04/2023	Yes

SCHHBG-2012-031(2898-0031)	Programme, CPA Nb. SCHHBG-XXX-XXX			
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-032(2898-0032)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-033(2898-0033)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-034(2898-0034)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-035(2898-0035)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-036(2898-0036)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-037(2898-0037)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-038(2898-0038)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-039(2898-0039)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb.	Sichuan Rural Poor-Household Biogas Development	2	11/04/2013 - 10/04/2023	Yes

SCHHBG-2012-040(2898-0040)	Programme, CPA Nb. SCHHBG-XXX-XXX			
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-041(2898-0041)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-042(2898-0042)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-043(2898-0043)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-044(2898-0044)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-045(2898-0045)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-046(2898-0046)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-047(2898-0047)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-048(2898-0048)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb.	Sichuan Rural Poor-Household Biogas Development	2	11/04/2013 - 10/04/2023	Yes

SCHHBG-2012-049(2898-0049)	Programme, CPA Nb. SCHHBG-XXX-XXX			
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-050(2898-0050)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-051(2898-0051)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-052(2898-0052)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2012-053(2898-0053)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	11/04/2013 - 10/04/2023	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-054(2898-0054)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-055(2898-0055)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-056(2898-0056)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-057(2898-0057)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb.	Sichuan Rural Poor-Household Biogas Development	2	24/03/2014 - 23/03/2024	Yes

SCHHBG-2013-058(2898-0058)	Programme, CPA Nb. SCHHBG-XXX-XXX			
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-059(2898-0059)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-060(2898-0060)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-061(2898-0061)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-062(2898-0062)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-063(2898-0063)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-064(2898-0064)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-065(2898-0065)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-066(2898-0066)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb.	Sichuan Rural Poor-Household Biogas Development	2	24/03/2014 - 23/03/2024	Yes

SCHHBG-2013-067(2898-0067)	Programme, CPA Nb. SCHHBG-XXX-XXX			
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-068(2898-0068)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-069(2898-0069)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-070(2898-0070)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-071(2898-0071)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-072(2898-0072)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2013-073(2898-0073)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	24/03/2014 - 23/03/2024	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2014-074(2898-0074)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	01/02/2015 - 31/01/2025	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2014-075(2898-0075)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	01/02/2015 - 31/01/2025	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb.	Sichuan Rural Poor-Household Biogas Development	2	01/02/2015 - 31/01/2025	Yes

SCHHBG-2014-076(2898-0076)	Programme, CPA Nb. SCHHBG-XXX-XXX			
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2014-077(2898-0077)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	01/02/2015 - 31/01/2025	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2014-078(2898-0078)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	01/02/2015 - 31/01/2025	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2014-079(2898-0079)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	01/02/2015 - 31/01/2025	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2014-080(2898-0080)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	01/02/2015 - 31/01/2025	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2014-081(2898-0081)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	01/02/2015 - 31/01/2025	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2014-082(2898-0082)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	01/02/2015 - 31/01/2025	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2014-083(2898-0083)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	01/02/2015 - 31/01/2025	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2014-084(2898-0084)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	01/02/2015 - 31/01/2025	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb.	Sichuan Rural Poor-Household Biogas Development	2	01/02/2015 - 31/01/2025	Yes

SCHHBG-2014-085(2898-0085)	Programme, CPA Nb. SCHHBG-XXX-XXX			
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2014-086(2898-0086)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	01/02/2015 - 31/01/2025	Yes
Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-2014-087(2898-0087)	Sichuan Rural Poor-Household Biogas Development Programme, CPA Nb. SCHHBG-XXX-XXX	2	01/02/2015 - 31/01/2025	Yes

A.2. Coordinating/managing entity

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CME: Chengdu Oasis Science & Technology Co., Ltd.

Entity responsible for completing the CDM-PoA-MR-FORM: UPM Umwelt-Projekt-Management GmbH;

guog@upm-cdm.eu, fuyy@oasispower.cn

This entity is not the CME in Appendix 1.

SECTION B. Implementation of PoA

B.1. Description of implemented PoA

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The PoA is managed, implemented, operated and monitored by the Coordinating Entity (CME) Chengdu Oasis Science & Technology Co., Ltd.. The CME takes care of all CDM related tasks. This includes the writing of all related documents, quantitative calculation of emission reductions, the management of CDM related procedures like validation, registration and verification, and the allocation of CER revenues for the distribution to the farmers and the technical service network.

The technical implementation of the digesters, the operation of the service network, as well as all necessary surveys and monitoring are undertaken by the Sichuan Rural Energy Office and their subsidiaries, the city, county and village level Rural Energy Offices. After the CER revenue has been provided by the CME, the Sichuan Rural Energy Office also ensures the distribution of the revenues to the individual households and the service network.

Each CPA under the PoA has two CPA implementers:

- Chengdu Oasis Science & Technology Co., Ltd. (also acting as the CME)
- The Sichuan Rural Energy Office

To manage the PoA and all included CPAs, the CME is maintaining several databases that hold all relevant information related to the implementation of all CPAs and their households.

The CPA database comprises the number of each CPA and the contact data for the employee in the City REO that is responsible for each CPA management. A household database has been set up to manage the necessary household data for each CPA, incl. household ID, household name, City, County, Town, Village, Digester ID, construction date, finish date, etc.

These databases are kept as electronic versions by the CME and backed up regularly. All data acquired within this data recording system will be kept at least until two years after the end of the crediting period of the PoA.

B.2. Post-registration changes to PoA

B.2.1. Corrections

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(a) Corrections that have been notified to the secretariat as applicable from the period prior to this monitoring period;

N/A.

(b) Corrections that have been notified to the secretariat as applicable from this monitoring period.

N/A.

B.2.2. Inclusion of monitoring plan

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N/A. No inclusion of a monitoring plan to the registered PDD that was not included at registration has been made.

B.2.3. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools

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(a) Changes that have been approved by the Board for the periods prior to this monitoring period;

This PoA voluntary changes AMS-I.C. (version 19) to AMS-I.I. (version 04). Such post-registration change (PRC ref no: PRC-2898-001) has been approved⁴ by EB on 11 Dec 2017.

(b) Changes that have been approved by the Board for this monitoring period;

N/A.

B.2.4. Changes to programme design

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(a) Changes that have been approved by the Board for the periods prior to this monitoring period;

This PoA voluntary changes AMS-I.C. (version 19) to AMS-I.I. (version 04). Such post-registration change (PRC ref no: PRC-2898-001) has been approved by EB on 11 Dec 2017.

Therefore, in each CPA, AMS-III.R (version 02) and AMS-I.I (version 04) are applied.

(b) Changes that have been approved by the Board for this monitoring period;

N/A.

PART II Monitoring of CPAs

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⁴ <https://cdm.unfccc.int/PRCContainer/DB/prcp617554437/view>

SECTION C. Implementation of CPAs

C.1. Description of implemented CPAs

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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 1.

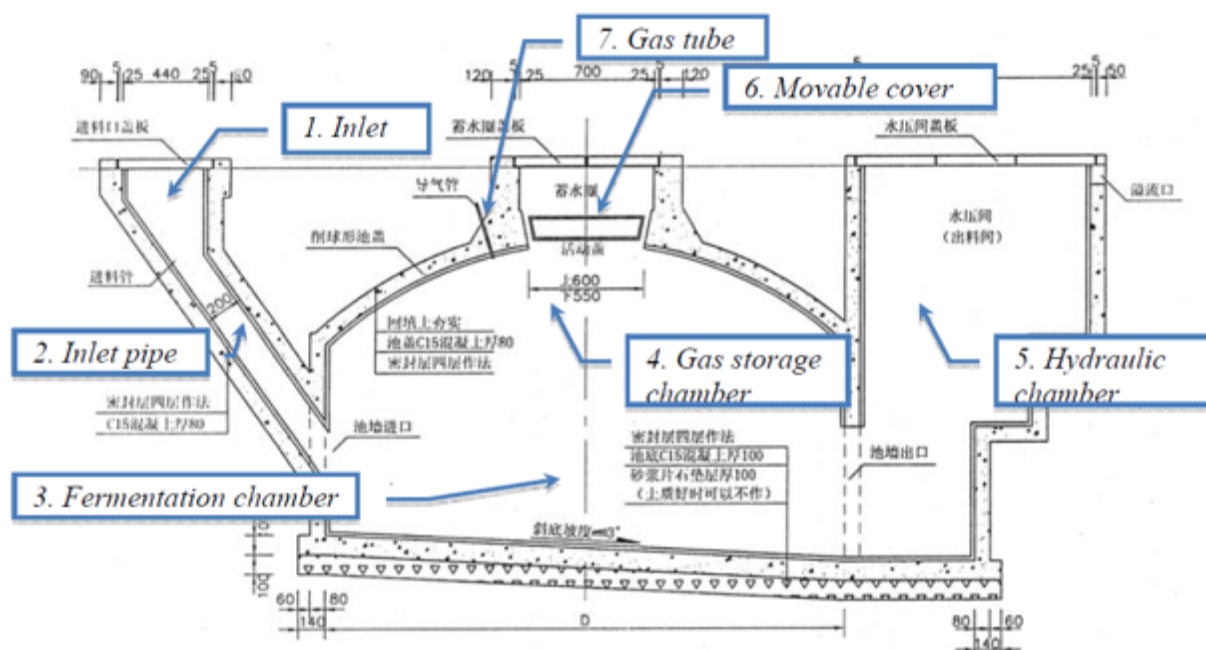


Figure 1: Typical design of a household biogas digester installed under the proposed PoA.

The technical flow is described in detail as follows:

a) Biogas generation and collection system

The design of biogas digesters is 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 m³, 8 m³ and 10 m³. All digesters constructed in Sichuan and included into the PoA follow either this standard or an applicable national or provincial revision or updated that replaced the current standard. The digesters are 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 Table 1.

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 Digesters
5.	NY/T 465-2001	Household-Scaled Biogas & Integrated Farming System-Specification on Design, Construction and Use for Southern Model
6.	NY/T1496.1-2007	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 3-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	Desulfurizer 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

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

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 is 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 is 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 reaches 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 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.

b) 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 is fed into a biogas stove that can be used for cooking purposes, and thereby replace coal as fuel. To allow a proper gas flow control and completely shut the gas pipe when the stove is switched of, a pressure gauge is 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 supports the participating households.

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

c) 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.

d) 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.

The ID numbers are given to the digesters by the Rural Energy Offices after the final check and are listed on the technical acceptance records. Digesters' ID numbers are given by local Rural Energy Offices independently and would overlap among different Counties. In order to guarantee that each ID number to each digester is unique, the City and County info are included to generate PoA Digester ID numbers for each digester. It means that, digesters' ID numbers are unique by identifying the PoA digester ID numbers, i.e. City – County – Digester ID. These PoA Digester ID numbers are unique to each digester and are used to clearly identify the single units for the PoA and this CPA.

Within the currently included 87 CPAs of this PoA, a total number of 395,435 households have been equipped with biogas digesters. This is same with targeted number. Therefore 100% of the planned number of digesters has been installed.

The digesters put into operation after the completion of construction. The table below indicates the dates of the start of construction of the first digester and the operation of the last digester for each CPA. The lifetime of household bio digester is 20 years according to the national standard GB/T 4750-2002 "Collection of standard design drawings for household anerobie digesters".

CPA Referenece Number	Start of Construction of the first digester	Operation Date of the last digester
2898-0001	10/12/2010	20/02/2011

CPA Referenece Number	Start of Construction of the first digester	Operation Date of the last digester
2898-0002	28/10/2010	10/07/2012
2898-0003	28/10/2010	28/07/2012
2898-0004	28/10/2010	14/08/2012
2898-0005	28/10/2010	15/08/2012
2898-0006	28/10/2010	13/06/2012
2898-0007	28/10/2010	30/12/2011
2898-0008	28/10/2010	29/12/2011
2898-0009	28/10/2010	03/06/2012
2898-0010	29/10/2010	04/06/2012
2898-0011	28/10/2010	20/06/2012
2898-0012	28/10/2010	19/07/2012
2898-0013	28/10/2010	06/07/2012
2898-0014	28/10/2010	14/12/2012
2898-0015	28/10/2010	22/12/2012
2898-0016	28/10/2010	12/07/2012
2898-0017	01/11/2010	11/09/2011
2898-0018	29/10/2010	27/11/2011
2898-0019	30/10/2010	08/06/2012
2898-0020	29/10/2010	30/12/2011
2898-0021	29/10/2010	30/12/2011
2898-0022	29/10/2010	20/12/2011
2898-0023	28/10/2010	27/12/2012
2898-0024	28/10/2010	12/11/2012
2898-0025	30/10/2010	29/12/2011
2898-0026	29/11/2010	07/12/2011
2898-0027	23/11/2010	29/12/2011
2898-0028	01/11/2010	15/03/2012
2898-0029	28/10/2010	05/09/2012
2898-0030	28/10/2010	29/04/2012
2898-0031	29/10/2010	09/12/2012
2898-0032	29/10/2010	27/12/2011
2898-0033	28/10/2010	08/09/2012
2898-0034	29/10/2010	27/08/2012
2898-0035	28/10/2010	23/12/2012
2898-0036	29/10/2010	30/07/2012
2898-0037	28/10/2010	20/12/2012
2898-0038	29/10/2010	18/12/2012
2898-0039	29/10/2010	30/12/2012
2898-0040	01/11/2010	24/09/2011
2898-0041	29/10/2010	08/12/2011
2898-0042	02/11/2010	30/07/2012
2898-0043	10/11/2010	03/07/2012
2898-0044	28/10/2010	30/08/2012
2898-0045	29/10/2010	30/08/2012
2898-0046	29/10/2010	10/12/2012

CPA Referenece Number	Start of Construction of the first digester	Operation Date of the last digester
2898-0047	28/10/2010	18/02/2012
2898-0048	28/10/2010	29/08/2012
2898-0049	28/10/2010	31/08/2012
2898-0050	29/10/2010	30/06/2012
2898-0051	29/10/2010	14/08/2012
2898-0052	29/10/2010	27/07/2012
2898-0053	28/10/2010	31/01/2012
2898-0054	01/11/2010	20/12/2012
2898-0055	02/11/2010	21/08/2012
2898-0056	22/11/2010	30/09/2012
2898-0057	29/10/2010	08/12/2012
2898-0058	29/10/2010	25/09/2012
2898-0059	02/11/2010	30/08/2012
2898-0060	05/11/2010	25/09/2012
2898-0061	02/11/2010	25/09/2012
2898-0062	29/10/2010	30/09/2012
2898-0063	30/10/2010	19/11/2012
2898-0064	28/10/2010	25/11/2012
2898-0065	29/10/2010	15/01/2013
2898-0066	19/05/2011	15/06/2013
2898-0067	01/10/2011	20/04/2013
2898-0068	29/10/2010	06/05/2013
2898-0069	29/10/2010	23/06/2013
2898-0070	21/02/2012	30/11/2012
2898-0071	29/10/2010	15/12/2012
2898-0072	29/10/2010	22/12/2012
2898-0073	29/10/2010	05/03/2013
2898-0074	29/10/2010	04/01/2013
2898-0075	27/07/2011	21/01/2014
2898-0076	01/11/2010	17/05/2014
2898-0077	03/10/2011	05/11/2013
2898-0078	13/08/2011	11/12/2013
2898-0079	21/02/2011	17/07/2013
2898-0080	28/07/2011	31/12/2013
2898-0081	29/10/2010	21/05/2014
2898-0082	10/08/2011	04/09/2014
2898-0083	30/10/2010	10/04/2014
2898-0084	29/10/2010	30/12/2013
2898-0085	29/10/2010	17/03/2014
2898-0086	06/11/2010	10/06/2014
2898-0087	06/11/2010	14/05/2014

1,000 units have been installed under CPA 2898-0001. 3,350 units have been installed under CPA 2898-0073. Under CPAs 2898-0002 to 2898-0072, and 2898-0074 to 2898-0087, 4,601 units have been installed each.

As indicated, these ID numbers are unique to each digester and are used to clearly identify the single units for the PoA and this CPA. In addition, the biogas systems for all involved households 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 CME on behalf of the CPA implementer and the participating households respectively, which could be verified through written statement from the implementer of the technology SREO. The double counting is avoided.

During the monitoring period, no events or situation that may impact the applicability of the applied methodology occurred. Furthermore, the ongoing operation of the CPAs has not been interrupted during the monitoring period.

The total emission reduction achieved during this monitoring period is 816,778 tCO₂e.

C.2. Location of CPAs

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The geographical boundary for the PoA is the administrative boundary of Sichuan province, China as shown in the following figure 2:



Figure 2: Location of the Sichuan Province in China.

All SSC-CPAs that will be included under the SSC-PoA will be within the defined geographical location of the SSC-PoA area and follow applicable national, provincial and/or sectoral policies and regulations in this region.

The list below shows each CPA and the city(ies) in which its households are located.

CPA reference number	City(ies)	Longitude	Latitude
2898-0001	Yibin	103° 36' - 105° 20' E	27° 50' - 29° 16' N
2898-0002	Yibin	103° 36' - 105° 20' E	27° 50' - 29° 16' N
2898-0003	Yibin	103° 36' - 105° 20' E	27° 50' - 29° 16' N
2898-0004	Yibin	103° 36' - 105° 20' E	27° 50' - 29° 16' N
2898-0005	Yibin	103° 36' - 105° 20' E	27° 50' - 29° 16' N
2898-0006	Yibin	103° 36' - 105° 20' E	27° 50' - 29° 16' N

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2898-0007	Yibin	103° 36' - 105° 20' E	27° 50' - 29° 16' N
2898-0008	Yibin	103° 36' - 105° 20' E	27° 50' - 29° 16' N
2898-0009	Yibin	103° 36' - 105° 20' E	27° 50' - 29° 16' N
2898-0010	Yibin	103° 36' - 105° 20' E	27° 50' - 29° 16' N
2898-0011	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0012	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0013	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0014	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0015	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0016	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0017	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0018	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0019	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0020	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0021	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0022	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0023	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0024	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0025	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0026	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0027	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0028	Guang'an	105° 57' - 107° 18' E	30° 01' - 30° 51' N
2898-0029	Guang'an	105° 57' - 107° 18' E	30° 01' - 30° 51' N
2898-0030	Guang'an	105° 57' - 107° 18' E	30° 01' - 30° 51' N
2898-0031	Guang'an	105° 57' - 107° 18' E	30° 01' - 30° 51' N
2898-0032	Suining	105° 03' - 106° 59' E	30° 10' - 31° 10' N
2898-0033	Suining	105° 03' - 106° 59' E	30° 10' - 31° 10' N
2898-0034	Suining	105° 03' - 106° 59' E	30° 10' - 31° 10' N
2898-0035	Dazhou	106° 40' - 108° 33' E	30° 19' - 32° 20' N
2898-0036	Ziyang	104° 11' - 105° 45' E	29° 41' - 30° 39' N
2898-0037	Ziyang	104° 11' - 105° 45' E	29° 41' - 30° 39' N
2898-0038	Ziyang	104° 11' - 105° 45' E	29° 41' - 30° 39' N
2898-0039	Ziyang	104° 11' - 105° 45' E	29° 41' - 30° 39' N
2898-0040	Ziyang	104° 11' - 105° 45' E	29° 41' - 30° 39' N
2898-0041	Ziyang	104° 11' - 105° 45' E	29° 41' - 30° 39' N
2898-0042	Meishan	102° 51' - 104° 30' E	29° 24' - 30° 22' N
2898-0043	Meishan	102° 51' - 104° 30' E	29° 24' - 30° 22' N
2898-0044	Meishan	102° 51' - 104° 30' E	29° 24' - 30° 22' N
2898-0045	Meishan	102° 51' - 104° 30' E	29° 24' - 30° 22' N
2898-0046	Neijiang	104° 16' - 105° 26' E	29° 11' - 30° 02' N
2898-0047	Leshan	102° 54' - 104° 15' E	28° 25' - 29° 56' N
2898-0048	Leshan	102° 54' - 104° 15' E	28° 25' - 29° 56' N
2898-0049	Zigong	104° 02' - 105° 16' E	28° 55' - 29° 38' N
2898-0050	Luzhou	105° 08' - 106° 28' E	27° 39' - 29° 20' N
2898-0051	Luzhou	105° 08' - 106° 28' E	27° 39' - 29° 20' N
2898-0052	Dazhou, Aba	100° 30' - 108° 33' E	30° 19' - 34° 19' N
2898-0053	Guang'an, Dazhou, Leshan	102° 54' - 108° 33' E	28° 25' - 32° 20' N

2898-0054	Luzhou	105° 08' - 106° 28' E	27° 39' - 29° 20' N
2898-0055	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0056	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0057	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0058	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0059	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0060	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0061	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0062	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0063	Suining	105° 03' - 106° 59' E	30° 10' - 31° 10' N
2898-0064	Neijiang	104° 16' - 105° 26' E	29° 11' - 30° 02' N
2898-0065	Leshan	102° 54' - 104° 15' E	28° 25' - 29° 56' N
2898-0066	Yibin	103° 36' - 105° 20' E	27° 50' - 29° 16' N
2898-0067	Guang'an	105° 57' - 107° 18' E	30° 01' - 30° 51' N
2898-0068	Guangan, Dazhou, Meishan, Leshan, Luzhou, Aba and Ganzi	97° 22' - 108° 33' E	27° 39' - 34° 20' N
2898-0069	Mianyang and Meishan	102° 51' - 105° 43' E	29° 24' - 33° 03' N
2898-0070	Mianyang and Neijiang	103° 45' - 105° 43' E	29° 11' - 33° 03' N
2898-0071	Yibin, Suining and Neijiang	103° 36' - 106° 59' E	27° 50' - 31° 10' N
2898-0072	Yibin and Ziyang	103° 36' - 105° 45' E	27° 50' - 30° 39' N
2898-0073	Ziyang and Zigong	104° 11' - 105° 16' E	29° 41' - 29° 38' N
2898-0074	Yibin	103° 36' - 105° 20' E	27° 50' - 29° 16' N
2898-0075	Mianyang	103° 45' - 105° 43' E	30° 42' - 33° 03' N
2898-0076	Dazhou	106° 40' - 108° 33' E	30° 19' - 32° 20' N
2898-0077	Ziyang	104° 11' - 105° 45' E	29° 41' - 30° 39' N
2898-0078	Ziyang	104° 11' - 105° 45' E	29° 41' - 30° 39' N
2898-0079	Meishan	102° 51' - 104° 30' E	29° 24' - 30° 22' N
2898-0080	Neijiang	104° 16' - 105° 26' E	29° 11' - 30° 02' N
2898-0081	Luzhou	105° 08' - 106° 28' E	27° 39' - 29° 20' N
2898-0082	Guang'an, Dazhou, Aba	100° 30' - 108° 33' E	30° 01' - 34° 19' N
2898-0083	Guang'an, Leshan	102° 54' - 107° 18' E	28° 25' - 30° 51' N
2898-0084	Leshan, Luzhou	102° 54' - 106° 28' E	27° 39' - 29° 56' N
2898-0085	Mianyang, Meishan, Luzhou	102° 51' - 106° 28' E	27° 39' - 33° 03' N
2898-0086	Yibin, Mianyang, Suining, Neijiang	103° 36' - 106° 59' E	27° 50' - 33° 03' N
2898-0087	Yibin, Ziyang, Zigong	103° 36' - 105° 45' E	27° 50' - 30° 39' N

C.3. Post-registration changes to CPAs

C.3.1. Temporary deviations from the monitoring plans in the included CPA-DDs, applied methodologies or standardized baselines

>>

N/A.

C.3.2. Corrections

>>

(a) Corrections that have been notified to the secretariat as applicable from the period prior to this monitoring period;

A correction was made for 2898-0002 to 2898-0053 during the first verification on the monitoring period (10 May 2012 - 05 Jun 2013).

The parameter $FC_{BL,y}$ and $FC_{PE,y}$ in the CPA-DDs of CPA 2898-0002 to CPA 2898-0053 should be the total coal consumption before and after installation for all the households in the entire CPA, but it was wrongly indicated as the average coal consumption per household in the original registered CPA-DDs. Therefore, a correction in the CPA-DDs of 2898-0002 to 2898-0053 was made, the value of $FC_{BL,y}$ and $FC_{PE,y}$ was corrected as the absolute coal consumption in the entire CPA. And the correction as a post –registration change was approved on 3rd Jan 2014.

In addition, above 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.I (version 04)⁵

(b) Corrections that have been notified to the secretariat as applicable from this monitoring period.
N/A.

C.3.3. Changes to the start date of the crediting period

>>

N/A. No changes to the start date of crediting period have been made.

C.3.4. Inclusion of monitoring plan

>>

N/A. No inclusion of a monitoring plan into the specific CPAs that was not included at registration has been made.

C.3.5. Permanent changes to the included monitoring plans, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools

>>

(a) Changes that have been approved by the Board for the periods prior to this monitoring period;

This PoA voluntary changes AMS-I.C. (version 19) to AMS-I.I. (version 04). Such post-registration change (PRC ref no: PRC-2898-001) has been approved⁶ by EB on 11 Dec 2017

(b) Changes that have been approved by the Board for this monitoring period;

N/A.

C.3.6. Changes to project design

>>

(a) Changes that have been approved by the Board for the periods prior to this monitoring period;

This PoA voluntary changes AMS-I.C. (version 19) to AMS-I.I. (version 04). Such post-registration change (PRC ref no: PRC-2898-001) has been approved by EB on 11 Dec 2017. Therefore, in each CPA, AMS-III.R (version 02) and AMS-I.I (version 04) are applied.

(b) Changes that have been approved by the Board for this monitoring period;

N/A.

⁵ The PoA voluntary changes AMS-I.C (version 19) to AMS-I.I. (version 04). Such post-registration change (PRC ref no: PRC-2898-001) has been approved by EB on 11 Dec 2017. See the link: <https://cdm.unfccc.int/PRCContainer/DB/prcp617554437/view>

⁶ <https://cdm.unfccc.int/PRCContainer/DB/prcp617554437/view>

SECTION D. Description of monitoring system of CPAs

>>

Apart of standard values and official publications, e.g. for annual average temperature and fuel NCVs, etc. The monitoring for this PoA contains a statistical survey of households that provides a representative sample for all CPAs.

For the monitoring of the PoA, a single sampling survey covers all included CPA. The management of this sampling survey happens on a central level:

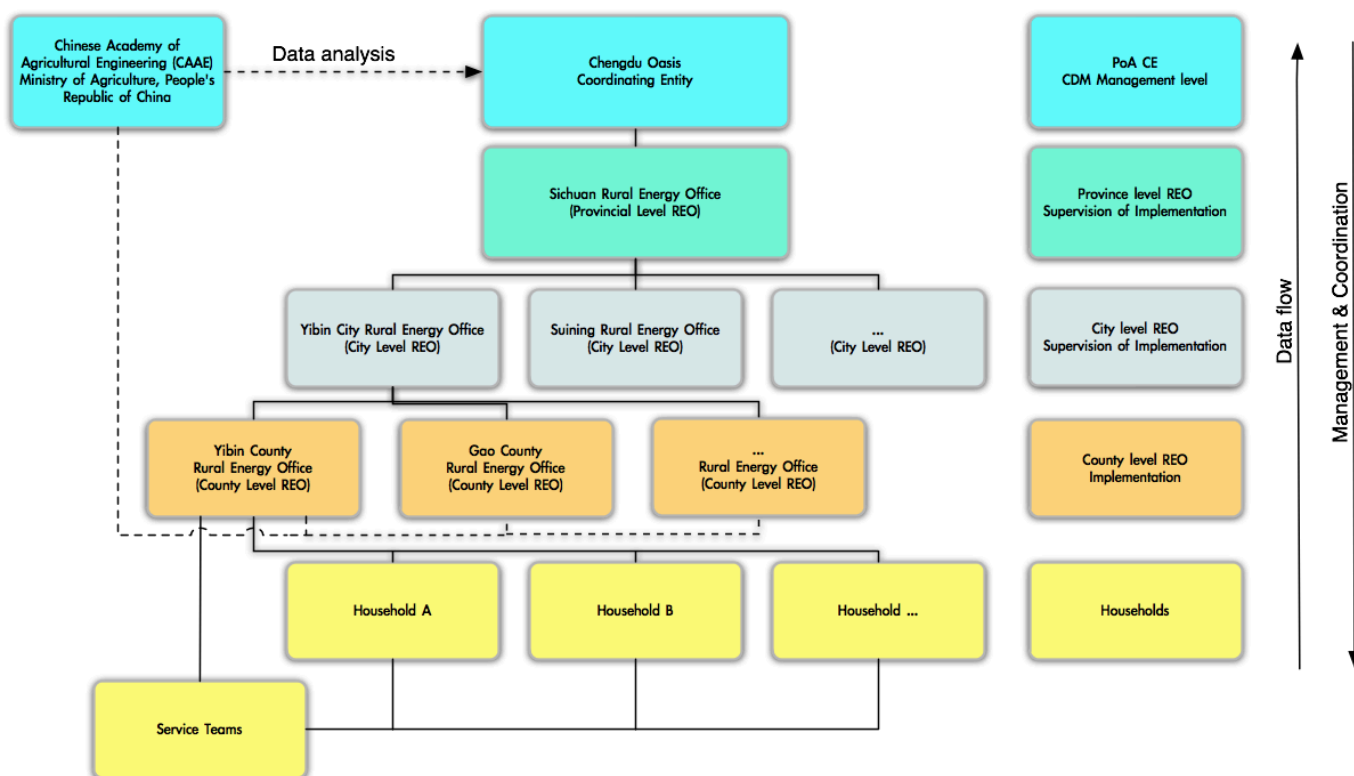


Figure 3: Collection and transferring of the household data to the CME for further analysis.

Using a central online platform, the CME determines the households to be included in the sampling using a simple random approach and submits the household references to the local data collectors. The local staff members of the Sichuan Rural Energy Office then visit the households and collect the required data. Using the same platform, the data is then typed into the database and transferred back to the CME that analyses the information and provides the collected data to the CDM Team to calculate the emission reduction.

The whole process of data collection is supervised by the responsible project manager at the CME.

In a second step, the outcome of the sampling survey is used to calculate the emission reduction for each CPA and prepare the monitoring report. This is done by a fully automated database system.

Both platforms, the web-interface for the local data collectors as well as the emission reduction calculation software are saved in a backup system regularly. A schematic diagram of the IT system can be seen in Figure 4:

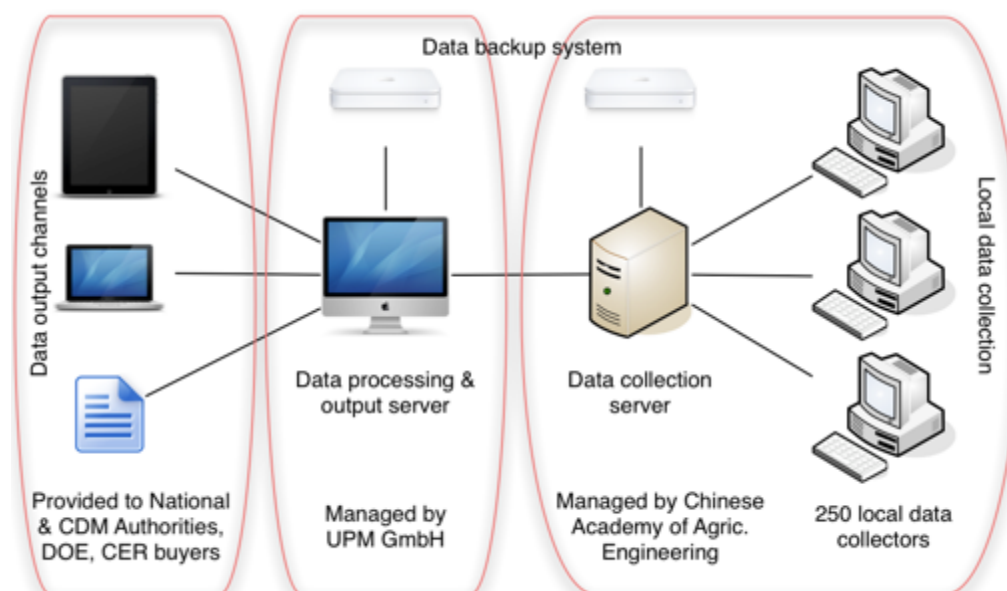


Figure 4: The IT system to collect and analyze the monitoring survey data.

SECTION E. Data and parameters

E.1. Data and parameters fixed ex ante

(Copy this table for each data or parameter.)

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

Data / Parameter:	$B_{0,LT}$
Unit:	m ³ CH ₄ kg ⁻¹
Description:	Maximum methane producing capacity for manure produced by livestock, of VS excreted.
Source of data:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, and Chapter 10, Table 10A-7 (swine).
Value(s) applied:	0.29

Choice of data or measurement methods and procedures	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.
Purpose of data:	Calculation of baseline & project emissions.
Additional comment:	N/A

Data / Parameter:	GWP_{CH_4}
Unit:	1
Description:	Global Warming Potential for CH ₄ .
Source of data:	para. 66 of EB69 meeting report
Value(s) applied:	25 from 01/01/2013 onwards
Choice of data or measurement methods and procedures	Default value
Purpose of data:	Calculation of baseline & project emissions.
Additional comment:	N/A

Data / Parameter:	D_{CH_4}
Unit:	kg/m ³
Description:	Conversion factor of m ³ CH ₄ to kilogram CH ₄ .
Source of data:	2006 IPCC guidelines, Volume 4, Chapter 10, Page 10.42.
Value(s) applied:	0.67
Choice of data or measurement methods and procedures	Default value
Purpose of data:	Calculation of baseline & project emissions.
Additional comment:	N/A

Data / Parameter:	UF_b
Unit:	
Description:	Model correction factor to account for model uncertainties (0.94)
Source of data:	Methodology AMS III.D
Value(s) applied:	0.94
Choice of data or measurement methods and procedures	Default value
Purpose of data:	Calculation of baseline & project emissions.
Additional comment:	N/A

E.2. Data and parameters monitored

(Copy this table for each data or parameter.)

Data / Parameter:	$FC_{BL,k,j}$
Unit:	Tonnes
Description:	Annual consumption of baseline fossil fuel j
Measured/ Calculated / Default:	Calculated
Source of data:	Comprehensive baseline survey.
Value(s) monitored parameter:	of 0.987*0.89
Monitoring equipment:	N/A. 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. According to the sampling description in I.6.3 of POA DD, the mean value of $FC_{BL,k,j}$ is 0.987t. The relative error is 1.51% at the 95% confidence level. The value obtained 0.987t will multiply by 0.89 to account for uncertainties, i.e. 0.987t *0.89.
Measuring/ Reading/ Recording frequency:	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.
Calculation method (if applicable):	-
QA/QC procedures:	This data on annual baseline fuel consumption obtained from households has been cross-checked with purchase receipt(s) submitted by the household. The data collected through sample-based measurements complies 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".
Purpose of data:	Calculation of baseline emissions
Additional comment:	

Data / Parameter	$FC_{m,j}$
Unit	Tonnes
Description	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.
Measured/ Calculated / Default	Calculated

Source of data	Monitoring survey.
Value(s) monitored parameter of	0.02513*1.12
Monitoring equipment	Data has been 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. According to monitoring survey, the mean value is 0.02513t. The relative error is 7.5% at the 95% confidence level. The value obtained 0.02513t will multiply by 1.12 to account for uncertainties, i.e. 0.02513t *1.12.
Measuring/ Reading/ Recording frequency	annually
Calculation method (if applicable)	-
QA/QC procedures	As per paragraph 11 of AMS I.I (version 04), the difference between $FC_{BL,k,j}$ and $FC_{m,j}$ have been cross-checked with biogas generation estimated as per relevant national standard. One 8m ³ biogas digester would generate biogas 385m ³ annually ⁷ , the heat efficiency of biogas stove is above 55% as per GB/T 3606-2001 (Domestic Biogas Stove), the heat efficiency of coal stove ⁸ is 20%. The NCV ⁹ of coal is 5,000 kcal per kg, while the NCV ¹⁰ of biogas is also 5,000 kcal per m ³ . Therefore, The amount of coal replacement is calculated as: $385m^3 * 5,000kcal/m^3 * 55\% / (5,000kcal/kg * 20\%) = 1,058.75kg$ This value is larger than the the coal replacement with biogas in this monitoring period (850.28kg) ¹¹ and reasonable. When biennial inspection is chosen, a 95% confidence interval and 10% margin of error requirement shall be achieved for the sampling parameter.
Purpose of data/parameter	Calculation of project emissions
Additional comments	

Data / Parameter	$N_{k,0}$
Unit	1
Description	Number of thermal applications k commissioned.

⁷ National rural biogas project construction plan (2006-2010), refer to the link:
http://jiuban.moa.gov.cn/zwl/m/tzgg/tz/200704/t20070418_805366.htm

⁸ Coal stove test report

⁹ China Energy Statistics Yearbook 2016

¹⁰ China Energy Statistics Yearbook 2016

¹¹ See ER sheet for details

Measured/ Calculated / Default	Calculated
Source of data	Commission record
Value(s) of monitored parameter	2898-0001: 1,000 2898-0073: 3,350 All other CPAs: 4,601 The total number for the 87 CPAs during this monitoring period is 395,435.
Monitoring equipment	After the installation of the bio-digesters and biogas stoves, they have been inspected as acceptance testing (commissioning) for proper operation in compliance with specifications. The acceptance check date of each subsystem has been recorded.
Measuring/ Reading/ Recording frequency	Once at the time of commission
Calculation method (if applicable)	-
QA/QC procedures	The systems are operated in compliance with manufacturer required maintenance
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	

Data / Parameter	$n_{k,y}$
Unit	%
Description	Proportion of $N_{k,0}$ that remain operating at year y (fraction)
Measured/ Calculated / Default	Calculated
Source of data	Monitoring sampling study
Value(s) of monitored parameter	99.5%
Monitoring equipment	N/A. The CME inspects that the biogas units are operational and in compliance with the required maintenance procedures from the manufacturers annually during the crediting period. Monitoring has been 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. 200 households have been randomly selected for interview and the interview was recorded in a form of questionnaire. According to the Survey list of the 200 samples and the questionnaire papers, 199 of all sampled 200 biogas digesters and stoves were under operation, the operation rate is 99.5%

Measuring/ Reading/ Recording frequency	Annually
Calculation method (if applicable)	-
QA/QC procedures	The systems are operated in compliance with manufacturer required maintenance at least once every two years (biennial) during the crediting period. 200 households have been randomly selected for interview and visited one by one by local REOs. The operation of all 200 household biogas digesters and stoves have been inspected by local REOs and recorded in questionanrie, which was signed by each visiting household and local REO, respectively.
Purpose of data/parameter	
Additional comments	

Data / Parameter	$N_{m,y}$
Unit	1
Description	Number of thermal application m remaining in use in year y Here, m refers to coal stove.
Measured/ Calculated / Default	Calculated
Source of data	Monitoring sampling study
Value(s) of monitored parameter	2898-0001: 1,000 2898-0073: 3,350 All other CPAs: 4,601 The total number for the 87 CPAs during this monitoring period is 395,435.
Monitoring equipment	N/A. Sampling monitoring survey with a sampling size determined following the latest guidelines and the applied methodologies. The CME inspects that the coal stoves remaining in use in year y, in compliance with the required maintenance procedures from the manufacturers annually during the crediting period. All 200 sampled households have coal stoves in use. Monitoring has been 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.
Measuring/ Reading/ Recording frequency	Annually
Calculation method (if applicable)	-

QA/QC procedures	This monitoring parameter is determined through a comprehensive monitoring survey that follows the latest guidelines of the EB “the <i>Standard For Sampling And Surveys For CDM Project Activities And Programme Of Activities</i> ”, with the level of confidence at least 95%, while the acceptable error is 10%.
Purpose of data/parameter	Project emissions calculation
Additional comments	

Data / Parameter:	t
Unit:	hours
Description:	Mean annual operation hours of the digesters.
Measured/ Calculated / Default:	The figure is obtained through a sampling monitoring survey. 200 households have been randomly selected for interview and visited one by one by local REOs. 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.) are recorded and with this input, the final value can be calculated.
Source of data:	Monitoring sampling survey
Value(s) of monitored parameter:	8,562.24(= operational days 356.76 * 24 hours per day)
Monitoring equipment:	
Measuring/ Reading/ Recording frequency:	Annually
Calculation method (if applicable):	
QA/QC procedures:	<p>200 households have been randomly selected for interview and visited one by one by local REOs. The annual operation hours of all 200 household biogas digesters have been inspected by local REOs and recorded in questionanrie, which was signed by each visiting household and local REO, respectively.</p> <p>According to monitoring survey, the mean value is 8,562.24(= operational days 356.76 * 24 hours per day). The relative error is 1.06% at the 95% confidence level, in line with EB requirement “the <i>Standard For Sampling And Surveys For CDM Project Activities And Programme Of Activities</i>”, with the level of confidence at least 95%, while the acceptable error is 10%.</p>
Purpose of data:	None. The parameter is required to be monitored by the methodology without being used in any calculation.
Additional comment:	

Data / Parameter:	T
Unit:	°C
Description:	Mean annual temperature in city k. This parameter determines the emission factors of the existing manure management systems.
Measured/ Calculated / Default:	This value is obtained each year from the latest officially published data available. City-specific data is taken to guarantee a precise and suitable value to be applied for each manure management system.
Source of data:	Sichuan Statistical Yearbook of 2017, listing annual average temperatures for the year 2016.
Value(s) monitored parameter:	of Bazhong: 17.9 Chengdu: 16.8 Dazhou: 18.5 Deyang: 17.4 Guang'an: 17.7 Guangyuan: 16.6 Kangding: 8.4 Leshan: 18.6 Luzhou: 18.3 Maerkang: 9.5 Meishan: 18.2 Mianyang: 17.9 Nanchong: 17.8 Neijiang: 18.0 Panzhihua: 20.8 Suining: 18.0 Xichang: 17.6 Yaan: 17.1 Yibin: 19.0 Zigong: 18.8 Ziyang: 18.1
Monitoring equipment:	
Measuring/ Reading/ Recording frequency:	Annually
Calculation method (if applicable):	
QA/QC procedures:	This data is taken from the latest available official publication.
Purpose of data:	Calculation of baseline & project emissions.
Additional comment:	

Data / Parameter:	$MCF_{j,k}$
Unit:	%
Description:	Methane conversion factors for each manure management system j in climate region k.

Measured/ Calculated / Default:	This value is 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 is applied for such cases. The value applied is chosen depending on the mean annual temperature (Parameter ID M04 of the registered PoA-DD) in the specific climate region for each manure management system.
Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, Volume 4, Chapter 10, Table 10.17. The mean annual temperature refers to Sichuan Statistical Yearbook of 2017, listing annual average temperatures for the year 2016.
Value(s) of monitored parameter:	Bazhong: 35 Chengdu: 32 Dazhou: 39 Deyang: 32 Guang'an: 35 Guangyuan: 32 Kangding: 17 Leshan: 39 Luzhou: 35 Maerkang: 17 Meishan: 35 Mianyang: 35 Nanchong: 35 Neijiang: 35 Panzhuhua: 46 Suining: 35 Xichang: 35 Yaan: 32 Yibin: 39 Zigong: 39 Ziyang: 35
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	Annually
Calculation method (if applicable):	-
QA/QC procedures:	This data is taken from the latest available official publication.
Purpose of data:	Calculation of baseline emissions.
Additional comment:	

Data / Parameter:	N _{LT,y}
Unit:	1
Description:	Annual average number of animals of type LT in year y (numbers).

Measured/ Calculated / Default:	The number of animals is determined based on the number of pigs per households and the number of households in a given CPA.
Source of data:	Monitoring sampling survey
Value(s) of monitored parameter:	4.17.
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	Annually
Calculation method (if applicable):	-
QA/QC procedures:	200 households have been randomly selected for interview and visited one by one by local REOs. The annual average pig number of each household in the monitoring period has been inspected by local REOs and recorded in questionnaire, which was signed by each visiting household and local REO, respectively. According to monitoring survey, the mean value is 4.17. The relative error is 7.33% at the 95% confidence level.
Purpose of data:	Calculation of baseline & project emissions.
Additional comment:	

Data / Parameter:	$MS\%_{i,y}$
Unit:	1
Description:	Fraction of manure handled in project animal manure management system i (i.e. digestion in the newly installed biogas digester)
Measured/ Calculated / Default:	Calculated
Source of data:	Monitoring sampling survey
Value(s) of monitored parameter:	100%
Monitoring equipment:	N/A. The CPA only covers one animal manure management system, i.e. the newly built biogas digester. According to monitoring survey, all the manure generated has been fed into biogas digesters directly. The amount of pig manure fed into the biogas digesters is same to what the pig manure generated.
Measuring/ Reading/ Recording frequency:	Annually
Calculation method (if applicable):	-

QA/QC procedures:	<p>200 households have been randomly selected for interview and visited one by one by local REOs. The fraction of manure treated in the biogas digester of each household in the monitoring period has been inspected by local REOs and recorded in questionnaire, which was signed by each visiting household and local REO, respectively.</p> <p>According to monitoring survey, all of 200 sampled households have 100% of manure treated in biogas digesters during the monitoring period.</p>
Purpose of data:	Calculation of project emissions.
Additional comment:	

Data / Parameter:	Proper sludge application ratio
Unit:	N/A
Description:	Land application of digestate from biogas digesters to avoid anaerobic digestion.
Measured/ Calculated / Default:	<p>200 households have been randomly selected for interview and visited one by one by local REOs. The sludge application measures in the biogas digester of each household in the monitoring period has been inspected by local REOs and recorded in questionnaire, which was signed by each visiting household and local REO, respectively.</p> <p>By interviewing the sample households, a factor of correct sludge application (not resulting in methane emissions) is 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 is determined to reduce the claimed emission reductions by the share of households that did not apply the sludge according to the requirements.</p>
Source of data:	Monitoring sampling survey
Value(s) of monitored parameter:	100%
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	Annually
Calculation method (if applicable):	-
QA/QC procedures:	This monitoring parameter is determined through a comprehensive monitoring survey that follows the latest guidelines of the EB “the <i>Standard For Sampling And Surveys For CDM Project Activities And Programme Of Activities</i> ”, with the level of confidence at least 95%, while the acceptable error is 10%.

Purpose of data:	Calculation of baseline & project emissions.
Additional comment:	

Data / Parameter:	$EF_{CO_2,i,y}$
Unit:	tCO ₂ /TJ
Description:	Emission Factor of raw coal
Measured/ Calculated / Default:	National publications of emission factors are followed every monitoring period. If the Chinese DNA should publish updated or changed data, this value is updated.
Source of data:	Official data from Chinese DNA: http://cdm.ccchina.gov.cn/archiver/cdmcn/UpFile/Files/Default/20160606120704298103.pdf
Value(s) of monitored parameter:	87.30
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	Annually
Calculation method (if applicable):	-
QA/QC procedures:	Official national data is applied
Purpose of data:	Calculation of baseline & project emissions.
Additional comment:	

Data / Parameter:	$NCV_{i,y}$
Unit:	GJ/t
Description:	Net Calorific Value of raw coal
Measured/ Calculated / Default:	National publications for the Net Calorific Value are followed every monitoring period. If the Chinese DNA should publish updated or changed data, this value is updated.
Source of data:	Official data from Chinese DNA: http://cdm.ccchina.gov.cn/archiver/cdmcn/UpFile/Files/Default/20160606120704298103.pdf
Value(s) of monitored parameter:	20.908
Monitoring equipment:	-

Measuring/ Reading/ Recording frequency:	Official data publications are 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.
Calculation method (if applicable):	-
QA/QC procedures:	Official national data is applied
Purpose of data:	Calculation of baseline & project emissions.
Additional comment:	

SD Monitoring:

No	1	
Indicator	Air quality	
Mitigation measure		
Chosen parameter	Smoke quantity in the kitchen while cooking	
Current situation of parameter	Smoke from the combustion of coal or fuel wood for cooking is released into kitchen. The index is 0.43 based on the interview with households after digester construction	
Estimation of baseline situation of parameter	The index is 2.57 based on the interview with households before digester construction	
Future target for parameter	The quantity of smoke in the kitchen is decreased.	
Way of monitoring	How	Householders have been interviewed to compare and comment the smoke quantity in the kitchen along with ER monitoring survey. During the monitoring survey visit, each sampled household was interviewed on this parameter as "Do you have a lot of smoke in the kitchen while cooking? (3= a lot of smoke very often; 2=lots of smoke sometimes; 1=just a little smoke; 0=no smoke)" before and after digester construction and normally answered by the housewife who cooks in the kitchen. The monitoring result of this SD indicator is calculated as the average of the chosen index of each sampled household. The indices are 2.57 and 0.43 before and after bio digester installation, respectively. It reached the target in the GS passport, i.e. the quantity of smoke in the kitchen is decreased.
	When	May 2017
	By who	Assigned by local REO

No	2	
Indicator	Livelihood of the poor	
Mitigation measure		
Chosen parameter	Average annual amount of money spent by one household to buy coal	
Current situation of parameter	Householders spent less money on coal	
Estimation of baseline situation of parameter	Householders spent money on coal	
Future target for parameter	Householders spent less money on coal with bio digesters implementation.	
Way of monitoring	How	<p>Householders have been interviewed about the change of the cost for coal along with ER monitoring survey.</p> <p>During the monitoring survey visit, each sampled household was interviewed on this parameter as “<i>How is the expenditure of coal changed, compared with the situation without bio digester? (3= almost same; 2=decreased; 1=increased)</i>”.</p> <p>The monitoring result of this SD indicator is calculated as the average of the chosen index of each sampled household. The monitoring result of this SD indicator is 2, which shows the expenditure on coal is decreased compared with the situation without bio digester.</p> <p>It reached the target in the GS passport, i.e. households spent less money on coal after the implementation of bio digesters.</p>
	When	May 2017
	By who	Assigned by local REO
Chosen parameter	Frequency of illness	
Current situation of parameter	Households got less diseases with bio digesters implementation	
Estimation of baseline situation of parameter	Householders got some kinds of diseases due to indoor air pollution.	
Future target for parameter	The frequency of illness of householders will be decreased.	
Way of monitoring	How	<p>Householders have been interviewed about the frequency of illness along with ER monitoring survey</p> <p>During the monitoring survey visit, each household was interviewed on this parameter as “<i>Do you suffer from this kind of disease, e.g. cough, headache, eyes infection, etc? (3=very often; 2=often; 1=sometimes; 0=never)</i>” and normally answered by the housewife who cooks.</p> <p>The monitoring result of this SD indicator is calculated as the average of the chosen index of each sampled household.</p> <p>The monitoring result of this SD indicator is calculated as the average of the chosen index of each sampled</p>

		household. The indices are 1.39 and 0.36 before and after bio digester installation, respectively. It reached the target in the GS passport, i.e. the frequency of illness of householders is decreased.
	When	May 2017
	By who	Assigned by local REO
Chosen parameter		Sanitation condition of toilet and pig pen in the households
Current situation of parameter		Sanitation condition of toilet and pig pen in the households is improved
Estimation of baseline situation of parameter		Sanitation condition of toilet and pig pen in the households is bad.
Future target for parameter		Sanitation condition of toilet and pig pen in the households will become better.
Way of monitoring	How	Householders have been interviewed about the sanitation condition along with ER monitoring survey During the monitoring survey, households were interviewed with the sanitation conditions of toilet and pig pen before and after the implementation of bio digesters, e.g. <i>is there any manure going to river outside the barn? (0=yes, 1=no); Floor of toilet (1=cement;2=stone or bricks;3=soil piling; 4=wood laths); Any Roof of toilet? (0=yes, 1=no); is floor of animal barn made of cement? (0=yes, 1=no); Any fence wall of animal barn? (0=yes, 1=no); People can enter home without going through animal barns (0=yes, 1=no); etc.</i> The monitoring index difference of each sampled household for each question above, i.e. the index after the implementation of digester minus the index before the implementation of digester, has been performed. It's found that for each question above, the monitoring index difference of each sampled household does not exceed zero, it means for each sampled household, the sanitation conditions of toilet and pig pen mentioned in the questions above, have been improved after the implementation of the project and the target of the parameter has been reached.
	When	May 2017
	By who	Assigned by local REO

No	3
Indicator	Access to affordable and clean energy services
Mitigation measure	
Chosen parameter	Change in traditional fuel consumption (% of total energy requirements)
Current situation of parameter	Less traditional fuel (coal and fuel wood) is consumed for household's daily life

Estimation of baseline situation of parameter		Households consumed the traditional fuel (coal and fuel wood) for daily life.
Future target for parameter		The ration of traditional fuel consumption will be decreased.
Way of monitoring	How	Households have been interviewed about the % of traditional fuel in the total energy requirement along with ER monitoring survey During the monitoring survey visit, each sampled household was interviewed on this parameter as: <i>“How is the consumption of coal changed, compared with the situation without bio digester? (3= almost same; 2=decreased; 1=increased)”</i> ; <i>“How is the consumption of firewood changed, compared with the situation without bio digester? (3= almost same; 2=decreased; 1=increased)”</i> ; <i>“How is the consumption of electricity changed, compared with the situation without bio digester? (3= almost same; 2=decreased; 1=increased)”</i> ; The monitoring result of this SD indicator is calculated as the average of the chosen index of each sampled household. The monitoring result of this SD indicator is 2, which shows the consumption of coal/firewood/electricity is decreased compared with the situation without bio digester. It reached the target in the GS passport, i.e. The ration of traditional fuel consumption will be decreased
	When	May 2017
	By who	Assigned by local REO

No	4	
Indicator	Human and institutional capacity	
Mitigation measure		
Chosen parameter	Number of Households trained to use biogas and know the basic maintenance of digesters and biogas stoves	
Current situation of parameter	All the involved households had the training about the biogas use	
Estimation of baseline situation of parameter	None would accept training	
Future target for parameter	A number of households will accept the training about the use of biogas.	
Way of monitoring	How	Householders have been interviewed about the training on the use of biogas along with ER monitoring survey During the monitoring survey visit, each sampled household was interviewed on this parameter as: <i>“Have you got the training on the use of biogas and basic knowhow of maintenance of digesters and biogas stove? (1=Yes, 2=No)”</i>

		<p>The monitoring result of this SD indicator is calculated as the average of the chosen index of each sampled household. The monitoring result of this SD indicator is 1, which shows all the sampled households have received such training.</p> <p>The target of this parameter has been reached.</p> <p>Training materials about the use of bio-digesters and biogas stove have been provided to the DOE.</p>
	When	May 2017
	By who	Assigned by Local REO

No	5	
Indicator	Quantitative employment and income generation	
Mitigation measure		
Chosen parameter	Quantitative employment and income generation	
Current situation of parameter	Technicians who were employed in the bio digesters construction have got the income	
Estimation of baseline situation of parameter	None would be employed and no income would be generated in the baseline scenario	
Future target for parameter	Technicians who participated the construction of bio digesters will get income	
Way of monitoring	How	<p>For the digesters construction in the 87CPAs, technicians have been paid for the digesters construction after the acceptance check of digesters by the local REOs. The payment record has been delivered to the DOE for verification.</p> <p>During the monitoring survey, SREO provided the C/ME a list of technicians who participated the digesters construction. Based on the list, twenty technicians were randomly selected and interviewed by the C/ME by Phone and got that they have got income from the construction of digesters.</p>
	When	May 2017
	By who	SREO, local REOs and C/ME

Implementation of continuous input /grievance mechanism

In order to attract more active and continuous stakeholders and get more stakeholder feedback, the CME proposed the three methods of continuous input & grievance expression:

- 1) Comment book. It's available at the reception room of each involved local rural energy office. All stakeholders have access to provide feedback on comment books. The contact information of Sichuan Rural energy office is listed on the first page of the comment book for each local office.
- 2) Telephone access. Stakeholders can also provide comments via phone. The telephone number of Sichuan Rural energy office (Contact info: Song Yumin, Sichuan rural energy office, 028-85534729) is provided to contact.

3) Internet/email access. Email address of Sichuan Rural energy office is provided as well for stakeholders to provide comments in the internet. Contact info: Song Yumin, Sichuan rural energy office, scnnjnjp@163.com.

4) Access to Gold Standard. Emails (info@goldstandard.org) as well as the GS telephone number +41 (0) 22 788 7080 has been published as well for stakeholder's comments.

During this monitoring period, no comments were received via comment book, telephone and email access.

E.3. Implementation of sampling plan

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All the covered CPAs 2898-0001 to 2898-0087 have this single sampling plan.

A. Sampling objective

The objective of sampling effort is to obtain unbiased and reliable estimates of the mean value of parameters used in the calculations of greenhouse gas emission reductions as follows:

- Annual consumption of fossil fuel type j coal (physical units, mass/volume) by application m ($FC_{m,j}$);
- Proportion of $N_{k,0}$ that remain operating at year y (fraction) ($n_{k,y}$);
- Number of thermal application m remaining in use in year y ($N_{m,y}$);
- Mean annual operation hours of the digesters (t);
- Annual average number of animals of type LT in year y (numbers). ($N_{LT,y}$);
- Fraction of manure handled in project animal manure management system i (i.e. digestion in the newly installed biogas digester) ($MS\%_{i,y}$);
- Land application of digestate from biogas digesters to avoid anaerobic digestion (Proper sludge application ratio);

B. Target population

The target population is the whole households in the proposed PoA which includes the households in the 13 regions, who replace their original pit manure management by household biogas digester system and replace their original cooking coal consumption by biogas.

For the included households of all CPAs in the 13 regions of Sichuan, they are located in as similar and limited area, have similar food and heating habits and availability of fuel used, have similar climatic conditions and similar animal raising habits as well as similar pit storage of manure, etc. It indicates that the entire households population is relatively homogeneous.

C. Sample Method

Simple Radom Sampling (SRS) method is to be adopted at PoA level. Sampling frame is the full list households included under the PoA.

The unbiased estimation of total value and mean value are:

$$\bar{y} = \frac{1}{n} \sum_{i=1}^n y_i \tag{D.1}$$

$$p = \frac{a}{nm} \tag{D.2}$$

The unbiased variation estimators of $V(\bar{y})$ and $V(p)$ with a sufficiently small f are:

$$v(\bar{y}) = \frac{1-f}{n} s^2 = \frac{1-f}{n(n-1)} \sum_{i=1}^n (y_i - \bar{y})^2 \approx \frac{1}{n(n-1)} \sum_{i=1}^n (y_i - \bar{y})^2 \tag{D.3}$$

$$v(p) = \frac{1-f}{n-1} p(1-q) \approx \frac{1}{n-1} p(1-q) \tag{D.4}$$

Relative error of the sample is to be calculated by formula:

$$r = t_{0.05} \frac{\sqrt{v(\bar{y})}}{\bar{y}} \tag{D.7}$$

Where:

<i>n</i>	<i>Sample size</i>
<i>f</i>	<i>Sampling fraction</i>
<i>N</i>	<i>Total size of population</i>
<i>s</i>	<i>Standard error</i>
<i>v</i>	<i>Variation of Sample</i>
<i>y_i</i>	<i>Observation of a sample household</i>
<i>ȳ</i>	<i>Mean value of sample</i>
<i>p</i>	<i>Proportion of the sample</i>
<i>q</i>	<i>Equals to 1-p</i>
<i>r</i>	<i>Relative error. Default is 10%.</i>
<i>t_{0.05}</i>	<i>1.96</i>

D. Sample Size

Step 1: Confidence/precision

The proposed PoA adopts the methodologies AMS I.I and AMS III.R. It is defined in *Standard For Sampling And Surveys For CDM Project Activities And Programme Of Activities, version 4* that a confidence/precision of 95/10 should be used if one survey covers several CPAs. Since this is the highest confidence/precision mentioned in the applied methodologies and standards, these values shall be used for the sample size calculation.

Step 2: Initial Sample size

For mean value, the following formula is to calculate the initial sample size *n₀*:

$$n_0 = \frac{t^2 S^2}{r^2 \bar{Y}^2} \tag{E.1}$$

To determine population parameter *S²* and *Ȳ²*, the following options can be taken: (a) taking a small scale SRS pre-survey, or (b) reference of similar survey, or (c) double sampling scheme.

Where,

<i>S</i>	<i>Standard error of sample</i>
<i>Ȳ</i>	<i>Mean value of sample</i>

r	<i>Relative error. Default is 10%.</i>
$t_{0.05}$	1.96

The small scale SRS pre-survey for this PoA was conducted in Apr 2011 by Sichuan Rural Energy Office and had statistical analysis by C/ME. 30 households with installed biogas digesters are randomly selected to survey on the annual operation hours of biogas system, annual average pig numbers, sludge application rate and rate of digesters still in operation, by visiting each sampled household.

For the sampling of the number of pigs and the annual digester operation hours, according to pre-survey data, the following parameters are estimated (for the application of equation E.1):

- Number of pigs: Mean: $\bar{Y} = 5$ pigs; Standard Deviation: $S = 3$ pigs
- Annual operation hours: $\bar{Y} = 8,400$ h; Standard Deviation: $S = 1,200$ h

With application of equation E.1, the initial sample size n_0 is calculated as:

Number of pigs:

$$n_0 = \frac{t^2 S^2}{r^2 \bar{Y}^2} = \frac{1.96^2 3^2}{0.1^2 5^2} \approx 139$$

Annual operation hours:

$$n_0 = \frac{t^2 S^2}{r^2 \bar{Y}^2} = \frac{1.96^2 1200^2}{0.1^2 8400^2} \approx 8$$

For proportion, initial sample size n_0 can be calculated by formula:

$$n_0 = \frac{t^2 Q}{r^2 P} \tag{E.2}$$

Where,

P	<i>Proportion of sample</i>
Q	$Q = 1 - P$
r	<i>Relative error. Default is 10%.</i>
$t_{0.05}$	1.96

According to pre-survey data, 24 households have aerobic sludge application and in operation, the proportional parameters (sludge application rate and rate of digesters still in operation) have $P=0.8$ and $Q = 1 - P = 0.2$.

With application of equation E.2, the initial sample size n_0 is calculated as:

$$n_0 = \frac{t^2 Q}{r^2 P} = \frac{1.96^2 * 0.2}{0.1^2 * 0.8} \approx 97$$

Step 4: Other considerations of sample size

Sample size should be corrected according to the size of target population N by formula:

$$n_1 = \frac{n_0}{1 + \frac{n_0}{N}} \quad (E.3)$$

Then, be corrected Respond Rate r_R (initially 90%) by formula:

$$n_2 = \frac{n_1}{r_R} \quad (E.4)$$

In case, the survey covers more than one expected parameters, conservatively, sample size n should not be less than the maximum calculated sample size of those indicators.

$$n \geq \max(n_1^1, n_2^2, \dots, n_2^n) \quad (E.5)$$

Using these values and equation E.1 the sampling sizes for these two parameters are:

Number of Pigs: 139

Annual Operation hours: 8

Using equations E.2, the sampling sizes for the proportional parameters (sludge application rate and rate of digesters still in operation) are calculated to be 97 as described above.

As a conservative approach, a sample size of 200 is chosen. This is bigger than all calculated minimum sampling sizes.

Supplementary survey is needed, in case, the data analysis of the baseline survey shows the pre-defined sample size is not sufficient to fulfill the requirement of confidence/precision.

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In the excel sheet with involved 395,435 households' info, incl. city, county, town, village, name of household, digester ID, PoA digester ID, etc, 200 households are randomly selected from the 395,435 households list by the simple random sampling (SRS) method. The excel function "randbetween" is employed to choose the households sample group.

The sampled households list was delivered to local REOs, which is responsible to implement survey. The survey team of each town is in charge of visiting the households in the project sample group and collecting data with the questionnaires. In the questionnaires, annual average number of swine raised, the year of bio-digester installation and fuel (coal, liquefied petroleum gas (LPG), electricity and firewood) consumption, operation hours of biogas digester and stove, etc are investigated for each sampled household.

The surveys have been performed by a survey team of two persons. After the questionnaire was filled, the surveyors and household owner signed the questionnaire form.

After the data collection by the survey team and checked by local REOs, all of the data is stored in an electronic database and forwarded to C/ME for statistical analysis, ex post emission reduction calculation and monitoring report conduction.

As shown in the sampling results (Excel sheet provided to the DOE), for the proportional parameters (Proper sludge application ratio), 100% sludge of each sampled digester has been applied in land application to avoid methane emissions; all the manure generated has been fed into biogas digesters directly ($MS\%_{i,y}$); All 200 sampled households have coal stoves in use, in this case, the total number of coal stoves in use for all 87 CPAs in the monitoring period is 395,435 ($N_{m,y}$); 199 of all sampled 200 households digesters and biogas stoves have been inspected that 99.5% in operation ($n_{k,y}$). for the monitoring parameters incl. average pig number $N_{LT,y}$, mean operation hours of each digester t , and annual consumption of fossil fuel type j coal (physical units, mass/volume) by application m ($FC_{m,j}$), achieved relative error of 7.33%, 1.06% and 7.50%, respectively under the confidence level of 95%. The monitoring of these parameters have met the confidence/precision of 95%/10%. The statistical quality is sufficient and no further survey has been conducted.

E. Procedures for Data Collection and Management

Selection and Training of Survey Staff. A Chinese survey plan, tools and training materials should be prepared before training activities. All survey staffs including county supervisors and interviewers are locally selected from county governmental agencies with at least 2 years of working experience in rural energy sector. Selected survey staffs needs to be trained and ensured clearly understanding of purpose, method, and procedures of baseline survey. Simulated test interview is required at the end of the training course, to ensure each trainee are qualified to undertaken household survey.

Prepare Sampling Frame. The HHs of the target CPA should be prepared according to the project plan. Potential problems should be considered and cross checked to ensure the quality of the sampling frame, such as none-coverage, blanks and duplicate listings.

Interview and Data Collection. The interview activity should be conducted by trained interviewer with the assistant of local (township or village) supportive staff. Up to 90% of respond rate is required according to the sampling design, accordingly, awareness of the project and data confidentiality is very important as precondition to get the farmers' cooperation. Respondent self-report is the main survey method, visual inspection is also needed as cross-check evident. Other cross-check methods are also welcomed to determine the accuracy of respondent self-report. Questionnaire should be filled by interviewer and confirmed by farmer, supportive staff and the interviewer himself. Memo and record is needed if altered.

Data Management and Quality Control.a) **Step 1: Supervisor Check**

Supervisor of the county need to review all questionnaires collected from each interviewer. Data on the questionnaires need to be subjected 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**

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**

Project data management software will check for inconsistencies, missing value, 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 statistic, the outliers can be easily figured out. Further statistical analysis can work out more characteristics of the data by professional analysis tools.

F. Data Security and Emergency Procedures

Considering the long-term data storage requirement, the monitoring sampling data, both and soft copy need to be stored carefully within the whole crediting period.

Two hardcopies of monitoring questionnaires need to be stored in CME offices in Beijing and Chengdu separately.

SECTION F. Calculation of emission reductions or net anthropogenic removals**F.1. Calculation of baseline emissions or baseline net removals**

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

Following the calculations laid out in the PoA-DD and AMS III.R, the following equation is applied to calculate the baseline emissions from an existing animal manure management system.

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

Where:

$BE_{CH_4,y}$	Baseline methane emissions in year y (tCO ₂ e)
GWP_{CH_4}	Global Warming Potential for CH ₄ (25 from 01/01/2013 onwards)
D_{CH_4}	CH ₄ density (0.00067 t/m ³ 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. As most of the CPAs only cover households in one city (refer section A.2), this index will only cover one city.
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 ³ CH ₄ (kgdm) ⁻¹)
$N_{LT,y}$	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. According to baseline survey, 100% manure has been handled in deep pit system.

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

The baseline emissions from coal replacement are calculated using formula 2:

$$BE_{CO_2,y} = \sum_k \sum_j N_{k,0} * n_{k,y} * FC_{BL,k,j} * NCV_j * EF_{FF,j} \quad 2$$

Where:

$BE_{CO_2,y}$	Baseline carbon dioxide emissions from fossil fuel combustion in year y (tCO ₂ 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, the NCV of raw coal is 20.908 GJ/t.
$EF_{FF,j}$	Is the CO ₂ emission coefficient of fuel j in year y (tCO ₂ /GJ). National data of coal (87.3 tCO ₂ /TJ) is applied.

For the specific calculation of baseline emissions of each CPA within this monitoring period, the result of equation 1 is multiplied with three factors:

Time: To account for the length of the monitoring period, the length of the monitoring period in days divided by 366 is applied as a factor. For CPA 2898-0001 to 2898-0087, the factor is $366/366 = 1$.

Households with proper sludge application: To exclude households without proper sludge application, the baseline emissions are multiplied with the monitoring parameter "Proper Sludge Application". During this monitoring period, 100% of sampled households have proper sludge application.

Number of households: Multiplying the baseline emissions per household with the number of households in the CPA leads to the baseline emissions in the entire CPA. During this monitoring period, 199 of 200 sampled households have biogas digesters operation, share of households in operation is 99.5% for each CPA. Therefore, during this monitoring period, the number of households used for calculation for each CPA is:

2898-0001: 995; 2898-0073: 3,333, remaining CPAs: 4,578 per CPA.

As result, the baseline emissions of each CPA are:

- 2898-0001: 2,407tCO₂e
- 2898-0002: 11,073tCO₂e
- 2898-0003: 11,073tCO₂e
- 2898-0004: 11,073tCO₂e
- 2898-0005: 11,073tCO₂e
- 2898-0006: 11,073tCO₂e
- 2898-0007: 11,073tCO₂e
- 2898-0008: 11,073tCO₂e
- 2898-0009: 11,073tCO₂e
- 2898-0010: 11,073tCO₂e
- 2898-0011: 10,690tCO₂e
- 2898-0012: 10,690tCO₂e
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- 2898-0018: 10,690tCO₂e
- 2898-0019: 10,690tCO₂e
- 2898-0020: 10,690tCO₂e
- 2898-0021: 10,690tCO₂e

2898-0022: 10,690tCO2e
2898-0023: 10,690tCO2e
2898-0024: 10,690tCO2e
2898-0025: 10,690tCO2e
2898-0026: 10,690tCO2e
2898-0027: 10,690tCO2e
2898-0028: 10,690tCO2e
2898-0029: 10,690tCO2e
2898-0030: 10,690tCO2e
2898-0031: 10,690tCO2e
2898-0032: 10,690tCO2e
2898-0033: 10,690tCO2e
2898-0034: 10,690tCO2e
2898-0035: 11,073tCO2e
2898-0036: 10,690tCO2e
2898-0037: 10,690tCO2e
2898-0038: 10,690tCO2e
2898-0039: 10,690tCO2e
2898-0040: 10,690tCO2e
2898-0041: 10,690tCO2e
2898-0042: 10,690tCO2e
2898-0043: 10,690tCO2e
2898-0044: 10,690tCO2e
2898-0045: 10,690tCO2e
2898-0046: 10,690tCO2e
2898-0047: 11,073tCO2e
2898-0048: 11,073tCO2e
2898-0049: 11,073tCO2e
2898-0050: 10,690tCO2e
2898-0051: 10,690tCO2e
2898-0052: 9,579tCO2e
2898-0053: 10,847tCO2e
2898-0054: 10,690tCO2e
2898-0055: 10,690tCO2e
2898-0056: 10,690tCO2e
2898-0057: 10,690tCO2e
2898-0058: 10,690tCO2e
2898-0059: 10,690tCO2e
2898-0060: 10,690tCO2e
2898-0061: 10,690tCO2e
2898-0062: 10,690tCO2e
2898-0063: 10,690tCO2e
2898-0064: 10,690tCO2e
2898-0065: 11,073tCO2e
2898-0066: 11,073tCO2e
2898-0067: 10,690tCO2e
2898-0068: 10,677tCO2e
2898-0069: 10,690tCO2e
2898-0070: 10,690tCO2e
2898-0071: 10,704tCO2e
2898-0072: 10,866tCO2e
2898-0073: 7,908tCO2e
2898-0074: 11,073tCO2e
2898-0075: 10,690tCO2e
2898-0076: 11,073tCO2e
2898-0077: 10,690tCO2e
2898-0078: 10,690tCO2e

2898-0079: 10,690tCO2e
 2898-0080: 10,690tCO2e
 2898-0081: 10,690tCO2e
 2898-0082: 9,804tCO2e
 2898-0083: 10,712tCO2e
 2898-0084: 11,005tCO2e
 2898-0085: 10,690tCO2e
 2898-0086: 10,769tCO2e
 2898-0087: 10,929tCO2e

F.2. Calculation of project emissions or actual net removals

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

Following the calculations laid out in the PoA-DD and AMS III.R, the following equation is applied to calculate the project emissions from physical leakage:

$$PE_{CH_4,y} = 0.10 \cdot GWP_{CH_4} \cdot D_{CH_4} \cdot \sum_{i,LT} B_{0,LT} \cdot N_{LT,y} \cdot VS_{LT,y} \cdot MS\%_{i,y} \quad 3$$

Where:

$PE_{CH_4,y}$	Project methane emissions in year y (tCO ₂ e)
GWP_{CH_4}	Global Warming Potential for CH ₄ (25 from 01/01/2013 onwards)
D_{CH_4}	CH ₄ density (0.00067 t/m ³ at room temperature (20deg 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 ³ CH ₄ (kg dm) ⁻¹)
$N_{LT,y}$	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.

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

The project emissions from coal consumption are calculated using formula 6:

$$PE_{CO_2,y} = \sum_m \sum_j N_{m,y} * FC_{m,j} * NCV_j * EF_{FF,j} \quad 4$$

Where:

$PE_{CO_2,y}$	Project carbon dioxide emissions from fossil fuel combustion in year y (tCO ₂ 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, the NCV of raw coal is 20.908 GJ/t.
$EF_{FF,j}$	Is the CO ₂ emission coefficient of fuel j in year y (tCO ₂ /GJ). National data of coal (87.3 tCO ₂ /TJ) is applied.

For the specific calculation of project emissions of each CPA within this monitoring period, the result of equation 5 is multiplied with two factors:

Time: To account for the length of the monitoring period, the length of the monitoring period in days divided by 366 is applied as a factor. For CPA 2898-0001 to 2898-0087, the factor is 366/366 = 1.

Households with proper sludge application: To exclude households without proper sludge application, the project emissions are multiplied with the monitoring parameter "Proper Sludge Application". During this monitoring period, 100% of sampled households have proper sludge application.

As result, the project emissions of each CPA are:

2898-0001: 272tCO₂e
 2898-0002: 1,253tCO₂e
 2898-0003: 1,253tCO₂e
 2898-0004: 1,253tCO₂e
 2898-0005: 1,253tCO₂e
 2898-0006: 1,253tCO₂e
 2898-0007: 1,253tCO₂e
 2898-0008: 1,253tCO₂e
 2898-0009: 1,253tCO₂e
 2898-0010: 1,253tCO₂e
 2898-0011: 1,253tCO₂e
 2898-0012: 1,253tCO₂e
 2898-0013: 1,253tCO₂e
 2898-0014: 1,253tCO₂e
 2898-0015: 1,253tCO₂e
 2898-0016: 1,253tCO₂e
 2898-0017: 1,253tCO₂e
 2898-0018: 1,253tCO₂e
 2898-0019: 1,253tCO₂e
 2898-0020: 1,253tCO₂e
 2898-0021: 1,253tCO₂e
 2898-0022: 1,253tCO₂e
 2898-0023: 1,253tCO₂e
 2898-0024: 1,253tCO₂e
 2898-0025: 1,253tCO₂e

2898-0026: 1,253tCO2e
2898-0027: 1,253tCO2e
2898-0028: 1,253tCO2e
2898-0029: 1,253tCO2e
2898-0030: 1,253tCO2e
2898-0031: 1,253tCO2e
2898-0032: 1,253tCO2e
2898-0033: 1,253tCO2e
2898-0034: 1,253tCO2e
2898-0035: 1,253tCO2e
2898-0036: 1,253tCO2e
2898-0037: 1,253tCO2e
2898-0038: 1,253tCO2e
2898-0039: 1,253tCO2e
2898-0040: 1,253tCO2e
2898-0041: 1,253tCO2e
2898-0042: 1,253tCO2e
2898-0043: 1,253tCO2e
2898-0044: 1,253tCO2e
2898-0045: 1,253tCO2e
2898-0046: 1,253tCO2e
2898-0047: 1,253tCO2e
2898-0048: 1,253tCO2e
2898-0049: 1,253tCO2e
2898-0050: 1,253tCO2e
2898-0051: 1,253tCO2e
2898-0052: 1,253tCO2e
2898-0053: 1,253tCO2e
2898-0054: 1,253tCO2e
2898-0055: 1,253tCO2e
2898-0056: 1,253tCO2e
2898-0057: 1,253tCO2e
2898-0058: 1,253tCO2e
2898-0059: 1,253tCO2e
2898-0060: 1,253tCO2e
2898-0061: 1,253tCO2e
2898-0062: 1,253tCO2e
2898-0063: 1,253tCO2e
2898-0064: 1,253tCO2e
2898-0065: 1,253tCO2e
2898-0066: 1,253tCO2e
2898-0067: 1,253tCO2e
2898-0068: 1,253tCO2e
2898-0069: 1,253tCO2e
2898-0070: 1,253tCO2e
2898-0071: 1,253tCO2e
2898-0072: 1,253tCO2e
2898-0073: 913tCO2e
2898-0074: 1,253tCO2e
2898-0075: 1,253tCO2e
2898-0076: 1,253tCO2e
2898-0077: 1,253tCO2e
2898-0078: 1,253tCO2e
2898-0079: 1,253tCO2e
2898-0080: 1,253tCO2e
2898-0081: 1,253tCO2e
2898-0082: 1,253tCO2e

2898-0083: 1,253tCO₂e
 2898-0084: 1,253tCO₂e
 2898-0085: 1,253tCO₂e
 2898-0086: 1,253tCO₂e
 2898-0087: 1,253tCO₂e

F.3. Calculation of leakage emissions

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According to the explanations in the registered PoA-DD, the leakage emissions of this PoA and its CPAs are considered 0.

F.4. Calculation of emission reductions or net anthropogenic removals

CPA UNFCCC reference number	Baseline GHG emissions or baseline net GHG removals (t CO ₂ e)	Project GHG emissions or actual net GHG removals (t CO ₂ e)	Leakage GHG emissions (t CO ₂ e)	GHG emission reductions or net anthropogenic GHG removals (t CO ₂ e)		
				Before 01/01/2013	From 01/01/2013	Total amount
2898-0001	2,407	272	0	0	2,135	2,135
2898-0002	11,073	1,253	0	0	9,820	9,820
2898-0003	11,073	1,253	0	0	9,820	9,820
2898-0004	11,073	1,253	0	0	9,820	9,820
2898-0005	11,073	1,253	0	0	9,820	9,820
2898-0006	11,073	1,253	0	0	9,820	9,820
2898-0007	11,073	1,253	0	0	9,820	9,820
2898-0008	11,073	1,253	0	0	9,820	9,820
2898-0009	11,073	1,253	0	0	9,820	9,820
2898-0010	11,073	1,253	0	0	9,820	9,820
2898-0011	10,690	1,253	0	0	9,437	9,437
2898-0012	10,690	1,253	0	0	9,437	9,437
2898-0013	10,690	1,253	0	0	9,437	9,437
2898-0014	10,690	1,253	0	0	9,437	9,437
2898-0015	10,690	1,253	0	0	9,437	9,437
2898-0016	10,690	1,253	0	0	9,437	9,437
2898-0017	10,690	1,253	0	0	9,437	9,437
2898-0018	10,690	1,253	0	0	9,437	9,437
2898-0019	10,690	1,253	0	0	9,437	9,437
2898-0020	10,690	1,253	0	0	9,437	9,437
2898-0021	10,690	1,253	0	0	9,437	9,437
2898-0022	10,690	1,253	0	0	9,437	9,437
2898-0023	10,690	1,253	0	0	9,437	9,437

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2898-0024	10,690	1,253	0	0	9,437	9,437
2898-0025	10,690	1,253	0	0	9,437	9,437
2898-0026	10,690	1,253	0	0	9,437	9,437
2898-0027	10,690	1,253	0	0	9,437	9,437
2898-0028	10,690	1,253	0	0	9,437	9,437
2898-0029	10,690	1,253	0	0	9,437	9,437
2898-0030	10,690	1,253	0	0	9,437	9,437
2898-0031	10,690	1,253	0	0	9,437	9,437
2898-0032	10,690	1,253	0	0	9,437	9,437
2898-0033	10,690	1,253	0	0	9,437	9,437
2898-0034	10,690	1,253	0	0	9,437	9,437
2898-0035	11,073	1,253	0	0	9,820	9,820
2898-0036	10,690	1,253	0	0	9,437	9,437
2898-0037	10,690	1,253	0	0	9,437	9,437
2898-0038	10,690	1,253	0	0	9,437	9,437
2898-0039	10,690	1,253	0	0	9,437	9,437
2898-0040	10,690	1,253	0	0	9,437	9,437
2898-0041	10,690	1,253	0	0	9,437	9,437
2898-0042	10,690	1,253	0	0	9,437	9,437
2898-0043	10,690	1,253	0	0	9,437	9,437
2898-0044	10,690	1,253	0	0	9,437	9,437
2898-0045	10,690	1,253	0	0	9,437	9,437
2898-0046	10,690	1,253	0	0	9,437	9,437
2898-0047	11,073	1,253	0	0	9,820	9,820
2898-0048	11,073	1,253	0	0	9,820	9,820
2898-0049	11,073	1,253	0	0	9,820	9,820
2898-0050	10,690	1,253	0	0	9,437	9,437
2898-0051	10,690	1,253	0	0	9,437	9,437
2898-0052	9,579	1,253	0	0	8,326	8,326
2898-0053	10,847	1,253	0	0	9,594	9,594
2898-0054	10,690	1,253	0	0	9,437	9,437
2898-0055	10,690	1,253	0	0	9,437	9,437
2898-0056	10,690	1,253	0	0	9,437	9,437
2898-0057	10,690	1,253	0	0	9,437	9,437
2898-0058	10,690	1,253	0	0	9,437	9,437
2898-0059	10,690	1,253	0	0	9,437	9,437
2898-0060	10,690	1,253	0	0	9,437	9,437
2898-0061	10,690	1,253	0	0	9,437	9,437
2898-0062	10,690	1,253	0	0	9,437	9,437
2898-0063	10,690	1,253	0	0	9,437	9,437
2898-0064	10,690	1,253	0	0	9,437	9,437

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2898-0065	11,073	1,253	0	0	9,820	9,820
2898-0066	11,073	1,253	0	0	9,820	9,820
2898-0067	10,690	1,253	0	0	9,437	9,437
2898-0068	10,677	1,253	0	0	9,424	9,424
2898-0069	10,690	1,253	0	0	9,437	9,437
2898-0070	10,690	1,253	0	0	9,437	9,437
2898-0071	10,704	1,253	0	0	9,451	9,451
2898-0072	10,866	1,253	0	0	9,613	9,613
2898-0073	7,908	913	0	0	6,995	6,995
2898-0074	11,073	1,253	0	0	9,820	9,820
2898-0075	10,690	1,253	0	0	9,437	9,437
2898-0076	11,073	1,253	0	0	9,820	9,820
2898-0077	10,690	1,253	0	0	9,437	9,437
2898-0078	10,690	1,253	0	0	9,437	9,437
2898-0079	10,690	1,253	0	0	9,437	9,437
2898-0080	10,690	1,253	0	0	9,437	9,437
2898-0081	10,690	1,253	0	0	9,437	9,437
2898-0082	9,804	1,253	0	0	8,551	8,551
2898-0083	10,712	1,253	0	0	9,459	9,459
2898-0084	11,005	1,253	0	0	9,752	9,752
2898-0085	10,690	1,253	0	0	9,437	9,437
2898-0086	10,769	1,253	0	0	9,516	9,516
2898-0087	10,929	1,253	0	0	9,676	9,676
Total	924,468	107,690	0	0	816,778	816,778

F.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the included CPA-DDs

CPA UNFCCC reference number	Amount achieved during this monitoring period (t CO_{2e})	Amount estimated ex ante (t CO_{2e})
2898-0001	2,135	2,282 ¹²
2898-0002	9,820	10,502
2898-0003	9,820	10,502
2898-0004	9,820	10,502
2898-0005	9,820	10,502
2898-0006	9,820	10,502
2898-0007	9,820	10,502
2898-0008	9,820	10,502
2898-0009	9,820	10,502

¹² For the value estimated ex ante calculation in the included CPA-DDs, it's calculated based on the days in the monitoring period multiplied by the ex-ante ER value in the registered CPA-DDs. Please refer to the ER calculation sheet and the registered CPA-DDs

2898-0010	9,820	10,502
2898-0011	9,437	10,061
2898-0012	9,437	10,061
2898-0013	9,437	10,061
2898-0014	9,437	10,061
2898-0015	9,437	10,061
2898-0016	9,437	10,061
2898-0017	9,437	10,061
2898-0018	9,437	10,061
2898-0019	9,437	10,061
2898-0020	9,437	10,061
2898-0021	9,437	10,061
2898-0022	9,437	10,061
2898-0023	9,437	10,061
2898-0024	9,437	10,061
2898-0025	9,437	10,061
2898-0026	9,437	10,061
2898-0027	9,437	10,061
2898-0028	9,437	10,061
2898-0029	9,437	10,061
2898-0030	9,437	10,061
2898-0031	9,437	10,061
2898-0032	9,437	10,061
2898-0033	9,437	10,061
2898-0034	9,437	10,061
2898-0035	9,820	10,061
2898-0036	9,437	10,502
2898-0037	9,437	10,502
2898-0038	9,437	10,502
2898-0039	9,437	10,502
2898-0040	9,437	10,502
2898-0041	9,437	10,502
2898-0042	9,437	10,061
2898-0043	9,437	10,061
2898-0044	9,437	10,061
2898-0045	9,437	10,061
2898-0046	9,437	10,061
2898-0047	9,820	10,502
2898-0048	9,820	10,502
2898-0049	9,820	10,502
2898-0050	9,437	10,502
2898-0051	9,437	10,502
2898-0052	8,326	8,654
2898-0053	9,594	10,147
2898-0054	9,437	10,502
2898-0055	9,437	10,061
2898-0056	9,437	10,061

2898-0057	9,437	10,061
2898-0058	9,437	10,061
2898-0059	9,437	10,061
2898-0060	9,437	10,061
2898-0061	9,437	10,061
2898-0062	9,437	10,061
2898-0063	9,437	10,061
2898-0064	9,437	10,061
2898-0065	9,820	10,502
2898-0066	9,820	10,502
2898-0067	9,437	10,061
2898-0068	9,424	10,114
2898-0069	9,437	10,061
2898-0070	9,437	10,061
2898-0071	9,451	10,077
2898-0072	9,613	10,502
2898-0073	6,995	7,646
2898-0074	9,820	10,502
2898-0075	9,437	10,061
2898-0076	9,820	10,061
2898-0077	9,437	10,502
2898-0078	9,437	10,502
2898-0079	9,437	10,061
2898-0080	9,437	10,061
2898-0081	9,437	10,502
2898-0082	8,551	8,873
2898-0083	9,459	10,087
2898-0084	9,752	10,502
2898-0085	9,437	10,164
2898-0086	9,516	10,152
2898-0087	9,676	10,502
Total	816,778	876,123

F.6. Remarks on increase in achieved emission reductions

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The actual value achieved during this monitoring period is 816,778 tCO₂e, which is 6.77% less than values (876,123 tCO₂e) estimated according to the registered PoA-DD and CPA-DDs.

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