

VERIFICATION REPORT OF “SICHUAN FURONG COAL MINE METHANE UTILIZATION PROJECT



Document Prepared By China Environmental United Certification Centre Co., Ltd.

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Summary:

China Environmental United Certification Centre Co., Ltd. (CEC) has performed the verification of Sichuan Furong Coal Mine Methane Utilization Project (hereinafter referred to as “the project”) of Sichuan Furong Group's Limited Industrial Company with regard to the requirements of VCS Standard Ver 3.5 and ACM0008 version 4.

The verification scope is defined as a periodic independent review and ex-post determination by the Designed Operational Entity of the monitored reductions in GHG emissions during defined verification period, and consisted of the following three phases: 1) Desk review of the project design and the baseline and monitoring plan; 2) on-site visit and follow-up interviews with project stakeholders; 3) Resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from Contract Review to Verification Report and Opinion, was conducted according to CEC’s internal procedures.

CEC was also commissioned by Sichuan Furong Group's Limited Industrial Company to validate that VCS Project Design (PD) document which contains design description required by the VCS that are additional to the registered CDM Project Design Document (PDD). CEC applied a gap validation upon the VCS PD as per VCS rules.

The findings from the desk review of the original project activity documents and the findings from interviews during the follow up visit are summarized. The verification of the Project issued 4 Corrective Action Request (CAR) and 2 Clarification Request. The Project Participant revised the VCS PD and Monitoring Report. The CARs and CLs were successfully closed. The verification is based on the monitoring report, the monitoring plan as set out in the validated PD, the validation report, emission reduction calculation spreadsheet and supporting documents made available to CEC by the project proponent.

CEC confirms that the project is implemented as planned and described in the approved revised CDM PDD and VCS PD. Installed equipment being essential for generating emission reduction run reliably and are calibrated appropriately. The monitoring system is in place and the project is ready to generate GHG emission reductions. The GHG emission reduction is calculated without material misstatements.

Based on the assessments performed and the historical evidence collected, CEC concludes:

- the project is conformance with the Verified Carbon Standard (VCS) Version 3.5 and the applied CDM methodology ACM0008 version 04;
- without qualification or limitation, that the project complies with the verification criteria for projects and their GHG emission reductions or removals set out in VCS Version 3.5;
- the project implementation is in line with the approved revised CDM-PDD and project monitoring plan contained in the revised CDM PDD (version 08, 28 August 2013);
- VCS PD version 02 dated 24 May 2015 complies with criteria for projects set out in VCS Version 3.5;
- the verification period of 16 April 2010 to 31 December 2012;
- Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO _{2e})	Project emissions or removals (tCO _{2e})	Leakage emissions (tCO _{2e})	Net GHG emission reductions or removals (tCO _{2e})
2010	128,708	15,031	0	113,677
2011	187,154	22,218	0	164,936
2012	176,823	21,057	0	155,766
Total	492,685	58,306	0	434,379

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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CL	Clarification Request
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse Gas
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
NCV	Net Calorific Value
PD	Project Description
PDD	Project Design Document
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention for Climate Change
VCS	Verified Carbon Standard
VCU	Verified Carbon Unit

1 INTRODUCTION

China Environmental United Certification Centre Co., Ltd. (CEC) was commissioned by Sichuan Furong Group's Limited Industrial Company to verify and certify the emissions reductions reported for the period 16 April 2010 to 31 December 2012 set out in the monitoring report of the project activity 'Sichuan Furong Coal Mine Methane Utilization Project' on the basis of requirements of VCS Standard Version 3.5 and ACM0008 version 4. This report contains the findings from the verification and a statement for the verified emission reductions.

CEC was also commissioned by Sichuan Furong Group's Limited Industrial Company to validate that VCS Project Design (PD) document which contains design description required by the VCS that are additional to the registered CDM Project Design Document (PDD).

1.1 Objective

Verification is the periodic independent review and ex post determination by the verifier of the monitored reductions in anthropogenic emissions by sources of greenhouse gases that have occurred as a result of a registered VCS project activity during the verification period. The verification report is the written assurance by the verifier that, during a specified time period, a project activity achieved the reductions in anthropogenic emissions by sources of greenhouse gases as verified.

The objective of the verification is

1. To verify that the project is implemented as stated in the registered CDM PDD and VCS PD.
2. To confirm that the monitoring system is in place and fully functional.
3. To assure that the project has generated verifiable emission reductions.

The verification shall consider both qualitative and quantitative information on emission reductions. Quantitative data comprises the monitoring reports submitted by the project entity to the auditor. Qualitative data comprises information on internal management controls, calculation procedures, frequency of emission reports, and review of calculations.

1.2 Scope and Criteria

The verification is an independent and objective review and ex-post determination of the monitored reductions in GHG emissions against the VCS Version 3.5.

Based on the key project information, the verification addresses the implementation and operation of the project activity as set out in the CDM PDD and validated VCS PD, and the information and reported emissions reductions set out in the monitoring report prepared by the project participant (PP) for this monitoring period.

The verification tests the data and assertions set out in the monitoring report prepared for this monitoring period by the PPs and is based on:

- the approved VCS methodology applied in project description (PD)

- the registered CDM PDD, approved revised CDM-PDD
- CDM validation report and the validation opinion on the post registration changes
- The Verified Carbon Standard (VCS) Version 3.5
- the ISO 14064-2:2006, ISO 14064-3:2006 and ISO 14065:2007
- Relevant methodological tools applicable during monitoring of the project activity
- Relevant decisions, guidance and clarifications of the VCSA and any other information and references relevant to the project activity’s reported emission reductions

The validation/verification body and validation/verification team meet the competence requirements set out in ISO 14065:2007.

CEC conducts all its work under strict rules to safeguard impartiality and ensure the independence of the verification team. The verification does not provide any consulting or recommendations for the client.

1.3 Level of assurance

As the VCS Version 3.5 only recognizes verified emission reductions, CEC has focused on providing a reasonable level of assurance that the emission reduction calculation methodology used is appropriate and correctly applied, and that emission reductions have been accurately monitored.

Consideration of materiality in planning the verification

No	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Audit techniques respond to the assessed risks
		Risk level	Justification	
1	Human error in the quantification of emissions (which may be more likely to occur if personnel are unfamiliar with, or not well trained regarding, emissions processes or data recording);	Low	The project owner has established the CDM monitoring and management manual and appointed the CDM technical staffs, CDM accountant staffs and CDM manager which were	Depending on the monitoring period being verified, conduct increased sampling during the months when there is a greater likelihood of errors and issues with data quality control due to project participants’ leave schedules.
2	Undue reliance on a poorly designed information system, which may have few effective quality controls; for example, the use of spreadsheets without adequate controls related to data changes/updates, version tracking, traceability, security,	Low	trained to responsible for the reading and recording of the power meters, gas flow meters, methane concentration meters, auditing of these metered data. The	Depending on the monitoring period being verified, conduct increased sampling during the months when there is a greater likelihood of errors and issues with data quality control due to project participants’ leave schedules.

	etc.;		installation and calibration of monitoring meters	
3	Manual adjustment of otherwise automatically recorded activity levels; for example, manual input may be required if a flare meter becomes overloaded.	Low	was also stipulated in the manual. The CDM monitoring and management manual has also established the QA/QC procedure to ensure the veracity and validity of the monitoring procedure and monitoring records. So the risk level is low.	Depending on how data is generated, processed, and reported, place greater emphasis on verifying data captured and processed manually and/or in spreadsheets versus those that are generated from an automated system.

Consideration of materiality in conducting the verification

(a) As per the “Application of materiality in verifications (Version 02.0)” which enters into force on 1 April 2015, the project is a large-scale CDM project activity expected achieving total emission reductions of 215,387 tons of CO₂e per year; as such, a 2 per cent materiality threshold is applied (4,308 tons of CO₂e).

(b) One of the parameters used for determining the project’s baseline emissions is the emission factor (CEF_{ELEC}) of the electricity from the CCPG is displaced by the project, which according to the monitoring plan is determined ex ante and 0.9745 tCO₂/MWh is applied as per the approved revised CDM PDD.

(c) The monitoring period is 16 April 2010 -31 December 2012. The values are presented for verification in the emission reduction calculation spreadsheet and MR are available for all months carried out during the monitoring period. The emission factor of electricity imported from CCPG by the project are manually transferred to the emission reduction calculation spreadsheet.

(d) During the course of the verification, emission factor errors are identified within a different data set from the approved revised CDM PDD and are identified to have been caused by errors in manual transposition.

(e) Due to the cause, these errors are easily quantified, and are identified to represent an error of 2.06% (4,446 tCO₂e) of the total emission reductions (more than the materiality threshold of 2 per cent (4,308t CO₂e).

(f) CEC, in accordance with the VVS, request the project participants to correct the data set containing the errors (detail see CAR 3). These errors are corrected by the project participants and the VVB confirms the corrections. By checking the approved revised CDM PDD, the verification team confirmed that the emission factor of electricity imported from CCPG by the project has been revised and the revised data is consistent with the approved revised CDM PDD.

(g) No further errors are identified in the additional data set, and the DOE proceeds with the remaining elements of the verification as defined in its verification plan.

The verification report is based on the CDM PDD, VCS PD, VCS Monitoring Report, supporting evidences made available to the verifier and information collected through performing interviews and during the on-site visit. The verification conclusion is assured the credibility of all above.

1.4 Summary Description of the Project

Title of Project Activity	Sichuan Furong Coal Mine Methane Utilization Project'
UNFCCC Registration Number	2677
Registration Date of the Project Activity	16/04/2010
Crediting Period	16/04/2010 to 15/04/2020 (fixed)
Monitoring Period Covered in this Report	16/04/2010 to 31/12/2012
Project Participants	Sichuan Furong Group's Limited Industrial Company
Location of the Project Activity	Yibin City, Sichuan Province, People's Republic of China
UNFCCC Link	https://cdm.unfccc.int/Projects/DB/DNV-CUK1244587133.21/view

The project involves coal mine methane capture and utilization in power generation at captive CMM power plants. Generator sets with a combined capacity of 15MW (with model number 500GF1-2RW, installed at Baijiao and Gongquan CMM power plant, and JMS620GS generators installed at Baijiao and newly built Shanmushu CMM power plant) have been installed to utilise CMM extracted from Furong Group's Baijiao, Shanmushu, Xunchang and Gongquan coal mines that is vented in the baseline scenario is captured by the project for power generation, while the small portion of residential and commercial usage of CMM in the baseline scenario remains unaffected by the Project and no emission reduction is claimed for this part of CMM utilization. Through the implementation of the project, it is estimated that an average annual volume of 15.6 million cubic meters of CH₄ will be combusted and destroyed, which in the baseline scenario would otherwise be released directly into the atmosphere. It is estimated average annual 43,890 MWh electricity derived from CMM will be delivered to the Furong coal mines for self-use, which will displace electricity from the CCPG. Waste heat from the power generation process is recovered and utilized for coal miners. However, no ERs will be claimed for this component as conservative.

The verification team checked the Construction completion acceptance reports issued by Sichuan Furong Group's Limited Industrial Company and was able to confirm that it is implemented by phases. The project start date is 28 November 2007, which is the four domestic generators each with a 500kW capacity were commissioned in Baijiao CMM power plant. By the end of year 2012, totally generation capacity of 13.144MW have been installed, namely 6.596MW have been installed in the Baijiao coal mine area, 3.50MW in Gongquan coal mine area and 3.048MW in Shanmushu coal mine area (was installed but not put into commission until September 2013).

Location	Installed capacity	Model	Waste heat boiler
Baijiao power plant	0.5 MW (1* 0.5MW)	500GF1-2RW	Q2/500/0.28-5.5-115/60

	6.096MW (2*3.048MW)	JMS620GS-S.L	QC12/500-2.4-1.0-200
Shanmushu power plant ¹	3.048MW (2*3.048MW)	JMS620GS-S.L	Q12.4/493-1.75-0.8
Gongquan power plant	3.5MW(7*0.5MW)	500GF1-2RW	Q2/500/0.28-1.0/120/60r

Sichuan Provincial Development and Reform Commission approved the installed capacity changes in the 'Approval of the installed capacity of the Sichuan Furong Coal Mine Methane Utilization Project', Chuan Fa Gai Neng Yuan Han [2013]536 dated 15 May 2013. The verification team reviewed the Chuan Fa Gai Neng Yuan Han [2013] and was able to confirm that 2 sets of 500GF1-2RW for back-up units only and the total actual capacity of the project activity will be about 15MW.

2 VERIFICATION PROCESS

2.1 Method and Criteria

The verification of this project is based on the VCS Version 3.5, the validated project design document, the monitoring report, emission reduction calculation spread sheet, the VCS Project Description (VCS-PD) and other supporting documents made available to the verifier, as well as information collected through performing interviews and during the on-site assessment.

Based on CEC's review of the project a verification team was established that takes into account the coverage of the qualifications and sectoral scope(s) for verifying the ER achieved by the project activity in the relevant monitoring period for this verification. Standard auditing techniques have been adopted. The verification team performed a desk review and follow-up interviews with relevant project stakeholders. The next step was to close out findings through direct communication with the PPs and finally prepared the verification report. This verification report and other supporting documents then underwent an internal quality control by the technical review department of CEC before submission to request for issuance.

The overall verification process, from contract review to verification report and opinion, was conducted according to CEC internal procedures.

Table 2.1 List of verification team and technical reviewer

Name	Role	Qualification	Specific Scope	Participated in the on-site visit
XUE Jinghua	Team Leader	Auditor	No	√
LI Yongmei	Team Member	Auditor	√	√

Technical reviewer	Role	Specific scope	Participated in the on-site visit
LIU Qingzhi	Technical reviewer	√	-
LIU Mingqing	Technical reviewer	√	-

¹ One set of 3.048MW in Shanmushu coal mine area was installed in December 2012, but not put into commission until September 2013, It is planned that another 3.048MW gas generator will be installed at Shanmushu coal mine.

XUE Jinghua is a lead Greenhouse Gas(GHG) assessor. She has attended extensive internal and external training courses on EMS, energy audit, CDM and CDM related knowledge since 2007. She has participated in over 30 validation/verification CDM projects in the areas of hydropower, wind power, coal mine methane recovery and utilization, waste heat recovery and landfill gas recovery and utilization. Besides CDM auditing, Ms. Xue has also participated in the assessment of hydroelectric projects against the criteria set by the World Commission on Dams and energy saving auditing.

LI Yongmei is a Greenhouse Gas(GHG) assessor. She worked as an engineer in coal mining and processing area for over 10 years before come to CEC in 2002. She is an experienced senior EMS auditor with over 10 years' certification working experience, she has involved in CDM work from 2005 and completed various CEC CDM training courses. Ms. Li has participated in and finished over 5 validation/verification CDM projects which are mainly in sectoral scope 8 and 10, and gives her experience in coal mine methane recovery related project.

LIU Qingzhi is a lead Greenhouse Gas (GHG) assessor. She is a qualified EMS Auditor and environmental Labeling auditor, who have also completed various CEC CDM training courses and GHG accounting related courses. She has participated in over 130 validation/verification CDM project activities and programme of activities (PoAs) in the areas of hydropower, wind power, coal mine methane recovery and utilization as well as animal waste recovery PoA, CFL distribution PoA etc. Most of the projects are in sectoral scope 1 and 8/10, which gives her rich experience in renewable energy and mining sector. Besides CDM auditing, Ms.LIU has participated in the assessment of hydroelectric projects against the criteria set by the World Commission on Dams and energy saving auditing.

LIU Mingqing is a Greenhouse Gas(GHG) assessor. He worked in coal mining industry for 10 years before transferred to environmental accreditation body. He is an experienced senior EMS auditor with over 10 years' certification working experience, he has involved in CDM training courses and work from 2005. Mr. Liu has participated in and finished over 10 validation/verification CDM projects which are mainly in sectoral scope 8 and 10, and gives him abundant experience in coal mine methane recovery related project.

2.2 Document Review

A detailed desk review was undertaken prior to the site visit. This included the approved CDM PDD, including the monitoring plan and the corresponding validation report, the applied monitoring methodology, VCS Version 3.5, VCS PD, VCS monitoring report, relevant external data and reports, on-site documents, relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board. All monitoring procedures were discussed prior to the site visit.

A complete list of all documents reviewed is contained in Annex A.

2.3 Interviews

The verification team carried out interviews in order to confirm evidence associated with the data generation, aggregation, calculation and reporting of the monitoring parameters, to assess the information included in the project documentation, and to gain additional information regarding the compliance of the project with the relevant criteria applicable for the VCS.

During verification the verification team has performed interviews to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarized in Table 2.2 and the interviewees in table 2.3.

Table 2.2 Interviewed topics

Interviewed organization	Topics
Goldchina Consultancy International Co., Ltd. (Consultant)	Project design and implementation Monitoring Plan Monitoring data and Monitoring Report GHG Calculations
Sichuan Furong Group's Limited Industrial Company (Project proponent)	Project design and implementation Technical equipment, including calibration and operation Monitoring Plan and management procedures Monitoring data Data uncertainty and residual risks (QA/QC)

Table 2.3 List of interviewees

Name	Title & Organization
ZHANG Hongge	CDM Director, Sichuan Furong Group's Limited Industrial Company
GONG Songbai	Operator on duty, Sichuan Furong Group's Limited Industrial Company
WANG Suqin	Operator on duty, Sichuan Furong Group's Limited Industrial Company
ZHANG Jinsheng	Operator on duty, Sichuan Furong Group's Limited Industrial Company
WANG Xiaorong	Operator on duty, Sichuan Furong Group's Limited Industrial Company
YI Xiaomei	Operator on duty, Sichuan Furong Group's Limited Industrial Company
LI Xi	Project Manager, Goldchina Consultancy International Co., Ltd.

2.4 Site Inspections

A site visit to the project activity was undertaken on 18 May and 19 May 2015, the below content was confirmed by the verification team:

- Confirmed the implementation and operation of the project;
- Resolved issues identified during document review;
- Confirmed the correct procedure of implementation for operations and data collection;
- Cross-checked information provided in the MR documentation with other sources (raw data);
- Checked the monitoring equipments against the requirements of the PD and the approved methodology, including calibrations, maintenance, etc.;
- Identified if the quality control and quality assurance procedures are in place to prevent or correct errors or omissions in the reported parameters.

2.5 Resolution of Findings

As an outcome of the verification process, the verification team can raise different types of findings. Where issues are identified relating to the monitoring, implementation and operation of the registered project activity that could impair the capacity of the registered project activity to achieve emission

reductions or influence the monitoring and reporting of emission reductions, these issues are discussed and concluded in the verification report through the following approaches:

Corrective Action Request (CAR) is issued, where:

- Non-compliance with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
- Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impair the estimate of emission reductions;
- Issues identified in a Forward Action Request (FAR) during validation (or previous verification) to be verified have not been resolved by the project participants.

Clarification Request (CL) is issued, where:

- Information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

The verification process may be stopped until this information has been made available to the verifiers' satisfaction. Failure to address a CL may result in a CAR. Information or clarification provided as a result of a CL may also lead to a CAR. After satisfactory close out of CARs and CLs, the final report presents the verification activities undertaken, the issues raised, and explains how these issues have been closed out to enable the final verification conclusions to be made.

A complete list of CARs, and CLs are included in Annex B.

2.5.1 Forward Action Requests

Forward Action Requests (FAR) may also be raised for actions if the monitoring and reporting require attention and/or adjustment for the next verification period. These have no impact upon the completion of the current verification activity.

There is no FARs observed during the verification process.

2.6 Eligibility for Validation Activities

CEC has the accreditation for validation/verification body under a VCS-approved GHG program (see <http://www.v-c-s.org/verification-validation/find-vvb>) and holds the accreditation for the validation or verification for the sectoral scope applicable to the methodology applied to the project (<http://www.v-c-s.org/china-environmental-United-certification-center-co-ltd>). Thus CEC meets the requirements by VCS Program Guide.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

GAP VALIDATION

Validation Process

The validation of project activity “Sichuan Furong Coal Mine Methane Utilization Project” was completed under the CDM criteria by the designated operational entity DNV on 09 June 2009, as per the validation report published at the UNFCCC website (<http://cdm.unfccc.int/Projects/DB/DNV-CUK1244587133.21/history>), the the registration request of the project was reviewed by CDM EB and the revised validation report was submitted on 12 April 2010². CEC reviewed the CDM validation report and confirmed that it provides details regarding Method and Criteria, Document Review, Interviews, Site Inspections, and Resolution of findings can be found in the validation reported. This project was registered as a CDM project on 16 April 2010, with UNFCCC reference number 2677.

The project proponent (Sichuan Furong Group's Limited Industrial Company) has requested sequential registration of the project on both VCS and CDM. In accordance with the VCS Standard: VCS Version 3.5, “projects may be registered under both the VCS Program and an approved GHG program”. “Project proponents shall not claim credit for the same GHG emission reduction or removal under the VCS Program and another GHG program”

CEC’s validation of gaps between CDM and VCS requirements were based on:

- Review of the PDD, CDM validation report, VCS requirements and documents provided by the PP
- Interviews and site inspection (see section 2.3 and 2.4 above)

Where material discrepancies were identified in the validation of gaps, Corrective Action Requests or Clarification Requests were raised during the validation process.

As per the Registration and Issuance Process of VCS Version 3.5, since the project is claiming GHG credits under both the VCS Program and the CDM, a VCS Project Description with the cover page and sections 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13 completed was provided to the CEC verification team.

Cover Page

The cover page of the VCS PD contains all relevant information.

Sectoral Scope and Project Type (Section 1.2 of the VCS PD template)

It was validated during the site visit that the project is applicable for the sectoral scope 8: Mining/mineral production and sectoral scope 10: Fugitive emission from fuels (solid, oil, gas)

Project Proponent (Section 1.3 of the VCS PD template)

² <https://cdm.unfccc.int/Projects/DB/DNV-CUK1244587133.21/view>

By the evidence described in the “Right of use” section below, it was validated that the project proponent of the project under VCS is Sichuan Furong Group’s Limited Industrial Company. The contact information and roles/responsibilities for the project proponent(s) is listed as below:

Mr. Zhang Hongge, Direct of Planning Department within Sichuan Furong Group’s Limited Industrial Company

Addr: Xunchang town, xinqiao road, Gong Country, Yibin City, Sichuan Province, P.R. of China

Tel: +86-(0)831-2333531

E-mail: 1515075591 @qq.com

Project Start Date (Section 1.5 of the VCS PD template)

The approval for the project to start commissioning on 28 November 2007, it was confirmed by checking the Construction completion acceptance report for 500GF1-2RW generator sets at Baijiao CMM power plant, issued by Sichuan Furong Group's Limited Industrial Company.

Project Crediting Period (Section 1.6 of the VCS PD template)

The starting date of the fixed crediting period is 16 April 2010. The fixed crediting period (10yrs) approach is adopted by the project, so the fixed crediting period is from 16/04/2010 to 15/04/2020..

Project Scale and Estimated GHG Emission Reductions or Removals (Section 1.7 of the VCS PD template)

According to the approved revised PDD, the annual emission reductions of the project are estimated to be 215,387tCO_{2e}, however it is listed as a Large Project in the VCS PD version 01. In accordance with the VCS program definitions, a Large Project is defined as a project that generates 300,000 tonnes CO_{2e} or more of GHG emissions reductions or removals per year. CAR 1 was raised. The PD has been revised. CEC reviewed the revised PD and verified that it is as a Project in the revised PD which is in line with the VCS rules. Thus, CAR 1 is closed.

Project Location (Section 1.9 of the VCS PD template)

During the site visit, the project location was confirmed to be in Furong coal mine of Xunchang town in Yibin city of southern Sichuan province, China. The Furong coal mine consists of four mines (Baijiao, Shanmushu, Xunchang and Gongquan). It is located 5km from the center of Xunchang town, 50km from Yibin city, and at a coordinate of 104°39'~104°41' east longitude and 28°25'~28°28' north latitude.

Conditions Prior to Project Initiation (Section 1.10 of the VCS PD template)

According to the registered CDM PDD and approved revised PDD, the project is a green field project and there was no activity prior to the project initiation. Through the implementation of the project, an average annual volume of 15.6 million cubic meters of CH₄ will be combusted and destroyed, which would otherwise be released directly into the atmosphere in the baseline scenario. Furthermore, a total of 43,890 MWh electricity derived from CMM will be delivered to the Furong coal mines for self-use per, which will displace electricity from both the on-site captive power plant and the Central China Power Grid (CCPG). Waste heat from the power generation process is recovered and utilized for coal miners.

The starting date of the project activity, defined as per the CDM Glossary of Terms, is 30 July 2007, and the project started construction on 31 August 2007. CEC reviewed the registered CDM PDD and the CDM registration validation report which had been demonstrated with sufficient supporting evidence, and was able to confirm that the project has not been implemented to generate any GHG emissions prior to the project initiation.

Right of Use (Section 1.12.1 of the VCS PD template)

The ownership of the project proponent, Sichuan Furong Group's Limited Industrial Company, was verified by the following evidence:

The equipment contracts of the Project

The construction contracts of the Project

Approval of FSR 'Sichuan Furong Coal Mine Methane Utilization Project', Sichuan Provincial Development and Reform Commission, 28 August 2007

Approval of revised FSR 'Sichuan Furong Coal Mine Methane Utilization Project', Sichuan Provincial Development and Reform Commission, 01 July 2011;

Approval of the installed capacity of the Sichuan Furong Coal Mine Methane Utilization Project, Chuan Fa Gai Neng Yuan Han [2013]536, issued by Sichuan Provincial Development and Reform Commission, 15 May 2013;

LOA of the project issued by the DNA of China in June 2008

All the evidence provided was confirmed and deemed to be in order. CEC can confirm that Sichuan Furong Group's Limited Industrial Company is the owner of the project.

Emissions Trading Programs and Other Binding Limits (Section 1.12.2 of the VCS PD template)

The verification team observed that the project proponent applied those credits for CERs generated during the same monitoring period from 16 April 2010 to 31 December 2012 on the UNFCCC website which is under the process of verification and thus has the risk of double accounting. CL 1 was raised. The response from PP has been received. First, it must be emphasized that considering the SOP fee levied by EB and the verification cost, the REVENUE of CP1 CER issuance is negative, the PP never and will not request for the issuance of CERs covered by the particular monitoring period. Second, the ISSUANCE DEED OF REPRESENTATION has been provided, in the para 2.2.4 of ISSUANCE DEED OF REPRESENTATION, the project owner represent and warrant that *'I have not submitted, sought, requested or received any recognition of the Reductions generated by the Project during the Verification Period and for which I am requesting VCU issuance from any GHG Program other than under the VCS Program or as any other form of GHG- or renewable energy-related environmental credit (including without limitation as renewable energy certificates), or I have provided evidence to the VCS Registry in accordance with the VCS Rules that any such credits have not been used and have been cancelled under the relevant environmental credit program'*. CEC checked the ISSUANCE DEED OF REPRESENTATION and was able to confirm that the PP will not request the reductions under the same monitoring period from 16 April 2010 to 31 December 2012 for CER issuance and/or any other GHG Program except VCS programme. CEC also reviewed the PP's email communication with VCS regarding the issue, was able to confirm that it is in line with VCS rules. Thus, the CL 1 is closed.

Participation under Other GHG Programs (Section 1.12.3 of the VCS PD template)

The project was registered as a CDM project on 16 April 2010 and the reference number is 2677, however, as discussed above the project proponent confirmed that, once emission reductions generate during 16 April 2010 to 31 December 2012 are issued under VCS rules, those credits will not be claimed as CERs, the CDM monitoring report was published in UNFCCC website but will not be issued forever.

Other Forms of Environmental Credit (Section 1.12.4 of the VCS PD template)

The project is located in China and is developed and operated by Sichuan Furong Group's Limited Industrial Company, which is a Chinese Investment Enterprise. By the document review and the investigation on the Carbon credit market web site such as www.V-C-S.org, there is no other forms of environmental credit identified for the project.

Additional Information Relevant to the Project (Section 1.13 of the VCS PD template)

1) Eligibility Criteria

In accordance with the registered CDM-PDD, approved revised CDM-PDD and CDM validation report of the project, the project is not a grouped project, thus this item is not applicable to the project.

2) Leakage Management

In accordance with the registered CDM-PDD, approved revised CDM-PDD and CDM validation report of the project, the leakage calculation is in line with the applied methodology ACM0008 (version 04), the verification team didn't identify any information that may leads to a risk of leakage.

3) Commercially Sensitive Information

As confirmed from the project owner, all information stated in the VCS monitoring report is public, and no commercially sensitive information has been excluded.

4) Further Information

As reported in the CDM validation report of the project, the CDM validation DOE issued a positive opinion to the project for requesting registration. In addition, the verification team didn't identify any additional information that may have a bearing on the eligibility of the project, the net GHG emission reductions or removals, or the quantification of the project's net GHG emission reductions or removals.

Overall Conclusion on the Gap Validation

The project activity "Sichuan Furong Coal Mine Methane Utilization Project" was developed as a CDM project, being registered on 16 April 2010, under the UNFCCC reference number 2677.

The project proponent (Sichuan Furong Group's Limited Industrial Company) has requested sequential registration of the project on both VCS and CDM. In accordance with the VCS Standard: VCS Version 3.5, "projects may be registered under both the VCS Program and an approved GHG program". "Project proponents shall not claim credit for the same GHG emission reduction or removal under the VCS Program and another GHG program".

Per VCS Version 3.5 requirements, for projects validated under the CDM, the cover page and sections 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4, and 1.13 of the VCS Project Description Template shall be completed. The VCS Project Description has been provided by the project proponent, containing required sections completed, which was further validated by CEC as discussed above.

In summary, it is CEC’s opinion that, based on the validation report for the CDM registration dated 12 April 2010, Validation opinion prepared by ERM CVS for post registration changes dated 09 September 2013, and the additional information provided in the VCS Project Description, version 02 dated 24 May 2015, “Sichuan Furong Coal Mine Methane Utilization Project” meets all relevant VCS Version 3.5 requirements.

3.2 Methodology Deviations

Not applicable. There are no deviations identified for the methodology applied to the project.**Project Description Deviations**

There are no deviations identified for the methodology applied to the project.

3.4 Grouped Project

N/A

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project involves coal mine methane capture and utilization in power generation at captive CMM power plants. Generator sets (with model number 500GF1-2RW, installed at Baijiao and Gongquan CMM power plant, and JMS620GS generators installed at Baijiao and newly built Shanmushu CMM power plant) have been installed to utilise CMM extracted from Furong Group’s Baijiao, Shanmushu, Xunchang and Gongquan coal mines, and waste heat from the power generation process is recovered and utilized for coal miners. However, no ERs will be claimed for this component as conservative.

The project construction commenced on 31 August 2007, and the operation of the first generator was started on 28 November 2007. In May to June 2012, three 500GF1-2RW generators installed at Baijiao coal mine were moved to Gongquan CMM power plant. Based on the onsite inspection, interviewing onsite operators, and checking the Project Completion acceptance Reports, the implementation and operation status in terms of generators and waste heat boiler for each coal mine before May 2012 and after June 2012 are confirmed as stated in the tables below separately.

Table 4.1.1 Project implementation activities before May 2012

	Installed Capacity	Model	Waste heat boiler	Remarks
Baijiao CMM power plant	2.0 MW (4*0.5MW)	500GF1-2RW	Q2/500/0.28 -5.5-115/60	Put into operation on 28 November 2007
	6.096MW (2*3.048MW)	JMS620GS-S.L	-	Put into operation on 25 May 2009
Shanmushu CMM power plant	-	-	-	-
Gongquan CMM power plant	2.0MW (4*0.5MW)	500GF1-2RW	Q2/500/0.28 -1.0/120/60	Put into operation on 15 May 2009
Total	10.096 MW			

Table 4.1.2 Project implementation activities after June 2012

Location	Installed capacity	Model	Waste heat boiler	Remarks
Baijiao CMM power plant	0.5 MW (1* 0.5MW)	500GF1-2RW	Q2/500/0.28 -5.5-115/60	Three waste heat boilers as backup
	6.096MW (2*3.048MW)	JMS620GS-S.L	QC12/500-2.4-1.0-200	Completed installation on 20 December 2012
Shanmushu CMM power plant ³	6.096MW (2*3.048MW)	JMS620GS-S.L	Q12.4/493-1.75-0.8	Completed installation on 30 December 2012
Gongquan CMM power plant	3.5MW (7*0.5MW)	500GF1-2RW	Q2/500/0.28 -1.0/120/60r	Three 500GF1-2RW generators (without waste boilers) moved from Baijiao in May -June 2012
Total	16.192MW	-	-	Including the 3.048MW gas generator will be installed at Shanmushu coal mine in plan

Xunchang coal mine has stopped operation permanently since 25 April 2010 due to a water inrush accident, which is after the start date of the crediting period. After that the Xunchang Drainage Station was abandoned, and the CMM usage around Xunchang mine in the baseline scenario was covered by Baijiao and Shanmushu coal mines through the same gas grid which covers all 3 coal mines.

It is confirmed by the PPs during the interview that another gas generator with the model of JMS620GS-S.L (unit capacity is 3.048MW) will be installed at Shanmushu CMM power plant. Then, the installed capacity will be 16.192MW. It is also confirmed by the PP that two sets of 500kW domestic generators are used as backup, which was approved by local DRC. Thus the total actual capacity of the project activity will be about 15MW. All the changes had been included in the updated PDD version 08 dated 28 August 2013, and approved by the UNFCCC Executive Board on 18 December 2013.

The approved revised PDD is version 08 dated 28 August 2013 as shown on the CDM project view page (<http://cdm.unfccc.int/Projects/DB/DNV-CUK1244587133.21/view>), while is stated as CDM-PDD version 04.1 dated 06 November 2013 in the listed CVS MR. CAR 2 was raised. The VCS MR has been corrected. CEC reviewed the revised VCS MR and verified that date and version of the approved revised CDM PDD is correct. Thus, CAR 2 is closed.

Please refer to Table 4.1.3 and Table 4.1.4 below for the technical parameters of the already installed generators.

Table 4.1.3 Technical parameters of 3.048MW gas generators

³ One set of 3.048MW in Shanmushu coal mine area was installed in December 2012, but not put into commission until September 2013, It is planned that another 3.048MW gas generator will be installed at Shanmushu coal mine.

Parameter	Value
Model	JMS620GS-S.L
Rated power	3048 kW
Power factor	1
Rated voltage	6300 V
Rate speed	1500
Weight	22200 kg
Technical lifetime	20years
Amount	4
Location	2 at Baijiao coal mine, 1 at Shanmushu coal mine and 1 is planned installing at Shanmushu coal mine

Table 4.1.4 Technical parameters of 500KW gas generators

Parameter	Value
Model	500GF1-2RW
Rated Power	500 kW
Power factor	0.8
Rated voltage	400V
Rate Speed	1000r/min
Weight	13350kg
Technical lifetime	>20years
Amount	8
Location	7 sets at Gongquan CMM power plant and 1 set at Baijiao CMM power plant
Remarks	Among the 8 sets gas generators, 2 sets will be used as back-up for hardware replacement.

The specifications of these waste heat boilers are shown in the Table 4.1.5 - Table 4.1.6 below.

Table 4.1.5 Technical parameters of waste heat boilers for 500KW gas generator

Items	Baijiao	Gongquan
Model	Q2/500-0.28-5.5/120/60	Q2/500-0.28-1.0/120
Rated heat output	0.28 MW	0.28 MW
Rated outflow pressure	5.5 Mpa	1.0 Mpa
Rated outflow temperature	115 °C	120 °C
Backwater temperature	60 °C	60 °C

Table 4.1.6 Technical parameters of waste heat boilers for 3048KW gas generator

Items	Baijiao	Shanmushu
Model	QC12/500-2.4-1.0-200	Q12.4/493-1.75-0.8
Rated heat output	2.4t/h	1.75t/h
Rated outflow pressure	1.0Mpa	0.8Mpa
Rated outflow temperature	200°C	175°C
Backwater temperature	10°C	20°C

The verification team has performed an on-site visit to verify the real implementation of the project against the description in the approved CDM PDD. All facilities and equipment as described in the approved CDM PDD are in place and the PP has operated the Project as per the approved CDM PDD.

- **Monitoring System**

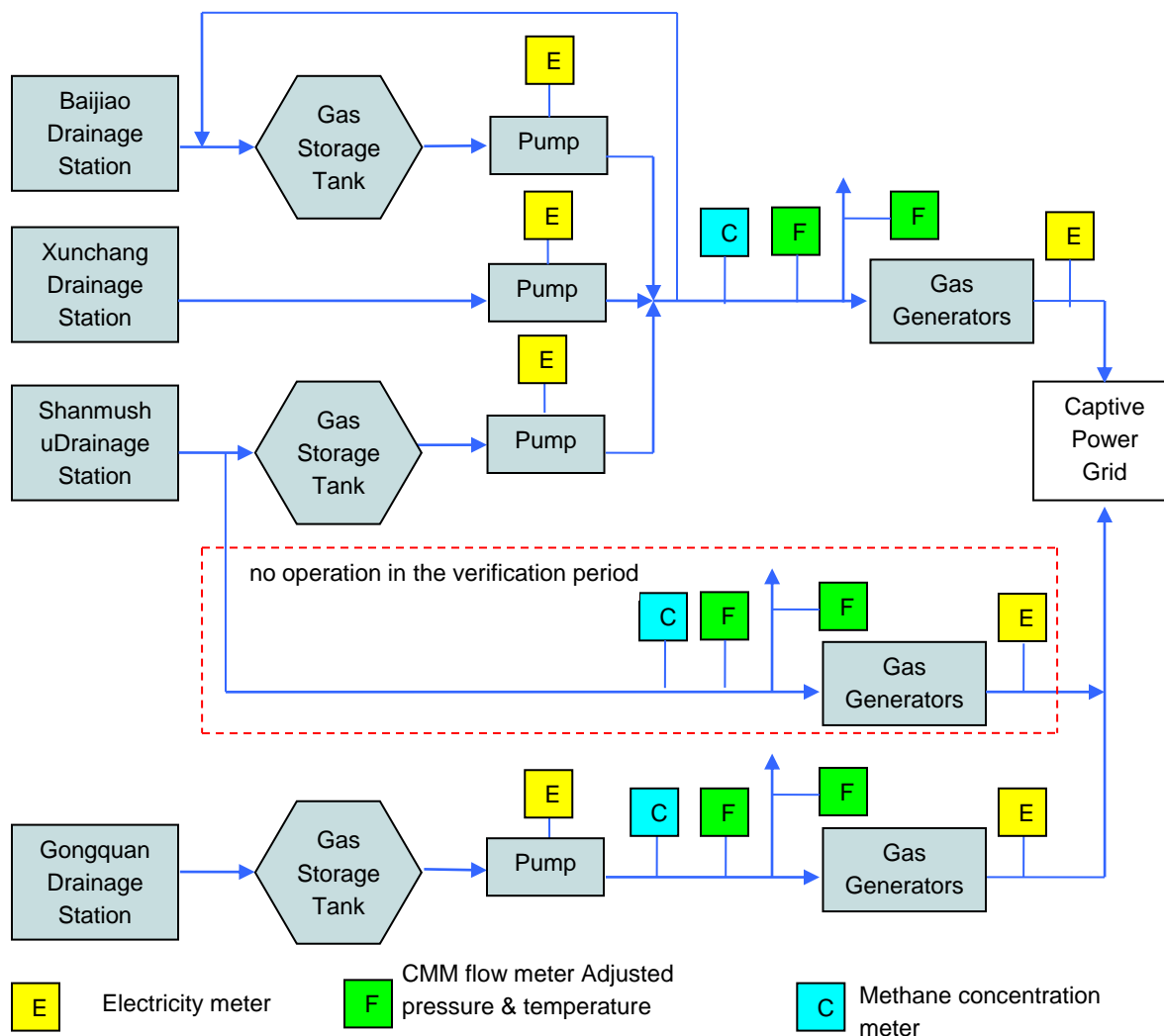
Based on the site inspections, reviewing the design specifications of CMM monitoring system and the interview during site visit, CEC confirms that the methane sent to and destroyed by CMM power plant (MM_{ELEC}) has been continuously measured by the V-cone gas flow meters (with combined pressure sensors and temperature sensors) installed at the inlet pipeline and the evacuation valve pipeline before gas generators, and infrared methane concentration meters installed at the inlet pipeline of the Baijiao and Gongquan CMM power plants; concentration of methane (PC_{CH_4}) was measured continuously by infrared methane concentration meters installed at the inlet pipeline of the power plants, which also contributed to the measurement of parameter MM_{ELEC} . It is verified that the CMM gas monitoring system is in compliance with the applied methodology and the approved revised monitoring plan.

The concentration (in mass) of NMHC in extracted gas (PC_{NMHC}) was analysed by an external qualified laboratory.

The electricity generated by the Project (GEN_y) is supplied to the captive power grid (electricity supplied by the CCPG and the power generation by the Project activity), which services the Baijiao, Shanmushu and Gongquan coal mines. Electricity delivered to and imported from the captive power grid is continuously measured by the electricity meters installed at the outlet of Baijiao and Gongquan CMM power plants. For the additional electricity consumption ($CONS_{ELEC,PJ}$), electricity meters are installed at each pump station to continuously measure the additional electricity consumption by the project.

Verification team observed that one gas generator with 3.048 MW installed capacity had been installed at the newly built Shanmushu CMM power plant, however, the gas generator was not put into operation

before the end of year 2012.



As per the approved revised monitoring plan contained in CDM-PDD version 08 dated 28 August 2013, the parameters “FC_{i,y}”, “NCV_i”, “EF_{CO2,i,y}”, “EG_y”, and “CEFE_{ELEC}” are not monitoring parameters. But they were listed in section 3.2 in VCS MR version 01 dated 11 May 2015. CAR 3 was raised. The MR has been revised. CEC reviewed the revised VCS MR and verified that the parameters “FC_{i,y}”, “NCV_i”, “EF_{CO2,i,y}”, “EG_y”, and “CEFE_{ELEC}” were removed from the section 3.2 in revised VCS MR, the ex ante determined emission factor CEF_{ELEC} of 0.9745 tCO₂/MWh is applied in the emission reduction calculation spreadsheet, and this is in line with the updated monitoring plan contained in the approved revised CDM-PDD version 08 dated 28 August 2013. Therefore, the CAR 3 is closed.

The parameters required by the monitoring plan and the way CEC has verified the information flow (from data generation, aggregation, to recording, calculation and reporting for these parameters) including the values in the monitoring reports is described below:

CONS_{ELEC,PJ} is additional electric power consumption by the project in year y. During the site visit, CEC checked and confirmed that the parameter is monitored by electricity meters located at each coal mine pump stations to monitor electricity consumed for pumping CMM to the gas generators. The accuracy class is 0.5, which is in line with the monitoring plan.

As per the calibration reports for the electricity meters issued by Electric Energy Metrological Station of Gongxian Quality Supervision Bureau, who is a qualified third party, the calibrations have been conducted at the required calibration frequency (once a year) which is in accordance with the monitoring plan and the applied methodology ACM0008 Version 04. The consumed electricity by the Project CONS_{ELEC,PJ} is cross-checked according to monthly electricity transaction notes between Sichuan Furong Group's Limited Industrial Company and Yibin Furong Electricity Limited Company and found to be consistent. Based on the document review and site inspections, CEC concluded that the monitoring data was continuously measured and recorded daily as required by the monitoring plan.

MM_{ELEC} is Methane sent to CMM power plant.

During the site visit, the verification team identified that two V-cone gas flow meters were installed for each CMM power plant. One is located at the inlet pipeline before the emergency vent pipeline, to monitor the CMM gas flow delivered to the CMM power plant and discharged via the evacuation valves, the other is located at the evacuation valve pipeline, to monitor the CMM gas flow discharged via the evacuation valve. Both the gas flow meters and methane concentration meter are of accuracy level of 0.5. It is confirmed that the V-cone gas flow meter combining the temperature sensor and pressure sensor to monitor the actual temperature and pressure, and the system automatically converts the flow volume to the normal volume automatically (Nm³, 1.013kba, 20°C) every 6 seconds. At the same time, the methane concentration is continuously monitored by the installed infrared methane concentration meters and also automatically reading every 6 seconds. Then, CMM flow was converted (Nm³ CMM multiply by the methane concentration (% in mass)) to Nm³CH₄, and finally to tCH₄ (Nm³CH₄ multiply the density of methane, 0.67g/m³ as per ACM0008 version 04) by the monitoring system every 6 seconds. After that the data is integrating and aggregated daily, monthly and yearly automatically by the monitoring system. The calibration frequency for this equipment is annually. Thus, the monitoring practice meets the requirements by the monitoring plan.

PC_{CH4} is concentration (in mass) of methane in extracted gas (%), measured on wet basis.

During the site visit, CEC checked and confirmed that the parameter is monitored by 1 methane concentration meter with accuracy level of 0.5 installed at the inlet pipeline of the each CMM power plant. The verification team observed that, the methane concentration is continuously monitored by the installed infrared methane concentration meters and automatically reads every 6 seconds. Then, the monitoring data is integrated and aggregated daily, monthly and yearly basing on the readings of every 6 seconds by the monitoring system automatically. The calibration frequency for this equipment is annually. Thus, the monitoring practice meets the requirements by the monitoring plan.

PC_{NMHC} is concentration of NMHC in extracted gas

In order to analyze the concentration of NMHC in extracted gas (PC_{NMHC}), the extracted gas is sampled and then analysed by Sichuan Quality Supervision and Inspection Institute for Gaseous Product, who is a qualified independent third party. CEC reviewed the gas analysis reports and found that the concentration

of NMHC in extracted gas is annually analysed. Thus, the monitoring practice meets the requirements by the monitoring plan.

CEF_{NMHC} is the carbon emission factor for combusted non methane hydrocarbons (various). It is calculated based on the NMHC test. As per the test reports prepared by Sichuan Quality Supervision and Inspection Institute for Gaseous Product, NMHC accounts for less than 1% by volume of extracted coal mine gas. Thus 0 is applied for the emission reduction calculations. The test had been carried out once a year in accordance with national standards.

GEN_y is the electricity generated by gas generators. During the site visit, CEC checked and confirmed that the parameter is monitored by bidirectional electricity meters located at the outlet of each CMM power plant to continuously monitor the amount of electricity supply and electricity imported for self-consumption by the CMM power plant. The calibration frequency for this equipment is annually which is in line with the monitoring plan. CEC concluded that the monitoring data was continuously measured and recorded daily, which meets the requirements by the monitoring plan. Monthly generated electricity GEN_y is cross-checked against the monthly electricity transaction notes between Sichuan Furong Group's Limited Industrial Company and Yibin Furong Electricity Limited Company and found to be consistent.

- **Data and parameters available at validation**

The parameters determined ex-ante is described below:

Eff_{ELEC}: the efficiency of methane destruction in power plant, 99.5% is applied as IPCC default value

GWP_{CH4}: global warming potential of methane, 21 is applied as IPCC default value

CEFC_{H4}: Carbon emission factor for combusted methane, 2.75 is applied as per ACM0008 (ver.04)

D_{CH4}: Density of methane under normal conditions (20°C and 101.325kPa) in the exhaust gases, 0.00067 tCH₄/m³ is applied as IPCC default value.

CEF_{ELEC}: Due to the fact that the on-site captive plant was closed as per the government requirement, only considering the electricity from the CCPG is displaced. 0.9745 tCO₂/MWh is applied as per the approved revised CDM PDD.

Based on the verification team's observations, interviews during the site inspections, and review of the data collected, CEC has verified that the implementation of the Project is consistent with the approved revised CDM-PDD.

For the parameters in section 3.1 in the listed VCS MR version 01 dated 11 May 2015: 1) As per the approved revised CDM-PDD version 08 dated 28 August 2013, the parameter for the efficiency of methane destruction in power plant is "Eff_{ELEC}". However, it is stated as "EF_{NG,upstream,y}"; 2) As per the approved revised CDM-PDD version 08 dated 28 August 2013, the parameter "CEFC_{H4}" is ex-ante determined. However, it is not listed in section 3.1 in the VCS MR. CAR 4 was raised. The VCS MR has been revised. . CEC reviewed the revised VCS MR and verified that: 1) efficiency of methane destruction in power plant was revised to Eff_{ELEC}; 2) the parameter "CEFC_{H4}" was included as ex-ante determined and listed in section 3.1 of the revised MR, this is in line with the approved revised CDM-PDD version 08 dated 28 August 2013. Therefore, the CAR 4 is closed.

4.2 Accuracy of GHG Emission Reduction and Removal Calculations

As per the applied methodology ACM0008 version 04 and the approved revised PDD, the GHG emission reductions achieved by the project activity are calculated using the following equation:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y Emissions reductions of the project activity during the year y (tCO₂e)

BE_y Baseline emissions during the year y (tCO₂e)

PE_y Project emissions during the year y (tCO₂e)

LE_y Leakage emissions in year y (tCO₂e)

Baseline emissions

The project activity includes the CMM capture and sent to power plants, no other technologies such as flaring, catalytic oxidation, etc., are being applied. As per the applied methodology ACM0008 version 04 and the approved revised CDM PDD, the baseline emissions are calculated as follows:

$$BE_y = BE_{MD,y} + BE_{MR,y} + BE_{Use,y}$$

- **Methane destruction in the baseline**

In the baseline scenario, a small portion of the extracted CMM is utilized by residential users through the gas grid. Emission reduction from this part is not considered and methane destruction in the baseline is set to zero. This is conservative.

- **Methane released into the atmosphere**

$$BE_{MR,y} = GWP_{CH_4} \times MM_{ELEC}$$

For the pre-mining CMM and post-mining CMM in the Project, there is a common drainage system and it is impossible to install separated systems, so, MM_{ELEC} includes the pre-mining CMM and post-mining CMM.

Table 4.2.1 Methane sent to Baijiao CMM power plant that would be released into the atmosphere

Year	MM_{ELEC} (m ³)	MM_{ELEC} (tCH ₄)	$BE_{MR,y}$ (tCO ₂ e)
16/04/2010-30/04/2010	261686.36	175.33	3,682
01/05/2010-31/05/2010	645160.14	432.26	9,077
01/06/2010-30/06/2010	599610.41	401.74	8,437
01/07/2010-31/07/2010	594684.58	398.44	8,367
01/08/2010-31/08/2010	630231.71	422.26	8,867
01/09/2010-30/09/2010	674639.33	452.01	9,492

01/10/2010-31/10/2010	572649.59	383.68	8,057
01/11/2010-30/11/2010	466309.81	312.43	6,561
01/12/2010-31/12/2010	434658.15	291.22	6,116
01/01/2011-31/01/2011	338359.07	226.70	4,761
01/02/2011-28/02/2011	417193.85	279.52	5,870
01/03/2011-31/03/2011	738434.12	494.75	10,390
01/04/2011-30/04/2011	685292.52	459.15	9,642
01/05/2011-31/05/2011	738136.29	494.55	10,386
01/06/2011-30/06/2011	636635.11	426.55	8,957
01/07/2011-31/07/2011	540937.67	362.43	7,611
01/08/2011-31/08/2011	501175.2	335.79	7,052
01/09/2011-30/09/2011	462513.37	309.88	6,508
01/10/2011-31/10/2011	461663.6	309.31	6,496
01/11/2011-30/11/2011	656610.77	439.93	9,239
01/12/2011-31/12/2011	678497.19	454.59	9,546
01/01/2012-31/01/2012	314423.62	210.66	4,424
01/02/2012-29/02/2012	297052.34	199.03	4,180
01/03/2012-31/03/2012	486024.11	325.64	6,838
01/04/2012-30/04/2012	571200.7	382.70	8,037
01/05/2012-31/05/2012	618913.55	414.67	8,708
01/06/2012-30/06/2012	570327.7	382.12	8,025
01/07/2012-31/07/2012	449437.38	301.12	6,324
01/08/2012-31/08/2012	338600.96	226.86	4,764
01/09/2012-30/09/2012	319918.73	214.35	4,501
01/10/2012-31/10/2012	366504.91	245.56	5,157
01/11/2012-30/11/2012	620508.61	415.74	8,731
01/12/2012-31/12/2012	566197.73	379.35	7,966
Total	17254189.18	11560.31	242,766

Table 4.2.2 Methane sent to Gongquan CMM power plant that would be released into the atmosphere

Year	MM_{ELEC} (m ³)	MM_{ELEC} (tCH ₄)	$BE_{MR,y}$ (tCO ₂ e)
16/04/2010-30/04/2010	151698.81	101.64	2,134
01/05/2010-31/05/2010	362329.14	242.76	5,098
01/06/2010-30/06/2010	348463.77	233.47	4,903
01/07/2010-31/07/2010	326089.58	218.48	4,588
01/08/2010-31/08/2010	294268.24	197.16	4,140
01/09/2010-30/09/2010	227180.81	152.21	3,196
01/10/2010-31/10/2010	223444.99	149.71	3,144
01/11/2010-30/11/2010	284912.33	190.89	4,009
01/12/2010-31/12/2010	229699.63	153.90	3,232
01/01/2011-31/01/2011	330159.54	221.21	4,645
01/02/2011-28/02/2011	402993.2	270.01	5,670
01/03/2011-31/03/2011	391767.36	262.48	5,512
01/04/2011-30/04/2011	467544.26	313.25	6,578
01/05/2011-31/05/2011	480144.55	321.70	6,756

01/06/2011-30/06/2011	325107.74	217.82	4,574
01/07/2011-31/07/2011	244642.47	163.91	3,442
01/08/2011-31/08/2011	269249.67	180.40	3,788
01/09/2011-30/09/2011	235704.34	157.92	3,316
01/10/2011-31/10/2011	253878.88	170.10	3,572
01/11/2011-30/11/2011	311231.94	208.53	4,379
01/12/2011-31/12/2011	301057.29	201.71	4,236
01/01/2012-31/01/2012	316663.47	212.16	4,455
01/02/2012-29/02/2012	257893.53	172.79	3,629
01/03/2012-31/03/2012	332028.04	222.46	4,672
01/04/2012-30/04/2012	295494.69	197.98	4,158
01/05/2012-31/05/2012	386464.19	258.93	5,438
01/06/2012-30/06/2012	383688.54	257.07	5,398
01/07/2012-31/07/2012	503162.5	337.12	7,079
01/08/2012-31/08/2012	529464.68	354.74	7,450
01/09/2012-30/09/2012	522700.75	350.21	7,354
01/10/2012-31/10/2012	507216.69	339.84	7,137
01/11/2012-30/11/2012	446592.51	299.22	6,284
01/12/2012-31/12/2012	393188.51	263.44	5,532
Total	11,336,127	7595.20	159,499

- **Emissions from power and heat generation replaced by the project**

$$BE_{Use,y} = GEN_y \times CEF_{ELEC}$$

In the baseline scenario the coal mine consumed electricity from both the on-site captive plant and the CCPG, thus the combined emission factor should be applied, however due to the fact that on-site captive plant was closed as per the local government requirements, only considering the electricity from the CCPG is displaced. So the CEF_{ELEC} is the same as CCPG emissions factor. CEC checked the approved revised CDM PDD and the Validation opinion prepared by ERM CVS for post registration changes dated 09 September 2013, and confirmed that it is conservative. Therefore the CEF_{ELEC} 0.9745 tCO₂/MWh is applied in the emission reduction calculations.

Table 4.2.3 Emissions from electricity displaced by Baijiao CMM power plant

Year	GEN_y (MWh)	$BE_{Use,y}$ (tCO ₂ e)
16/04/2010-30/04/2010	977.760	953
01/05/2010-31/05/2010	2758.212	2,688
01/06/2010-30/06/2010	2310.624	2,252
01/07/2010-31/07/2010	2416.848	2,355
01/08/2010-31/08/2010	2403.300	2,342
01/09/2010-30/09/2010	2772.576	2,702
01/10/2010-31/10/2010	2405.472	2,344
01/11/2010-30/11/2010	1964.160	1,914
01/12/2010-31/12/2010	1711.392	1,668

01/01/2011-31/01/2011	992.640	967
01/02/2011-28/02/2011	1386.288	1,351
01/03/2011-31/03/2011	2015.040	1,964
01/04/2011-30/04/2011	2626.716	2,560
01/05/2011-31/05/2011	2604.324	2,538
01/06/2011-30/06/2011	2416.704	2,355
01/07/2011-31/07/2011	2292.144	2,234
01/08/2011-31/08/2011	2052.240	2,000
01/09/2011-30/09/2011	2113.752	2,059
01/10/2011-31/10/2011	1883.232	1,836
01/11/2011-30/11/2011	1975.872	1,925
01/12/2011-31/12/2011	1783.680	1,738
01/01/2012-31/01/2012	755.904	737
01/02/2012-29/02/2012	906.432	883
01/03/2012-31/03/2012	1503.168	1,465
01/04/2012-30/04/2012	2271.072	2,213
01/05/2012-31/05/2012	2198.592	2,143
01/06/2012-30/06/2012	1980.480	1,930
01/07/2012-31/07/2012	1470.528	1,433
01/08/2012-31/08/2012	1003.104	978
01/09/2012-30/09/2012	998.400	973
01/10/2012-31/10/2012	1177.824	1,148
01/11/2012-30/11/2012	1989.504	1,939
01/12/2012-31/12/2012	2499.744	2,436
Total	62617.728	61,021

Table 4.2.4 Emissions from electricity displaced by Gongquan CMM power plant

Year	GEN _y (MWh)	$BE_{Use,y}$ (tCO _{2e})
16/04/2010-30/04/2010	574.164	560
01/05/2010-31/05/2010	902.628	880
01/06/2010-30/06/2010	939.132	915
01/07/2010-31/07/2010	860.94	839
01/08/2010-31/08/2010	685.764	668
01/09/2010-30/09/2010	538.992	525
01/10/2010-31/10/2010	566.1	552
01/11/2010-30/11/2010	796.248	776
01/12/2010-31/12/2010	692.82	675
01/01/2011-31/01/2011	921.492	898
01/02/2011-28/02/2011	1087.956	1,060
01/03/2011-31/03/2011	860.976	839
01/04/2011-30/04/2011	942.3	918
01/05/2011-31/05/2011	1080.36	1,053
01/06/2011-30/06/2011	960.804	936

01/07/2011-31/07/2011	784.584	765
01/08/2011-31/08/2011	959.184	935
01/09/2011-30/09/2011	884.196	862
01/10/2011-31/10/2011	913.104	890
01/11/2011-30/11/2011	764.676	745
01/12/2011-31/12/2011	821.232	800
01/01/2012-31/01/2012	977.04	952
01/02/2012-29/02/2012	685.08	668
01/03/2012-31/03/2012	721.944	704
01/04/2012-30/04/2012	787.248	767
01/05/2012-31/05/2012	1014.984	989
01/06/2012-30/06/2012	973.836	949
01/07/2012-31/07/2012	1146.744	1,118
01/08/2012-31/08/2012	1340.064	1,306
01/09/2012-30/09/2012	1330.452	1,297
01/10/2012-31/10/2012	1320.336	1,287
01/11/2012-30/11/2012	1253.376	1,221
01/12/2012-31/12/2012	1078.56	1,051
Total	30167.316	29,398

Table 4.2.5 Baseline emissions of Baijiao CMM power plant

Year	$BE_{MD,y}$ (tCO ₂ e)	$BE_{MR,y}$ (tCO ₂ e)	$BE_{Use,y}$ (tCO ₂ e)	BE_y (tCO ₂ e)
16/04/2010-30/04/2010	0	3,682	953	4,635
01/05/2010-31/05/2010	0	9,077	2,688	11,765
01/06/2010-30/06/2010	0	8,437	2,252	10,688
01/07/2010-31/07/2010	0	8,367	2,355	10,722
01/08/2010-31/08/2010	0	8,867	2,342	11,209
01/09/2010-30/09/2010	0	9,492	2,702	12,194
01/10/2010-31/10/2010	0	8,057	2,344	10,401
01/11/2010-30/11/2010	0	6,561	1,914	8,475
01/12/2010-31/12/2010	0	6,116	1,668	7,783
01/01/2011-31/01/2011	0	4,761	967	5,728
01/02/2011-28/02/2011	0	5,870	1,351	7,221
01/03/2011-31/03/2011	0	10,390	1,964	12,353
01/04/2011-30/04/2011	0	9,642	2,560	12,202
01/05/2011-31/05/2011	0	10,386	2,538	12,924
01/06/2011-30/06/2011	0	8,957	2,355	11,313
01/07/2011-31/07/2011	0	7,611	2,234	9,845
01/08/2011-31/08/2011	0	7,052	2,000	9,051
01/09/2011-30/09/2011	0	6,508	2,059	8,566
01/10/2011-31/10/2011	0	6,496	1,836	8,332
01/11/2011-30/11/2011	0	9,239	1,925	11,164
01/12/2011-31/12/2011	0	9,546	1,738	11,285

01/01/2012-31/01/2012	0	4,424	737	5,161
01/02/2012-29/02/2012	0	4,180	883	5,063
01/03/2012-31/03/2012	0	6,838	1,465	8,303
01/04/2012-30/04/2012	0	8,037	2,213	10,250
01/05/2012-31/05/2012	0	8,708	2,143	10,851
01/06/2012-30/06/2012	0	8,025	1,930	9,954
01/07/2012-31/07/2012	0	6,324	1,433	7,757
01/08/2012-31/08/2012	0	4,764	978	5,742
01/09/2012-30/09/2012	0	4,501	973	5,474
01/10/2012-31/10/2012	0	5,157	1,148	6,305
01/11/2012-30/11/2012	0	8,731	1,939	10,669
01/12/2012-31/12/2012	0	7,966	2,436	10,402
Total	0	242,766	61,021	303,787

Table 4.2.6 Baseline emissions of Gongquan CMM power plant

Year	$BE_{MD,y}$ (tCO ₂ e)	$BE_{MR,y}$ (tCO ₂ e)	$BE_{Use,y}$ (tCO ₂ e)	BE_y (tCO ₂ e)
16/04/2010-30/04/2010	0	2,134	560	2,694
01/05/2010-31/05/2010	0	5,098	880	5,978
01/06/2010-30/06/2010	0	4,903	915	5,818
01/07/2010-31/07/2010	0	4,588	839	5,427
01/08/2010-31/08/2010	0	4,140	668	4,809
01/09/2010-30/09/2010	0	3,196	525	3,722
01/10/2010-31/10/2010	0	3,144	552	3,696
01/11/2010-30/11/2010	0	4,009	776	4,785
01/12/2010-31/12/2010	0	3,232	675	3,907
01/01/2011-31/01/2011	0	4,645	898	5,543
01/02/2011-28/02/2011	0	5,670	1,060	6,730
01/03/2011-31/03/2011	0	5,512	839	6,351
01/04/2011-30/04/2011	0	6,578	918	7,497
01/05/2011-31/05/2011	0	6,756	1,053	7,808
01/06/2011-30/06/2011	0	4,574	936	5,511
01/07/2011-31/07/2011	0	3,442	765	4,207
01/08/2011-31/08/2011	0	3,788	935	4,723
01/09/2011-30/09/2011	0	3,316	862	4,178
01/10/2011-31/10/2011	0	3,572	890	4,462
01/11/2011-30/11/2011	0	4,379	745	5,124
01/12/2011-31/12/2011	0	4,236	800	5,036
01/01/2012-31/01/2012	0	4,455	952	5,408
01/02/2012-29/02/2012	0	3,629	668	4,296
01/03/2012-31/03/2012	0	4,672	704	5,375
01/04/2012-30/04/2012	0	4,158	767	4,925
01/05/2012-31/05/2012	0	5,438	989	6,427

01/06/2012-30/06/2012	0	5,398	949	6,348
01/07/2012-31/07/2012	0	7,079	1,118	8,197
01/08/2012-31/08/2012	0	7,450	1,306	8,755
01/09/2012-30/09/2012	0	7,354	1,297	8,651
01/10/2012-31/10/2012	0	7,137	1,287	8,423
01/11/2012-30/11/2012	0	6,284	1,221	7,505
01/12/2012-31/12/2012	0	5,532	1,051	6,583
Total	0	159,499	29,398	188,897

Project emissions

Project emissions are defined by the following equation:

$$PE_y = PE_{ME} + PE_{MD} + PE_{UM}$$

- **Combustion emissions from additional energy required for CMM capture and use**

$$PE_{ME} = CONS_{ELEC,PJ} \times CEF_{ELEC}$$

Table 4.2.7 Project emissions from additional energy use in Baijiao, Shanmushu and Xunchang

Years	$CONS_{ELEC,PJ}$ (MWh)	PE_{ME} (tCO _{2e})
16/04/2010-30/04/2010	65.880	64
01/05/2010-31/05/2010	110.280	107
01/06/2010-30/06/2010	107.040	104
01/07/2010-31/07/2010	113.080	110
01/08/2010-31/08/2010	113.560	111
01/09/2010-30/09/2010	111.360	109
01/10/2010-31/10/2010	114.840	112
01/11/2010-30/11/2010	110.640	108
01/12/2010-31/12/2010	112.280	109
01/01/2011-31/01/2011	131.760	128
01/02/2011-28/02/2011	116.680	114
01/03/2011-31/03/2011	149.280	145
01/04/2011-30/04/2011	114.973	112
01/05/2011-31/05/2011	116.059	113
01/06/2011-30/06/2011	118.731	116
01/07/2011-31/07/2011	119.693	117
01/08/2011-31/08/2011	112.880	110
01/09/2011-30/09/2011	106.816	104
01/10/2011-31/10/2011	110.706	108
01/11/2011-30/11/2011	107.602	105
01/12/2011-31/12/2011	110.826	108
01/01/2012-31/01/2012	107.131	104
01/02/2012-29/02/2012	109.520	107

01/03/2012-31/03/2012	108.562	106
01/04/2012-30/04/2012	108.317	106
01/05/2012-31/05/2012	97.859	95
01/06/2012-30/06/2012	110.357	108
01/07/2012-31/07/2012	91.691	89
01/08/2012-31/08/2012	76.232	74
01/09/2012-30/09/2012	76.464	75
01/10/2012-31/10/2012	77.019	75
01/11/2012-30/11/2012	88.926	87
01/12/2012-31/12/2012	81.419	79
Total	3508.462	3,419

Table 4.2.8 Project emissions from additional energy use in Gongquan

Years	$CONS_{ELEC,PJ}$ (MWh)	PE_{ME} (tCO_{2e})
16/04/2010-30/04/2010	8.654	8
01/05/2010-31/05/2010	18.077	18
01/06/2010-30/06/2010	17.284	17
01/07/2010-31/07/2010	17.729	17
01/08/2010-31/08/2010	17.962	18
01/09/2010-30/09/2010	17.772	17
01/10/2010-31/10/2010	18.058	18
01/11/2010-30/11/2010	17.390	17
01/12/2010-31/12/2010	18.087	18
01/01/2011-31/01/2011	14.285	14
01/02/2011-28/02/2011	8.916	9
01/03/2011-31/03/2011	9.903	10
01/04/2011-30/04/2011	9.832	10
01/05/2011-31/05/2011	12.618	10
01/06/2011-30/06/2011	13.346	15
01/07/2011-31/07/2011	13.938	14
01/08/2011-31/08/2011	13.981	14
01/09/2011-30/09/2011	13.098	13
01/10/2011-31/10/2011	13.616	13
01/11/2011-30/11/2011	13.230	13
01/12/2011-31/12/2011	14.395	14
01/01/2012-31/01/2012	13.516	13
01/02/2012-29/02/2012	12.318	12
01/03/2012-31/03/2012	13.750	13
01/04/2012-30/04/2012	13.392	13
01/05/2012-31/05/2012	13.680	13
01/06/2012-30/06/2012	13.462	13
01/07/2012-31/07/2012	14.058	14
01/08/2012-31/08/2012	18.822	18
01/09/2012-30/09/2012	14.380	14

01/10/2012-31/10/2012	14.183	14
01/11/2012-30/11/2012	15.129	15
01/12/2012-31/12/2012	14.456	14
Total	473.318	461

- **Combustion emissions from use of captured methane**

$$PE_{MD} = MD_{ELEC} \times (CEF_{CH_4} + r \times CEF_{NMHC})$$

$$r = Pc_{NMHC} / Pc_{CH_4}$$

The yearly tests shows that the concentration of NMHC in extracted CMM from Furong coal mines only accounts no more than 0.016% or 0.014% in volume, which is much lower than 1%. Therefore, the combustion emission from NMHC is ignored in ex ante emission calculations.

$$PE_{MD} = MD_{ELEC} \times CEF_{CH_4}$$

$$MD_{ELEC} = MM_{ELEC} \times Eff_{ELEC}$$

The IPCC default value of Eff_{ELEC} , 99.5%, is applied to the proposed project. With CEF_{CH_4} value of 2.75 tCO₂/tCH₄, PE_{MD} is calculated and shown in the table below.

Table 4.2.9 PE_{MD} from use of captured methane from Baijiao, Shanmushu and Xunchang

Years	MM _{ELEC} (tCH ₄)	MD _{ELEC} (tCH ₄)	PE _{MD} (tCO ₂ e)
16/04/2010-30/04/2010	175.33	174.45	480
01/05/2010-31/05/2010	432.26	430.10	1,183
01/06/2010-30/06/2010	401.74	399.73	1,099
01/07/2010-31/07/2010	398.44	396.45	1,090
01/08/2010-31/08/2010	422.26	420.14	1,155
01/09/2010-30/09/2010	452.01	449.75	1,237
01/10/2010-31/10/2010	383.68	381.76	1,050
01/11/2010-30/11/2010	312.43	310.87	855
01/12/2010-31/12/2010	291.22	289.76	797
01/01/2011-31/01/2011	226.70	225.57	620
01/02/2011-28/02/2011	279.52	278.12	765
01/03/2011-31/03/2011	494.75	492.28	1,354
16/04/2010-30/04/2011	459.15	456.85	1,256
01/05/2011-31/05/2011	494.55	492.08	1,353
01/06/2011-30/06/2011	426.55	424.41	1,167
01/07/2011-31/07/2011	362.43	360.62	992
01/08/2011-31/08/2011	335.79	334.11	919

01/09/2011-30/09/2011	309.88	308.33	848
01/10/2011-31/10/2011	309.31	307.77	846
01/11/2011-30/11/2011	439.93	437.73	1,204
01/12/2011-31/12/2011	454.59	452.32	1,244
01/01/2012-31/01/2012	210.66	209.61	576
01/02/2012-29/02/2012	199.03	198.03	545
01/03/2012-31/03/2012	325.64	324.01	891
01/04/2012-30/04/2012	382.70	380.79	1,047
01/05/2012-31/05/2012	414.67	412.60	1,135
01/06/2012-30/06/2012	382.12	380.21	1,046
01/07/2012-31/07/2012	301.12	299.62	824
01/08/2012-31/08/2012	226.86	225.73	621
01/09/2012-30/09/2012	214.35	213.27	587
01/10/2012-31/10/2012	245.56	244.33	672
01/11/2012-30/11/2012	415.74	413.66	1,138
01/12/2012-31/12/2012	379.35	377.46	1,038
Total	11560.31	11502.51	31,632

Table 4.2.10 PE_{MD} from use of captured methane from Gongquan

Years	MM_{ELEC} (tCH ₄)	MD_{ELEC} (tCH ₄)	PE_{MD} (tCO ₂ e)
16/04/2010-30/04/2010	101.64	101.13	278
01/05/2010-31/05/2010	242.76	241.55	664
01/06/2010-30/06/2010	233.47	232.30	639
01/07/2010-31/07/2010	218.48	217.39	598
01/08/2010-31/08/2010	197.16	196.17	539
01/09/2010-30/09/2010	152.21	151.45	416
01/10/2010-31/10/2010	149.71	148.96	410
01/11/2010-30/11/2010	190.89	189.94	522
01/12/2010-31/12/2010	153.90	153.13	421
01/01/2011-31/01/2011	221.21	220.10	605
01/02/2011-28/02/2011	270.01	268.66	739
01/03/2011-31/03/2011	262.48	261.17	718
16/04/2010-30/04/2011	313.25	311.69	857
01/05/2011-31/05/2011	321.70	320.09	880
01/06/2011-30/06/2011	217.82	216.73	596
01/07/2011-31/07/2011	163.91	163.09	448
01/08/2011-31/08/2011	180.40	179.50	494
01/09/2011-30/09/2011	157.92	157.13	432
01/10/2011-31/10/2011	170.10	169.25	465
01/11/2011-30/11/2011	208.53	207.48	571
01/12/2011-31/12/2011	201.71	200.70	552
01/01/2012-31/01/2012	212.16	211.10	581
01/02/2012-29/02/2012	172.79	171.92	473

01/03/2012-31/03/2012	222.46	221.35	609
01/04/2012-30/04/2012	197.98	196.99	542
01/05/2012-31/05/2012	258.93	257.64	708
01/06/2012-30/06/2012	257.07	255.79	703
01/07/2012-31/07/2012	337.12	335.43	922
01/08/2012-31/08/2012	354.74	352.97	971
01/09/2012-30/09/2012	350.21	348.46	958
01/10/2012-31/10/2012	339.84	338.14	930
01/11/2012-30/11/2012	299.22	297.72	819
01/12/2012-31/12/2012	263.44	262.12	721
Total	7595.20	7557.23	20,782

- **Un-combusted methane from end uses**

Not all of the methane used to generate electricity will be combusted, and a small amount will escape into the atmosphere.

$$PE_{UM} = GWP_{CH_4} \times MM_{ELEC} \times (1 - Eff_{ELEC})$$

Table 4.2.11 Un-combusted methane from end uses in Baijiao, Shanmushu and Xunchang

Year	MM_{ELEC} (tCH ₄)	Total CH ₄ emissions (tCH ₄)	PE_{UM} (tCO ₂ e)
16/04/2010-30/04/2010	175.33	0.88	18.41
01/05/2010-31/05/2010	432.26	2.16	45.39
01/06/2010-30/06/2010	401.74	2.01	42.18
01/07/2010-31/07/2010	398.44	1.99	41.84
01/08/2010-31/08/2010	422.26	2.11	44.34
01/09/2010-30/09/2010	452.01	2.26	47.46
01/10/2010-31/10/2010	383.68	1.92	40.29
01/11/2010-30/11/2010	312.43	1.56	32.80
01/12/2010-31/12/2010	291.22	1.46	30.58
01/01/2011-31/01/2011	226.70	1.13	23.80
01/02/2011-28/02/2011	279.52	1.40	29.35
01/03/2011-31/03/2011	494.75	2.47	51.95
01/04/2011-30/04/2011	459.15	2.30	48.21
01/05/2011-31/05/2011	494.55	2.47	51.93
01/06/2011-30/06/2011	426.55	2.13	44.79
01/07/2011-31/07/2011	362.43	1.81	38.05
01/08/2011-31/08/2011	335.79	1.68	35.26
01/09/2011-30/09/2011	309.88	1.55	32.54
01/10/2011-31/10/2011	309.31	1.55	32.48
01/11/2011-30/11/2011	439.93	2.20	46.19
01/12/2011-31/12/2011	454.59	2.27	47.73

01/01/2012-31/01/2012	210.66	1.05	22.12
01/02/2012-29/02/2012	199.03	1.00	20.90
01/03/2012-31/03/2012	325.64	1.63	34.19
01/04/2012-30/04/2012	382.70	1.91	40.18
01/05/2012-31/05/2012	414.67	2.07	43.54
01/06/2012-30/06/2012	382.12	1.91	40.12
01/07/2012-31/07/2012	301.12	1.51	31.62
01/08/2012-31/08/2012	226.86	1.13	23.82
01/09/2012-30/09/2012	214.35	1.07	22.51
01/10/2012-31/10/2012	245.56	1.23	25.78
01/11/2012-30/11/2012	415.74	2.08	43.65
01/12/2012-31/12/2012	379.35	1.90	39.83
Total	11560.31	57.80	1213.83

Table 4.2.12 Un-combusted methane from end uses in Gongquan

Year	MM_{ELEC} (tCH ₄)	Total CH ₄ emissions (tCH ₄)	PE_{UM} (tCO _{2e})
16/04/2010-30/04/2010	101.64	0.51	10.67
01/05/2010-31/05/2010	242.76	1.21	25.49
01/06/2010-30/06/2010	233.47	1.17	24.51
01/07/2010-31/07/2010	218.48	1.09	22.94
01/08/2010-31/08/2010	197.16	0.99	20.70
01/09/2010-30/09/2010	152.21	0.76	15.98
01/10/2010-31/10/2010	149.71	0.75	15.72
01/11/2010-30/11/2010	190.89	0.95	20.04
01/12/2010-31/12/2010	153.90	0.77	16.16
01/01/2011-31/01/2011	221.21	1.11	23.23
01/02/2011-28/02/2011	270.01	1.35	28.35
01/03/2011-31/03/2011	262.48	1.31	27.56
01/04/2011-30/04/2011	313.25	1.57	32.89
01/05/2011-31/05/2011	321.70	1.61	33.78
01/06/2011-30/06/2011	217.82	1.09	22.87
01/07/2011-31/07/2011	163.91	0.82	17.21
01/08/2011-31/08/2011	180.40	0.90	18.94
01/09/2011-30/09/2011	157.92	0.79	16.58
01/10/2011-31/10/2011	170.10	0.85	17.86
01/11/2011-30/11/2011	208.53	1.04	21.90
01/12/2011-31/12/2011	201.71	1.01	21.18
01/01/2012-31/01/2012	212.16	1.06	22.28
01/02/2012-29/02/2012	172.79	0.86	18.14
01/03/2012-31/03/2012	222.46	1.11	23.36
01/04/2012-30/04/2012	197.98	0.99	20.79

01/05/2012-31/05/2012	258.93	1.29	27.19
01/06/2012-30/06/2012	257.07	1.29	26.99
01/07/2012-31/07/2012	337.12	1.69	35.40
01/08/2012-31/08/2012	354.74	1.77	37.25
01/09/2012-30/09/2012	350.21	1.75	36.77
01/10/2012-31/10/2012	339.84	1.70	35.68
01/11/2012-30/11/2012	299.22	1.50	31.42
01/12/2012-31/12/2012	263.44	1.32	27.66
Total	7595.20	37.98	797.50

Table 4.2.13 Project emissions of Baijiao, Shanmushu and Xunchang

Year	PE_{ME} (tCO₂e)	PE_{MD} (tCO₂e)	PE_{UM} (tCO₂e)	PE_y (tCO₂e)
16/04/2010-30/04/2010	64	480	18.41	562
01/05/2010-31/05/2010	107	1,183	45.39	1,336
01/06/2010-30/06/2010	104	1,099	42.18	1,246
01/07/2010-31/07/2010	110	1,090	41.84	1,242
01/08/2010-31/08/2010	111	1,155	44.34	1,310
01/09/2010-30/09/2010	109	1,237	47.46	1,393
01/10/2010-31/10/2010	112	1,050	40.29	1,202
01/11/2010-30/11/2010	108	855	32.80	996
01/12/2010-31/12/2010	109	797	30.58	937
01/01/2011-31/01/2011	128	620	23.80	773
01/02/2011-28/02/2011	114	765	29.35	908
01/03/2011-31/03/2011	145	1,354	51.95	1,551
01/04/2011-30/04/2011	112	1,256	48.21	1,417
01/05/2011-31/05/2011	113	1,353	51.93	1,518
01/06/2011-30/06/2011	116	1,167	44.79	1,328
01/07/2011-31/07/2011	117	992	38.05	1,146
01/08/2011-31/08/2011	110	919	35.26	1,064
01/09/2011-30/09/2011	104	848	32.54	985
01/10/2011-31/10/2011	108	846	32.48	987
01/11/2011-30/11/2011	105	1,204	46.19	1,355
01/12/2011-31/12/2011	108	1,244	47.73	1,400
01/01/2012-31/01/2012	104	576	22.12	703
01/02/2012-29/02/2012	107	545	20.90	672
01/03/2012-31/03/2012	106	891	34.19	1,031
01/04/2012-30/04/2012	106	1,047	40.18	1,193
01/05/2012-31/05/2012	95	1,135	43.54	1,274
01/06/2012-30/06/2012	108	1,046	40.12	1,193
01/07/2012-31/07/2012	89	824	31.62	945
01/08/2012-31/08/2012	74	621	23.82	719

01/09/2012-30/09/2012	75	587	22.51	684
01/10/2012-31/10/2012	75	672	25.78	773
01/11/2012-30/11/2012	87	1,138	43.65	1,268
01/12/2012-31/12/2012	79	1,038	39.83	1,157
Total	3,419	31,632	1213.83	36,265

Table 4.2.14 Project emissions of Gongquan

Year	PE_{ME} (tCO_{2e})	PE_{MD} (tCO_{2e})	PE_{UM} (tCO_{2e})	PE_y (tCO_{2e})
16/04/2010-30/04/2010	8	278	10.67	297
01/05/2010-31/05/2010	18	664	25.49	707
01/06/2010-30/06/2010	17	639	24.51	680
01/07/2010-31/07/2010	17	598	22.94	638
01/08/2010-31/08/2010	18	539	20.70	578
01/09/2010-30/09/2010	17	416	15.98	450
01/10/2010-31/10/2010	18	410	15.72	443
01/11/2010-30/11/2010	17	522	20.04	559
01/12/2010-31/12/2010	18	421	16.16	455
01/01/2011-31/01/2011	14	605	23.23	642
01/02/2011-28/02/2011	9	739	28.35	776
01/03/2011-31/03/2011	10	718	27.56	755
01/04/2011-30/04/2011	10	857	32.89	900
01/05/2011-31/05/2011	10	880	33.78	924
01/06/2011-30/06/2011	15	596	22.87	634
01/07/2011-31/07/2011	14	448	17.21	479
01/08/2011-31/08/2011	14	494	18.94	526
01/09/2011-30/09/2011	13	432	16.58	461
01/10/2011-31/10/2011	13	465	17.86	497
01/11/2011-30/11/2011	13	571	21.90	605
01/12/2011-31/12/2011	14	552	21.18	587
01/01/2012-31/01/2012	13	581	22.28	616
01/02/2012-29/02/2012	12	473	18.14	503
01/03/2012-31/03/2012	13	609	23.36	645
01/04/2012-30/04/2012	13	542	20.79	576
01/05/2012-31/05/2012	13	708	27.19	749
01/06/2012-30/06/2012	13	703	26.99	744
01/07/2012-31/07/2012	14	922	35.40	972
01/08/2012-31/08/2012	18	971	37.25	1,026
01/09/2012-30/09/2012	14	958	36.77	1,009
01/10/2012-31/10/2012	14	930	35.68	979
01/11/2012-30/11/2012	15	819	31.42	865
01/12/2012-31/12/2012	14	721	27.66	763

Total	461	20,782	797.50	22,041
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Leakage

According to the applied methodology and approved revised CDM PDD, leakage (LE_y) does not need to be accounted for. Hence, zero is applied.

Therefore, the emission reductions are calculated as:

$$ER_y = (GEN_y * CEF_{ELEC} + GWP_{CH4} * MM_{ELEC}) - (CONS_{ELEC, PJ} * CEF_{ELEC} + MD_{ELEC} * CEF_{CH4} + GWP_{CH4} * MM_{ELEC} * (1 - Eff_{ELEC}))$$

Table 4.2.15 Emission reduction of Baijiao, Shanmushu and Xunchang coal mines

Year	BE_y (tCO _{2e})	PE_y (tCO _{2e})	LE_y (tCO _{2e})	ER_y (tCO _{2e})
16/04/2010-30/04/2010	4,635	562	0	4,072
01/05/2010-31/05/2010	11,765	1,336	0	10,430
01/06/2010-30/06/2010	10,688	1,246	0	9,442
01/07/2010-31/07/2010	10,722	1,242	0	9,480
01/08/2010-31/08/2010	11,209	1,310	0	9,899
01/09/2010-30/09/2010	12,194	1,393	0	10,801
01/10/2010-31/10/2010	10,401	1,202	0	9,199
01/11/2010-30/11/2010	8,475	996	0	7,480
01/12/2010-31/12/2010	7,783	937	0	6,847
01/01/2011-31/01/2011	5,728	773	0	4,956
01/02/2011-28/02/2011	7,221	908	0	6,313
01/03/2011-31/03/2011	12,353	1,551	0	10,802
01/04/2011-30/04/2011	12,202	1,417	0	10,785
01/05/2011-31/05/2011	12,924	1,518	0	11,405
01/06/2011-30/06/2011	11,313	1,328	0	9,985
01/07/2011-31/07/2011	9,845	1,146	0	8,698
01/08/2011-31/08/2011	9,051	1,064	0	7,987
01/09/2011-30/09/2011	8,566	985	0	7,582
01/10/2011-31/10/2011	8,332	987	0	7,345
01/11/2011-30/11/2011	11,164	1,355	0	9,809
01/12/2011-31/12/2011	11,285	1,400	0	9,885
01/01/2012-31/01/2012	5,161	703	0	4,458
01/02/2012-29/02/2012	5,063	672	0	4,391
01/03/2012-31/03/2012	8,303	1,031	0	7,272
01/04/2012-30/04/2012	10,250	1,193	0	9,057
01/05/2012-31/05/2012	10,851	1,274	0	9,577
01/06/2012-30/06/2012	9,954	1,193	0	8,761
01/07/2012-31/07/2012	7,757	945	0	6,812
01/08/2012-31/08/2012	5,742	719	0	5,023

01/09/2012-30/09/2012	5,474	684	0	4,791
01/10/2012-31/10/2012	6,305	773	0	5,532
01/11/2012-30/11/2012	10,669	1,268	0	9,401
01/12/2012-31/12/2012	10,402	1,157	0	9,245
Total	303,787	36,265	0	267,523

Table 4.2.16 Emission reduction of Gongquan coal mine

Year	BE_y (tCO_{2e})	PE_y (tCO_{2e})	LE_y (tCO_{2e})	ER_y (tCO_{2e})
16/04/2010-30/04/2010	2,694	297	0	2,397
01/05/2010-31/05/2010	5,978	707	0	5,270
01/06/2010-30/06/2010	5,818	680	0	5,138
01/07/2010-31/07/2010	5,427	638	0	4,789
01/08/2010-31/08/2010	4,809	578	0	4,231
01/09/2010-30/09/2010	3,722	450	0	3,272
01/10/2010-31/10/2010	3,696	443	0	3,253
01/11/2010-30/11/2010	4,785	559	0	4,225
01/12/2010-31/12/2010	3,907	455	0	3,452
01/01/2011-31/01/2011	5,543	642	0	4,901
01/02/2011-28/02/2011	6,730	776	0	5,955
01/03/2011-31/03/2011	6,351	755	0	5,596
01/04/2011-30/04/2011	7,497	900	0	6,597
01/05/2011-31/05/2011	7,808	924	0	6,884
01/06/2011-30/06/2011	5,511	634	0	4,877
01/07/2011-31/07/2011	4,207	479	0	3,727
01/08/2011-31/08/2011	4,723	526	0	4,197
01/09/2011-30/09/2011	4,178	461	0	3,717
01/10/2011-31/10/2011	4,462	497	0	3,965
01/11/2011-30/11/2011	5,124	605	0	4,519
01/12/2011-31/12/2011	5,036	587	0	4,449
01/01/2012-31/01/2012	5,408	616	0	4,792
01/02/2012-29/02/2012	4,296	503	0	3,793
01/03/2012-31/03/2012	5,375	645	0	4,730
01/04/2012-30/04/2012	4,925	576	0	4,349
01/05/2012-31/05/2012	6,427	749	0	5,678
01/06/2012-30/06/2012	6,348	744	0	5,604
01/07/2012-31/07/2012	8,197	972	0	7,225
01/08/2012-31/08/2012	8,755	1,026	0	7,729
01/09/2012-30/09/2012	8,651	1,009	0	7,642
01/10/2012-31/10/2012	8,423	979	0	7,444
01/11/2012-30/11/2012	7,505	865	0	6,640
01/12/2012-31/12/2012	6,583	763	0	5,821
Total	188,897	22,041	0	166,856

Table 4.2.17 Emission reduction of the Project

Year	BE_y (tCO _{2e})	PE_y (tCO _{2e})	LE_y (tCO _{2e})	ER_y (tCO _{2e})
16/04/2010-30/04/2010	7,329	860	0	6,469
01/05/2010-31/05/2010	17,743	2,043	0	15,700
01/06/2010-30/06/2010	16,506	1,926	0	14,580
01/07/2010-31/07/2010	16,149	1,880	0	14,269
01/08/2010-31/08/2010	16,018	1,888	0	14,130
01/09/2010-30/09/2010	15,916	1,843	0	14,073
01/10/2010-31/10/2010	14,097	1,645	0	12,452
01/11/2010-30/11/2010	13,260	1,555	0	11,705
01/12/2010-31/12/2010	11,690	1,392	0	10,299
Total in 2010	128,708	15,031	0	113,677
01/01/2011-31/01/2011	11,271	1,415	0	9,856
01/02/2011-28/02/2011	13,951	1,684	0	12,268
01/03/2011-31/03/2011	18,705	2,307	0	16,398
01/04/2011-30/04/2011	19,698	2,316	0	17,382
01/05/2011-31/05/2011	20,732	2,442	0	18,290
01/06/2011-30/06/2011	16,823	1,962	0	14,861
01/07/2011-31/07/2011	14,051	1,626	0	12,426
01/08/2011-31/08/2011	13,774	1,590	0	12,184
01/09/2011-30/09/2011	12,744	1,446	0	11,298
01/10/2011-31/10/2011	12,794	1,483	0	11,310
01/11/2011-30/11/2011	16,288	1,960	0	14,328
01/12/2011-31/12/2011	16,321	1,987	0	14,334
Total in 2011	187,154	22,218	0	164,936
01/01/2012-31/01/2012	10,568	1,319	0	9,249
01/02/2012-29/02/2012	9,359	1,175	0	8,184
01/03/2012-31/03/2012	13,678	1,676	0	12,002
01/04/2012-30/04/2012	15,175	1,768	0	13,406
01/05/2012-31/05/2012	17,277	2,023	0	15,255
01/06/2012-30/06/2012	16,302	1,937	0	14,365
01/07/2012-31/07/2012	15,954	1,916	0	14,037
01/08/2012-31/08/2012	14,497	1,745	0	12,752
01/09/2012-30/09/2012	14,125	1,693	0	12,433
01/10/2012-31/10/2012	14,728	1,752	0	12,976
01/11/2012-30/11/2012	18,174	2,133	0	16,041
01/12/2012-31/12/2012	16,986	1,920	0	15,066
Total in 2012	176,823	21,057	0	155,766
Total	492,685	58,306	0	434,379

It is stated in VCS MR that the emission reductions for this monitoring period should be 437,143tCO_{2e}. CL 2 was raised for clarification. The VCS MR has been revised and a footnote has been included to

demonstrate the calculations. CEC reviewed the revised VCS MR and confirmed the calculation is correct. Thus, the CL 2 is closed.

During this monitoring period from 16/04/2010 to 31/12/2012 (total 991 days). The actual emission reductions are 434,379tCO₂e. As per the approved revised CDM PDD, the estimated emission reductions are 167,439tCO₂e in 2010, 200,372tCO₂e in 2011, 200,343tCO₂e in 2012, and the emission reductions for this monitoring period is 519,986tCO₂e (there are 260 days from 16 April 2010 to 31 December 2010, 519,986 tCO₂e = 167,439 tCO₂e * (260/365) + 200,372 tCO₂e + 200,343 tCO₂e). Since the emission reductions for this monitoring period are lower than the VCS PD estimates and no further explanation is necessary.

The emission Reductions in each year is summarized in the below table.

Table 4.2.18: Emission Reductions in each year

GHG Emission Reductions in each year	VCUs (tCO ₂ e)
2010	113,677
2011	164,936
2012	155,766

The verification team has confirmed that the calculation of the emission reductions is correct. CEC has ensured that:

- The data used for the determination of the emission reductions are available and monitored in accordance with the updated monitoring plan contained in the approved revised CDM-PDD;
- The relevant commercial invoices have been cross checked and found consistent;
- The appropriate methods and formulae for calculating baseline emissions, project emissions and leakage have been properly followed the methodology and the updated monitoring plan contained in the approved revised CDM-PDD;
- The emission factor of CCPG determined ex-ante in the approved revised PDD is applied in the monitoring report and the calculations have been justified.

4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

The meters have been installed and calibrated in accordance with the revised monitoring plan in the approved updated PDD. The calibration is conducted at the frequency of once a year, as specified in revised monitoring plan, this complies with the applied methodology.

The calibration information of the meters is summarized in the below tables.

Table 9 Calibration of meters installed for additional electric power consumption

location	Baijiao	Shanmushu	Xunchang	Gongquan
Accuracy class	0.5s/0.5	0.5	0.5	0.5
Serial No.	0045641220/ 45386238	13442301/ 13442265	45555857	45386237
Calibration frequency	yearly	yearly	yearly	yearly
Date of calibration	01 April 2010 13 January 2011 10 January 2012	01 April 2010 13 January 2011 10 January 2012	01 April 2010	01 April 2010 13 January 2011 10 January 2012

Validity	31 March 2011 12 January 2012 3 January 2013	31 March 2011 12 January 2012 3 January 2013	31 March 2011	31 March 2011 12 January 2012 3 January 2013
Calibration Entity	Electric Energy Metrological Station of Gongxian Quality Supervision Bureau with the certification paper (No. (Yi)faji(2012)13006), which was accredited by Sichuan Yinbin Quality Supervision Bureau			

Table 10 Calibration information of meters installed for electricity generation by CMM power plants

location	Baijiao CMM power plant	Gongquan CMM power plant
Accuracy class	0.5/0.5/0.2	0.5
Serial No.	2510034/13260114/10050317770071	13260124
Calibration frequency	yearly	yearly
Date of calibration	02 May 2009 30 April 2010 28 April 2011 25 April 2012	02 May 2009 30 April 2010 28 April 2011 25 April 2012
Validity	01 May 2010 29 April 2011 27 April 2012 24 April 2013	01 May 2010 29 April 2011 27 April 2012 24 April 2013
Calibration Entity	Electric Energy Metrological Station of Gongxian Quality Supervision Bureau with the certification paper (No. (Yi)faji(2012)13006), which was accredited by Sichuan Yinbin Quality Supervision Bureau	

Table 11 Calibration information of gas flow meters

Type/location	Gas flow meter		
	Baijiao		Gongquan
Accuracy class	0.5	0.5	0.5
Serial No.	1553	120894 ⁴	1528
Calibration frequency	yearly	yearly	yearly
Date of calibration	28 June 2009 25 June 2010 23 June 2011 20 June 2012	03 July 2012	28 June 2009 25 June 2010 23 June 2011 20 June 2012
Validity	27 June 2010 24 June 2011 22 June 2012 19 June 2013	02 July 2013	27 June 2010 24 June 2011 22 June 2012 19 June 2013
Calibration Entity	Product quality supervision and inspection center of mechanical industrial process control system with the certification No. 2008000264A, Certification and Accreditation Administration of the People's Republic of China		

⁴ Gas flow meter serial No 120894 replaced 1553 on 10 July 2012

Table 12 Calibration information of methane concentration meters

Type/location	methane concentration meter			
	Baijiao		Gongquan	
Accuracy class	0.5	0.5	0.5	0.5
Serial No.	2484	1101 ⁵	1245	1243 ⁶
Calibration frequency	yearly	yearly	yearly	yearly
Date of calibration	11 January 2010 10 January 2011 09 January 2012	15 March 2012	25 December 2009 23 December 2010 21 June 2011 20 June 2012	20 June 2012
Validity	10 January 2011 09 January 2012 08 January 2013	14 March 2013	24 December 2010 22 December 2011 20 June 2012 19 June 2013	19 June 2013
Calibration Entity	National Station of Mining Safety Metrology with the certification with authorization Certificate No.: (Guo) Faji(2007)00012, by Certification and Accreditation Administration of the People's Republic of China			

Table 13 NMHC Concentration analysis reports

Year	Baijiao	Gongquan
2010	0.016%	0.016%
2011	0.016%	0.016%
2012	0.014%	0.014%
Calibration Entity	Sichuan Gaseous Products Quality Supervision and Inspection Station with the certification paper (No.(2012)Chuan Zhi Jian Ren Zi 006, and 2012230110B), accredited by Sichuan Quality Supervision Bureau.	

As required by the VVS, the verification team is able to confirm that the monitoring has been carried out in accordance with the approved methodology ACM0008 version 04 which was applied by the proposed CDM project activity and the monitoring plan contained in the CDM PDD and VCS PD. All parameters are appropriately monitored. The actual project activity does not contain changes which may impact the additionality or scale of the project activity or applicability of baseline methodology. Thus no deviation of methodology, modification of monitoring plan or report of changes is needed. The value of parameters has been verified against the monitoring plan and monitoring report, and found complete and accurate.

The verification team has verified the reported data and procedures implemented by the PP during document review and on site verification and confirmed that: the monitoring actions have been carried out in accordance with the approved methodology ACM0008 version 04 which was applied by the proposed CDM project activity and the monitoring plan contained in the approved CDM PDD and VCS PD. The actual project activity does not contain changes which may impact the additionality or scale of the project activity or applicability of baseline methodology. Thus no deviation of methodology, modification of monitoring plan or report of changes is needed.

⁵ Methane concentration meter serial No. 1101 replaced 2484 on 28 December 2012

⁶ Methane concentration meter serial No. 1243 replaced 1245 on 24 December 2012

The operational and management structure was checked via reviewing CDM Monitoring Manual and interviewing relevant staffs of the project owner, the verification team confirms that the management system of the project is in place and the responsibilities are properly identified based on monitoring plan in approved revised CDM PDD, VCS PD and the MR for this period. Key parameters and date are measured and reviewed periodically as per the procedures in CDM PDD and VCS PD.

According to the applied methodology, there are no other external data required for determining the emission reductions of the project as the emission factor of the first crediting period has been determined ex-ante in the CDM PDD and VCS PD. The verification team has verified and confirmed that the emission factor used in the monitoring report is in compliance with the CDM PDD and VCS PD.

The verification team checked and confirmed that the operation logs, and confirmed that the actual operation hours of both units are less than the estimated operation hours in the CDM PDD and VCS PD in this monitoring period.

CEC has ensured that:

- The data used for the determination of the emission reductions are available and monitored in accordance with the monitoring plan without conservative assumption;
- The relevant commercial receipts have been cross checked and found consistent;
- The appropriate methods and formulae for calculating baseline emissions, project emissions and leakage have been properly followed the methodology, VCS PD and the updated monitoring plan contained in the approved revised CDM-PDD;
- The emission factor of CCPG determined ex-ante in the registered VCS PD is applied in the monitoring report and the calculations have been justified.

All necessary and requested documentation was provided by the project participants so that a complete verification of all relevant issues could be carried out. On site assessment was granted to the only and all installations of the plant which are relevant for the project performance and the monitoring activities.

There are no open issues regarding the implementation of the project activity and the steps to claim emission reductions which might not be in compliance with the UNFCCC criteria and relevant guidance provided by the COP/MOP and the CDM EB (clarifications and/or guidance)

4.3.1 Management and Operational System

In order to verify data quality, especially the value of net electricity supplied to grid, the operational and management structure was checked through interviewing with relevant staffs and reviewing documents. CEC can confirm that the management system of the project is in place, with the responsibilities properly identified based on monitoring plan in VCS PD. And the key parameters are measured and reviewed periodically as per the procedures

4.4 Non-Permanence Risk Analysis

Not applicable.

5 VERIFICATION CONCLUSION

China Environmental United Certification Centre Co., Ltd. (CEC) was commissioned by Sichuan Furong Group's Limited Industrial Company to validate the VCS PD and to verify the emission reductions reported for the period from 16 April 2010 to 31 December 2012, under the Verified Carbon Standard (VCS) Version 3.5, as set out in the monitoring report of the VCS project activity "Sichuan Furong Coal Mine Methane Utilization Project", registered as a CDM project under UNFCCC reference number 2677.

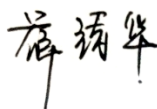
CEC verified the VCS monitoring report version 2.0, dated 24 May 2015 for the reporting period and confirms that the project is implemented as described in the approved revised CDM PDD and VCS PD. Installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately. The monitoring system is in place and the Project is ready to generate GHG emission reductions (VCUs). CEC can confirm that the GHG emission reduction is calculated without material misstatements.

Based on the assessments performed and the historical evidence collected, CEC concludes:

- the project is conformance with the Verified Carbon Standard (VCS) Version 3.5 and the CDM methodology "Consolidated baseline methodology for coal bed methane, coal mine methane and ventilation air methane capture and use for power (electrical or motive) and heat and/or destruction by flaring or catalytic oxidation" ACM0008 version 04;
- without qualification or limitation, that the project complies with the verification criteria for projects and their GHG emission reductions or removals set out in VCS Version 3.5
- the project implementation is in line with the approved revised CDM-PDD and project monitoring plan contained in the revised CDM PDD (version 08, 28 August 2013);
- VCS PD version 02 dated 24 May 2015 complies with criteria for projects set out in VCS Version 3.5.
- the verification period of 16 April 2010 to 31 December 2012
- Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2010	128,708	15,031	0	113,677
Year 2011	187,154	22,218	0	164,936
Year 2012	176,823	21,057	0	155,766
Total	492,685	58,306	0	434,379

Beijing, 18/06/2015



XUE Jinghua

Verification Team Leader

Beijing, 18/06/2015



ZHANG Xiaodan

General Manager

ANNEX A: REFERENCE DOCUMENTS

1. VCS Monitoring Report version 1.0 and version 2.0
2. VER calculation spreadsheet version 1.0 and version 2.0
3. CDM registered PDD version 07 and approved revised PDD version 08 dated 28 August 2013
4. CDM validation report prepared by DNV, 12 April 2010
5. Validation opinion prepared by ERM CVS for post registration changes, 09 September 2013
6. VCS PD version 01 and version 02
7. CDM methodology: Consolidated baseline methodology for coal bed methane, coal mine methane and ventilation air methane capture and use for power (electrical or motive) and heat and/or destruction by flaring or catalytic oxidation, ACM0008 version 04
8. Construction completion acceptance report for 500GF1-2RW generator sets at Baijiao CMM power plant, issued by Sichuan Furong Group's Limited Industrial Company, 16 December 2007
9. Construction completion acceptance report for JMS620GS-S.L generator sets at Baijiao CMM power plant, issued by Sichuan Furong Group's Limited Industrial Company, 25 September 2009
10. Construction completion acceptance report at Gongquan CMM power plant, issued by Sichuan Furong Group's Limited Industrial Company, 15 May 2009
11. Calibration reports for electricity meters installed at CMM power plants, by Electric Energy Metrological Station of Gongxian Quality Supervision Bureau
12. Calibration reports for electricity meters for electricity meters installed at pump stations for additional electricity consumptions, by Electric Energy Metrological Station of Gongxian Quality Supervision Bureau
13. Calibration reports for gas flow meters, product quality supervision and inspection center of mechanical industrial process control system
14. Calibration reports for methane concentration meters, National Station of Mining Safety Metrology
15. Specifications of GLY series gas flow meters, Chongqing Branch of China Coal Research Institute (CQCCRI)
16. Specifications of GJG100H(B) methane concentration meters, Chongqing Branch of China Coal Research Institute (CQCCRI), ver 1.0
17. Technical agreement between Sichuan Furong Group's Limited Industrial Company and Shandong Shenli Oil Field Shengli Power Machinery Group Co., Ltd
18. Certificate of Electric Energy Metrological Station of Gongxian Quality Supervision Bureau, by Sichuan Yinbin Quality Supervision Bureau
19. Verification Regulation of Electrical Energy Meters with Electronics (JJG 596-1999), by General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China
20. Verification Regulation of Electromechanical Meters for Measuring Alternating-current Electrical Energy (JJG 307-2006), by General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China
21. Investigation report on the belt conveyor roadway abnormal gushing accident in Xunchang coal mine, prepared by Sichuan Coalfield Geological Engineering Investigation and Design Institute, who is a qualified third party

22. Design specifications of CMM monitoring system, by Chongqing Branch of China Coal Research Institute
23. CDM Project Management Manual
24. CDM monitoring training records
25. Training certificates for CMM monitoring system, by the CMM flow meters, methane concentration meters and a modern display cabinet supplier, CQCCRI
26. Technical training certificates by GE Energy (8 copy)
27. Technical training certificates by Shengdong
28. Extracted Gas analysis reports for Baijiao and Gongquan, Sichuan Gaseous Products Quality Supervision and Inspection Station
29. Certificate of Sichuan Gaseous Products Quality Supervision and Inspection Station, by Sichuan Quality Supervision Bureau
30. Certificate of product quality supervision and inspection center of mechanical industrial process control system, Certification and Accreditation Administration of the People's Republic of China
31. Certificate of National Station of Mining Safety Metrology, with authorization Certificate No.: (Guo) Fajj(2007)00012, Certification and Accreditation Administration of the People's Republic of China
32. Daily electricity meters readings record for the electricity generation (GEN_y) at Baijiao and Gongquan CMM power plant
33. Monthly electricity generation (GEN_y) report at Baijiao and Gongquan CMM power plant
34. Log book of 500kW (model 500GF1-2RW) and 3048 kW (model JMS620GS-S.L) CMM generator sets at Baijiao power plant
35. Log book of 500kW (model 500GF1-2RW) CMM generator sets at Gongquan power plant
36. Daily electricity meters readings record for CONS_{Elec,PJ} at Baijiao, Shanmushu and Gongquan pump stations
37. Daily CMM consumption records at Baijiao and Gongquan power plants
38. Monthly CMM consumption records at Baijiao and Gongquan power plants
39. Methane Monitoring system troubleshooting records, by Sichuan Furong Group's Limited Industrial Company
40. Sichuan Furong Group's Limited Industrial Company and Yibin South Sichuan construction engineering co., LTD , three 500kW gas generators relocation engineering contract.
41. Approval of revised FSR 'Sichuan Furong Coal Mine Methane Utilization Project', Sichuan Provincial Development and Reform Commission
42. 2006 IPCC Guidelines for National Greenhouse Gas Inventories
43. Explanation on the shutdown of captive waste coal-fired power plant Sichuan Furong Group's Limited Industrial Company, by Yibin Environmental Protection Bureau
44. Log book of captive waste coal-fired power plant Sichuan Furong Group's Limited Industrial Company

45. Approval of the installed capacity of the Sichuan Furong Coal Mine Methane Utilization Project, Chuan Fa Gai Neng Yuan Han [2013]536, issued by Sichuan Provincial Development and Reform Commission. It is clearly stated that 2 sets of 500GF1-2RW for back-up units only.
46. Construction completion acceptance report for the waste heat boilers installation for JMS620GS-S.L gas generators at Baijiao CMM power plant, issued by Sichuan Furong Group's Limited Industrial Company
47. PP VCS issuance representation

ANNEX B: CERTIFICATE OF COMPETENCE

XUE Jinghua

Qualification in accordance with CEC-4001C-C/0 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area (s): 1.2

Beijing, 01 Dec 2014

ZHANG Xiaodan

XU Linghua



CDM Supervisor, Technical Director



Quality Assurance Management Division

LI Yongmei

Qualification in accordance with CEC-4001C-C/0 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area(s): 8.1, 10.1

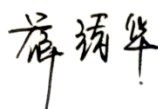
Beijing, 01 Dec 2014

ZHANG Xiaodan

XUE Jinghua



CDM Supervisor, Technical Director



Quality Assurance Management Division

LIU Qingzhi

Qualification in accordance with CEC-4001C-C/0 *Operation Instruction for Personal Competence Assessment* for CDM

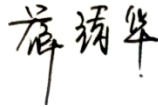
CDM Auditor: Yes

Industry Sector Expert for Technical Area(s): 1.2, 5.1, 8.1/10.1,11.1, 12.1

Beijing, 01 Dec 2014

ZHANG Xiaodan

XUE Jinghua



CDM Supervisor, Technical Director

Quality Assurance Management Division

LIU Minqing

Qualification in accordance with CEC-4001C-C/0 *Operation Instruction for Personal Competence Assessment* for CDM

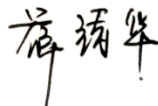
CDM Auditor: Yes

Industry Sector Expert for Technical Area(s): 8.1, 10.1

Beijing, 01 Dec 2014

ZHANG Xiaodan

XUE Jinghua



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