

# Sichuan Furong Coal Mine Methane Utilization Project

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**Table of Contents**

1	Project Details .....	3
1.1	Summary Description of the Implementation Status of the Project .....	3
1.2	Sectoral Scope and Project Type .....	4
1.3	Project Proponent .....	4
1.4	Other Entities Involved in the Project .....	4
1.5	Project Start Date .....	5
1.6	Project Crediting Period .....	5
1.7	Project Location .....	5
1.8	Title and Reference of Methodology .....	6
1.9	Other Programs .....	6
2	Implementation Status .....	7
2.1	Implementation Status of the Project Activity .....	7
2.2	Deviations .....	9
2.3	Grouped Project .....	10
3	Data and Parameters .....	10
3.1	Data and Parameters Available at Validation .....	10
3.2	Data and Parameters Monitored .....	12
3.3	Monitoring Plan .....	18
4	Quantification of GHG Emission Reductions and Removals .....	22
4.1	Baseline Emissions .....	22
4.2	Project Emissions .....	33
4.3	Leakage .....	46
4.4	Net GHG Emission Reductions and Removals .....	46

## 1 PROJECT DETAILS

### 1.1 Summary Description of the Implementation Status of the Project

Sichuan Furong Coal Mine Methane Utilization Project(the Project) is implemented by Sichuan Furong Group’s Limited Industrial Company (hereinafter referred to as “Furong Group”). The primary objective of the project is to capture and use coal mine methane (“CMM”) for power generation. This will displace electricity used from the on-site captive power plant<sup>1</sup> and the Central China Power Grid (“CCPG”) for on-site use. CMM is extracted from four of Furong Group’s mines, including Baijiao, Shanmushu, Xunchang<sup>2</sup> 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.

The project activity involves the installation of electricity generators with a combined capacity of 15MW for the generation of power using CMM. By the end of year 2012, generation capacity of 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. It is planned that another 3.048MW gas generator will be installed at Shanmushu coal mine. Details about the generation capacity of the three coal mines please refer to the table below.

Table 1-1 Generation capacity of the three coal mines

Coal mines	Practical Situation
Baijiao	6.596MW(3.048MW×2units+0.5MW) On 28/11/2007, four domestic generators each with a 500kW capacity were commissioned in Baijiao coal mine; <sup>a</sup> On 25/05/2009, two sets of 3.048MW gas generator manufactured by GE Jenbacher GmbH were commissioned in Baijiao coal mine.
Shanmushu	6.096MW(3.048MW×2units) One set of 3.048MW gas generator manufactured by GE Jenbacher GmbH has been installed in Shanmushu coal mine area, but not put into commission until 09/2013; It is planned that another 3.048MW gas generator manufactured by GE Jenbacher GmbH will be installed in Shanmushu coal mine, but now the location is undetermined.
Gongquan	3.50 MW(0.5MW×7units) On 15/05/2009, four domestic generators each with a 500kW capacity were commissioned in Gongquan coal mine. <sup>a</sup>
Total	16.192MW <sup>b</sup>

Note: <sup>a</sup>During 05/2012-06/2012, three domestic generators installed in Baijiao coal mine were moved to Gongquan coal mine.

<sup>b</sup>The total named capacity of the project activity will be 16.192MW, but two sets of 500kW domestic generators are used as back-up (one is in Baijiao coal mine and the other is in Gongquan coal mine), because the equipment failure of 500kW domestic generators is frequent, which was approved by local DRC. Thus the total actual capacity of the project activity will be about 15MW.

<sup>1</sup> The on-site captive power plant was stopped on 11/04/2010 according to the local government requirements, so, the electricity generated by the project only displaced the electricity generated by CCPG after 11/04/2010.

<sup>2</sup> Xunchang coal mine stopped operation since 25/04/2010 because of a water inrush accident. So, CMM is extracted from the other three mines, i.e. Baijiao, Shanmushu and Gongquan coal mines. CMM extracted from three coal mine is prioritized for residential use and the surplus amount is sent for power generation. Details please refer to Fig. 3-1.

Through the implementation of the project, it is estimated that an average annual volume of 15.6 million cubic meters of CH<sub>4</sub> will be combusted and destroyed, which, in the baseline scenario, would otherwise be released directly into the atmosphere. Furthermore, 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, ERs will not be claimed for this component in order to be conservative. Consequently, through CMM combustion and displacement of fossil fuel-fired electricity from the CCPG, the project will reduce 2,153,870tCO<sub>2</sub> equivalents of greenhouse gas emissions during the 10-year crediting period.

During the monitoring period (from 16/04/2010 to 31/12/2012), the monitoring activities were conducted strictly in accordance with the monitoring plan in the approved revised PDD. The project has operated without any accidental or emergency events that might impact the accuracy and/or implementation of monitoring activities. During this monitoring period, the total emission reductions are 434,379tCO<sub>2</sub>e.

## 1.2 Sectoral Scope and Project Type

This category would fall within sectoral scope 08: Mining/Mineral Production and 10: Fugitive Emission from Fuels(solid, oil and gas)

## 1.3 Project Proponent

Organization name	Sichuan Furong Group's Limited Industrial Company
Contact person	Zhang Hongge
Title	Direct of Planning Department
Address	Xunchang town, xinqiao road, Gong Country, Yibin City, Sichuan Province, P.R. of China
Telephone	86-(0)831-2333531
Email	315667940 @qq.com

## 1.4 Other Entities Involved in the Project

Organization name	Beijing Carbon Invcap International Carbon Assets Management Co.,Ltd.
Role in the project	The buyer
Contact person	Jessy Tang
Title	General manager

Address	Room 3103, Unit 3, Building 1, Tangning One, No.16, Zhongguancun East Road, Haidian District, Beijing, 100083
Telephone	86-18010121386
Email	vcs@carboninvcap.com

**1.5 Project Start Date**

28/11/2007 (the first generator unit put into operation)

**1.6 Project Crediting Period**

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

**1.7 Project Location**

The proposed project is located 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<sup>3</sup> 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.

The power generators will be installed at Baijiao, Shanmushu and Gongquan coal mines.

The geographic location of the project is shown in the figure below.

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<sup>3</sup> Please refer to footnote 2.

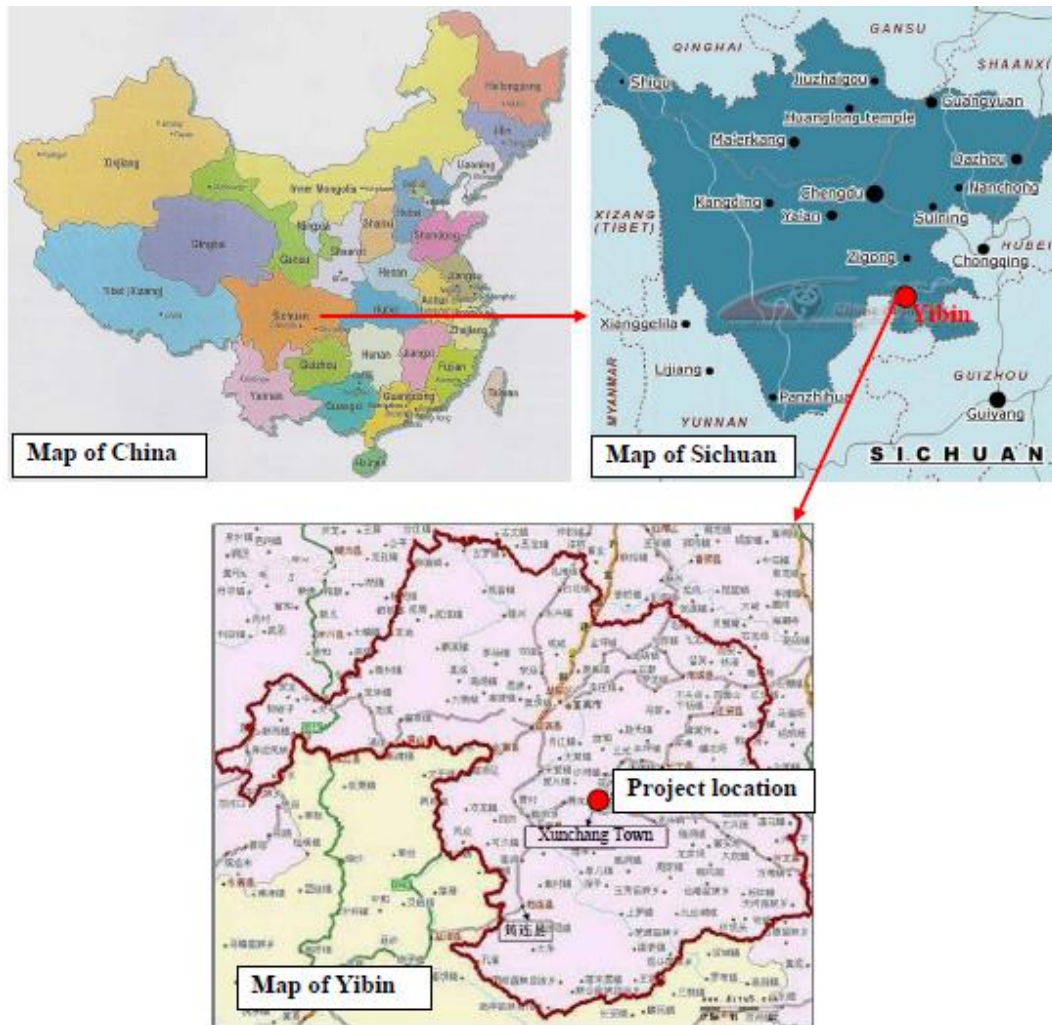


Fig.1-1 Project Location

## 1.8 Title and Reference of Methodology

ACM0008 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 (version 04).

## 1.9 Other Programs

### Emission Trading Programs and Other Binding Limits:

The project has been registered as a CDM project on 16/04/2010, for which a fixed crediting period of 10 years will be used under the CDM GHG Program. The project proponent confirmed that, once emission reductions generate during 16/04/2010-31/12/2012 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. And issued VCUs will be sold only once to one particular buyer.

China is Non-annex I country and there is no compliance with an emission trading program or to meet binding limits on GHG emissions for this project activity.

**Other Forms of Environmental Credit:**

The project does not result in creation of any other form of GHG related environmental credit during the period for which VCU are claimed.

**Participation under Other GHG Programs:**

The Project has been registered as a CDM project with registration number 2677.

**2 IMPLEMENTATION STATUS**

**2.1 Implementation Status of the Project Activity**

The construction of the Project was started on 31/08/2007. The Project was commissioned on 28/11/2007. By the end of year 2012, generators with a combined generation capacity of 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 (but 3.048MW generator was not commissioned in the monitoring period).

500kW domestic generators are easily moved, so, it is the project owner's arrangement that 500kW domestic generators will be used to balance the CMM extraction fluctuation for three coal mines. So, the location of 500kW domestic generators is flexible.

At present, eight domestic generators each with a 500kW capacity and three imported generators each with a 3048kW capacity have already been installed at the project site, and another 3.048MW gas generator will be installed. Please refer to Table 2-1 and 2-2 below for the technical parameters of the already installed generators.

Table 2-1 Technical parameters of 3.048MW gas generators

Parameter	Value
	Imported Units
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 undetermined at Shanmushu coal mine

Table 2-2 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	By the end of 2012, 7 sets at Gongquan coal mine and 1 set at Baijiao coal mine.
Remark	Among the 8 sets gas generators, 2 sets will be used as back-up for hardware replacement, by now, one is at Baijiao coal mine and the other one is at Gongquan coal mine.

Four waste heat boilers for 500KW gas generators were installed at Baijiao area in March 2008 and four waste heat boilers for 500KW gas generators were installed at Gongquan area in January 2009. The specifications of these waste heat boilers are shown in the Table 2-3 below.

Table 2-3 Technical parameters of waste heat boilers for 500KW gas generators

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

Two waste heat boilers for 3.048MW gas generators were installed at Baijiao area in December 2012, and one waste heat boiler for the 3.048MW gas generator is under installation at Shanmushu area at the end of 2012. The specifications of these waste heat boilers are shown in the table below.

Table 2-4 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 post-registration change was included in the revised registered PDD version 08 dated 28/08/2013 and approved by EB on 18/12/2013.

The project was implemented as described in the revised registered PDD version 08 dated 28/08/2013. During this monitoring period, the project had a smooth operation and the monitoring system worked properly, no special events occurred.

## 2.2 Deviations

### 2.2.1 Methodology Deviations

There is no deviation applied to this monitoring period.

### 2.2.2 Project Description Deviations

There is no deviation applied to this monitoring period.

### 2.3 Grouped Project

The Project is not a grouped project.

## 3 DATA AND PARAMETERS

### 3.1 Data and Parameters Available at Validation

Data / Parameter	$Eff_{ELEC}$
Data unit	-
Description	Efficiency of methane destruction in power plant
Source of data	IPCC
Value applied:	99.5%
Justification of choice of data or description of measurement methods and procedures applied	IPCC is the reliable source.
Purpose of the data	Calculation of project emissions
Comments	-

Data / Parameter	$GWP_{CH_4}$
Data unit	tCO <sub>2</sub> e/CH <sub>4</sub>
Description	Global warming potential of methane
Source of data	IPCC
Value applied:	21
Justification of choice of data or description of measurement methods and procedures applied	IPCC is the reliable source.
Purpose of the data	Calculation of baseline, project and leakage emissions
Comments	-

Data / Parameter	$CEF_{CH_4}$
Data unit	tCO <sub>2</sub> e/tCH <sub>4</sub>
Description	Carbon emission factor for combusted methane
Source of data	Methodology ACM0008 (ver.04)

Value applied:	2.75
Justification of choice of data or description of measurement methods and procedures applied	IPCC is the reliable source.
Purpose of the data	Calculation of project emissions
Comments	-

Data / Parameter	$D_{CH_4}$
Data unit	tCH <sub>4</sub> /m <sup>3</sup>
Description	Density of methane under normal conditions (20°C and 101.325kPa) in the exhaust gases
Source of data	IPCC default value
Value applied:	0.00067
Justification of choice of data or description of measurement methods and procedures applied	IPCC is the reliable source.
Purpose of the data	Calculation of baseline, project and leakage emissions
Comments	-

Data / Parameter	$CEF_{ELEC}$
Data unit	tCO <sub>2</sub> e/MWh
Description	Because the on-site captive plant was closed as per the government requirement, only considering the electricity from the CCPG is displaced. So the $CEF_{ELEC}$ will be CCPG emissions factor, this is conservative.
Source of data	The approved revised PDD
Value applied:	0.9745
Justification of choice of data or description of measurement methods and procedures applied	The data is ex ante determined in the approved revised PDD.
Purpose of the data	Calculation of baseline emissions
Comments	Determined ex-ante and fixed for the fixed crediting period

### 3.2 Data and Parameters Monitored

Data / Parameter	<i>CONS<sub>ELEC,PJ</sub></i>				
Data unit	MWh				
Description	Additional electric power consumption by the project in year y				
Source of data	On-site continuous measurements by electricity meters				
Description of measurement methods and procedures to be applied	On-site electricity meters.				
Frequency of monitoring/recording	Continuously monitored by on-site electricity meters. The data will be daily recorded.				
Value monitored:	3981.78				
Monitoring equipment		Baijiao	Shanmushu	Xunchang	Gongquan
	Type	Electricity meter	Electricity meter	Electricity meter	Electricity meter
	Accuracy class	0.5s/0.5	0.5	0.5	0.5s
	Serial number	0045641220/ 45386238	13442301/ 13442265	45555857	45386237
	Calibration frequency	yearly	yearly	yearly	yearly
	Date of previous calibration	01/04/2010	01/04/2010		01/04/2010
		13/01/2011	13/01/2011	01/04/2010	13/01/2011
		10/01/2012	10/01/2012		10/01/2012
Validity	yes	yes	yes	yes	
QA/QC procedures to be applied	Electricity meters were maintained and calibrated for accuracy (0.5) according to manufacturer's specifications and relevant national or sectoral regulations. The calibration will be carried out annually by an				

	independent certified party.
Purpose of the data	Calculation of project emissions
Calculation method	N/A
Comments	The original data and calculation process please refer to the CER calculation sheet

Data / Parameter	$MM_{ELEC}$				
Data unit	tCH <sub>4</sub>				
Description	Methane(including pre-mining CMM and post mining CMM) sent to CMM power plant(minus the vented methane)				
Source of data	Automatically calculated by the installed monitoring system with monitored data by gas flow meters (installed at the inlet pipeline and the pipeline emergency vent valve located) and methane concentration meters (installed at the inlet pipeline).				
Description of measurement methods and procedures to be applied	Measured				
Frequency of monitoring/recording	Continuously measured. The monitored data will be daily recorded.				
Value monitored:	19,155.51				
Monitoring equipment	Automatically calculated by the installed monitoring system with monitored data by gas flow meters (installed at the inlet pipeline and the pipeline emergency vent valve located) and methane concentration meters (installed at the inlet pipeline).				
	meter	Gas flow meter		methane concentration meter	
	mine	Baijiao	Gongquan	Baijiao	Gongquan
	Type	Gas flow meter	Gas flow meter	methane concentration meter	methane concentration meter
	Accuracy class	0.5	0.5	0.5	0.5
	Serial number	1553/120894 (120894 replaced 1553 on	1528	2484/1101 (1101 replaced 2484 on	1245/1243 (1243 replaced 1245 on

	10/07/2012)		28/12/2012)	24/12/2012)
Calibration frequency	yearly	yearly	yearly	yearly
Date of last calibration	28/06/2009 (for 1553) 25/06/2010 (for 1553) 23/06/2011 (for 1553) 20/06/2012 (for 1553) 03/07/2012 (for 120894)	28/06/2009 25/06/2010 23/06/2011 20/06/2012	11/01/2010 (for 2484) 10/01/2011 (for 2484) 09/01/2012 (for 2484) 15/03/2012 (for 1101)	25/12/2009 (for 1245) 23/12/2010 (for 1245) 21/06/2011 (for 1245) 20/06/2012 (for 1245) 20/06/2012 (for 1243)
Validity	yes	yes	yes	yes
QA/QC procedures to be applied	Monitoring instruments are maintained and calibrated according to manufacturer's specifications and relevant national or sectoral regulations. The calibration is carried out by an independent certified party annually.			
Purpose of the data	Calculation of baseline and project emissions			
Calculation method	The methane in volume sent to CMM power plant is equal to the CMM from the pumps subtract the vented CMM. But the readings of gas flow meters which were installed at the emergency vent valves are zero, which means that the emergency evacuation valves before the gas generators were not used, so no CMM was vented during the monitoring period.			
Comments	The original data and calculation process please refer to the ER calculation sheet.  Some backup meters are calibrated and waiting for replacement once gas flow meters and methane concentration meters be malfunctioned.			

Data / Parameter	$PC_{CH_4}$
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Data unit	%																				
Description	Concentration (in volume) of methane in extracted gas (%), measured on wet basis																				
Source of data	Measured by the on-site infrared methane concentration meters, optical.																				
Description of measurement methods and procedures to be applied	Measured																				
Frequency of monitoring/recording	Continuously measured																				
Value monitored:	35.10(average)																				
Monitoring equipment	<p>Methane concentration can be measured real-time by infrared methane concentration meters mounted on the gas pipelines using nondispersive infrared gas analysis technique. The monitored data will be recorded daily. The continuously monitored methane concentration meter with accuracy of 0.5 will be installed.</p> <table border="1" data-bbox="716 884 1373 1890"> <thead> <tr> <th>mine</th> <th>Baijiao</th> <th>Gongquan</th> </tr> </thead> <tbody> <tr> <td>Type</td> <td>methane concentration meter</td> <td>methane concentration meter</td> </tr> <tr> <td>Accuracy class</td> <td>0.5</td> <td>0.5</td> </tr> <tr> <td>Serial number</td> <td>2484/1101 (1101 replaced 2484 on 28/12/2012)</td> <td>1245/1243 (1243 replaced 1245 on 24/12/2012)</td> </tr> <tr> <td>Calibration frequency</td> <td>yearly</td> <td>yearly</td> </tr> <tr> <td>Date of last calibration</td> <td>11/01/2010 (for 2484) 10/01/2011 (for 2484) 09/01/2012 (for 2484) 15/03/2012</td> <td>25/12/2009 (for 1245) 23/12/2010 (for 1245) 21/06/2011 (for 1245) 20/06/2012</td> </tr> </tbody> </table>			mine	Baijiao	Gongquan	Type	methane concentration meter	methane concentration meter	Accuracy class	0.5	0.5	Serial number	2484/1101 (1101 replaced 2484 on 28/12/2012)	1245/1243 (1243 replaced 1245 on 24/12/2012)	Calibration frequency	yearly	yearly	Date of last calibration	11/01/2010 (for 2484) 10/01/2011 (for 2484) 09/01/2012 (for 2484) 15/03/2012	25/12/2009 (for 1245) 23/12/2010 (for 1245) 21/06/2011 (for 1245) 20/06/2012
mine	Baijiao	Gongquan																			
Type	methane concentration meter	methane concentration meter																			
Accuracy class	0.5	0.5																			
Serial number	2484/1101 (1101 replaced 2484 on 28/12/2012)	1245/1243 (1243 replaced 1245 on 24/12/2012)																			
Calibration frequency	yearly	yearly																			
Date of last calibration	11/01/2010 (for 2484) 10/01/2011 (for 2484) 09/01/2012 (for 2484) 15/03/2012	25/12/2009 (for 1245) 23/12/2010 (for 1245) 21/06/2011 (for 1245) 20/06/2012																			

		(for 1101)	(for 1245) 20/06/2012 (for 1243)
	Validity	yes	yes
QA/QC procedures to be applied	Monitoring instruments are maintained and calibrated according to manufacturer's specifications. The calibration is carried out by an independent certified party annually.		
Purpose of the data	Calculation of baseline and project emissions		
Calculation method	N/A		
Comments	Some backup meters are calibrated and waiting for replacement once gas flow meters and methane concentration meters be malfunctioned.		

Data / Parameter	$PC_{NMHC}$														
Data unit	%														
Description	Concentration (in volume) of NMHC in extracted gas														
Source of data	Analyzed by Sichuan Quality Supervision and Inspection Institute for Gaseous Product, a nationally certified entity. Measured by hydrogen flame ionization detector using gas phase chromatography, optical.														
Description of measurement methods and procedures to be applied	Measured														
Frequency of monitoring/recording	at least once a year														
Value monitored:	<table border="1"> <thead> <tr> <th>Year</th> <th>Baijiao CMM power plant</th> <th>Gongquan CMM power plant</th> </tr> </thead> <tbody> <tr> <td>2010</td> <td>0.016%</td> <td>0.016%</td> </tr> <tr> <td>2011</td> <td>0.016%</td> <td>0.016%</td> </tr> <tr> <td>2012</td> <td>0.014%</td> <td>0.014%</td> </tr> </tbody> </table>			Year	Baijiao CMM power plant	Gongquan CMM power plant	2010	0.016%	0.016%	2011	0.016%	0.016%	2012	0.014%	0.014%
Year	Baijiao CMM power plant	Gongquan CMM power plant													
2010	0.016%	0.016%													
2011	0.016%	0.016%													
2012	0.014%	0.014%													
Monitoring equipment	<p>Annual qualified lab analysis with hydrogen flame ionization detector using gas phase chromatography.</p> <p>The lab must be qualified and certified by relevant authorities according to local or national regulations.</p>														
QA/QC procedures to be applied	The test will be carried out at least once a year in accordance with national standards.														

Purpose of the data	Calculation of project emissions
Calculation method	N/A
Comments	CO <sub>2</sub> emissions from the combustion of non methane hydrocarbons (NMHCs), if they represent more than 1% by volume of the extracted coal mine gas; if $PC_{NMHC} < 1\%$ , emission from NMHC destruction can be ignored.

Data / Parameter	$CEF_{NMHC}$
Data unit	-
Description	Carbon emission factor for combusted non methane hydrocarbons (various)
Source of data	Will be analyzed by the same qualified institute for $PC_{NMHC}$ .
Description of measurement methods and procedures to be applied	To be monitored.
Frequency of monitoring/recording	at least once a year
Value monitored:	-
Monitoring equipment	Analyzed by Sichuan Quality Supervision and Inspection Institute for Gaseous Product, a nationally certified entity.  The lab must be qualified and certified by relevant authorities according to local or national regulations.
QA/QC procedures to be applied	The test will be carried out at least once a year in accordance with national standards.
Purpose of the data	Calculation of project emissions
Calculation method	N/A
Comments	If $PC_{NMHC} < 1\%$ , emission from NMHC destruction can be ignored.

Data / Parameter	$GEN_y$
Data unit	MWh
Description	Electricity generated by gas generators
Source of data	Continuous on-site measurement by electricity meters
Description of measurement methods and procedures to be applied	Electricity meters were installed at gas power plants to measure the electricity delivered to the on-site electric

applied	grid for Furong self-use.																						
Frequency of monitoring/recording	Continuously measured																						
Value monitored:	92,785.044																						
Monitoring equipment	<table border="1"> <thead> <tr> <th></th> <th>Baijiao</th> <th>Gongquan</th> </tr> </thead> <tbody> <tr> <td>Type</td> <td>Electricity meter</td> <td>Electricity meter</td> </tr> <tr> <td>Accuracy class</td> <td>0.5/0.5/0.2</td> <td>0.5</td> </tr> <tr> <td>Serial number</td> <td>2510034/13260114 /10050317770071</td> <td>13260124</td> </tr> <tr> <td>Calibration frequency</td> <td>yearly</td> <td>yearly</td> </tr> <tr> <td>Date of last calibration</td> <td>02/05/2009 30/04/2010 28/04/2011 25/04/2012</td> <td>02/05/2009 30/04/2010 28/04/2011 25/04/2012</td> </tr> <tr> <td>Validity</td> <td>yes</td> <td>yes</td> </tr> </tbody> </table>			Baijiao	Gongquan	Type	Electricity meter	Electricity meter	Accuracy class	0.5/0.5/0.2	0.5	Serial number	2510034/13260114 /10050317770071	13260124	Calibration frequency	yearly	yearly	Date of last calibration	02/05/2009 30/04/2010 28/04/2011 25/04/2012	02/05/2009 30/04/2010 28/04/2011 25/04/2012	Validity	yes	yes
	Baijiao	Gongquan																					
Type	Electricity meter	Electricity meter																					
Accuracy class	0.5/0.5/0.2	0.5																					
Serial number	2510034/13260114 /10050317770071	13260124																					
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Date of last calibration	02/05/2009 30/04/2010 28/04/2011 25/04/2012	02/05/2009 30/04/2010 28/04/2011 25/04/2012																					
Validity	yes	yes																					
QA/QC procedures to be applied	<p>Monitoring instruments will be maintained and calibrated for accuracy (0.5S) according to manufacturer's specifications.</p> <p>The calibration will be carried out annually by an independent certified party.</p>																						
Purpose of the data	Calculation of baseline emissions																						
Calculation method	N/A																						
Comments	The original data and calculation process please refer to the ER calculation sheet.																						

### 3.3 Monitoring Plan

#### Data Collection Procedures

CMM flow, temperature and pressure are continuously measured by the flow meters installed. Methane concentration is continuously measured by the methane concentration meters installed. The monitored data is recorded automatically and aggregated hourly, daily, monthly and yearly by the monitoring system.

Electricity delivered and imported is continuously measured by the electricity meters. The monitored data will be daily recorded and aggregated monthly and yearly.

Additional electric power consumption by the project is continuously measured by the electricity meters installed at the pump station. And the monitored data will be daily recorded and aggregated monthly and yearly.

The other parameters, such as NMHC in the CMM are measured annually by a qualified institute.

Collected data is archived in electronic spreadsheet and checked by directors of Monitoring System. The electronic documents are stored on hard disk. In addition, a hard copy printout is archived in a designated documents storage room.

The main monitoring instruments and installation points are shown in Fig. 3-1 below.

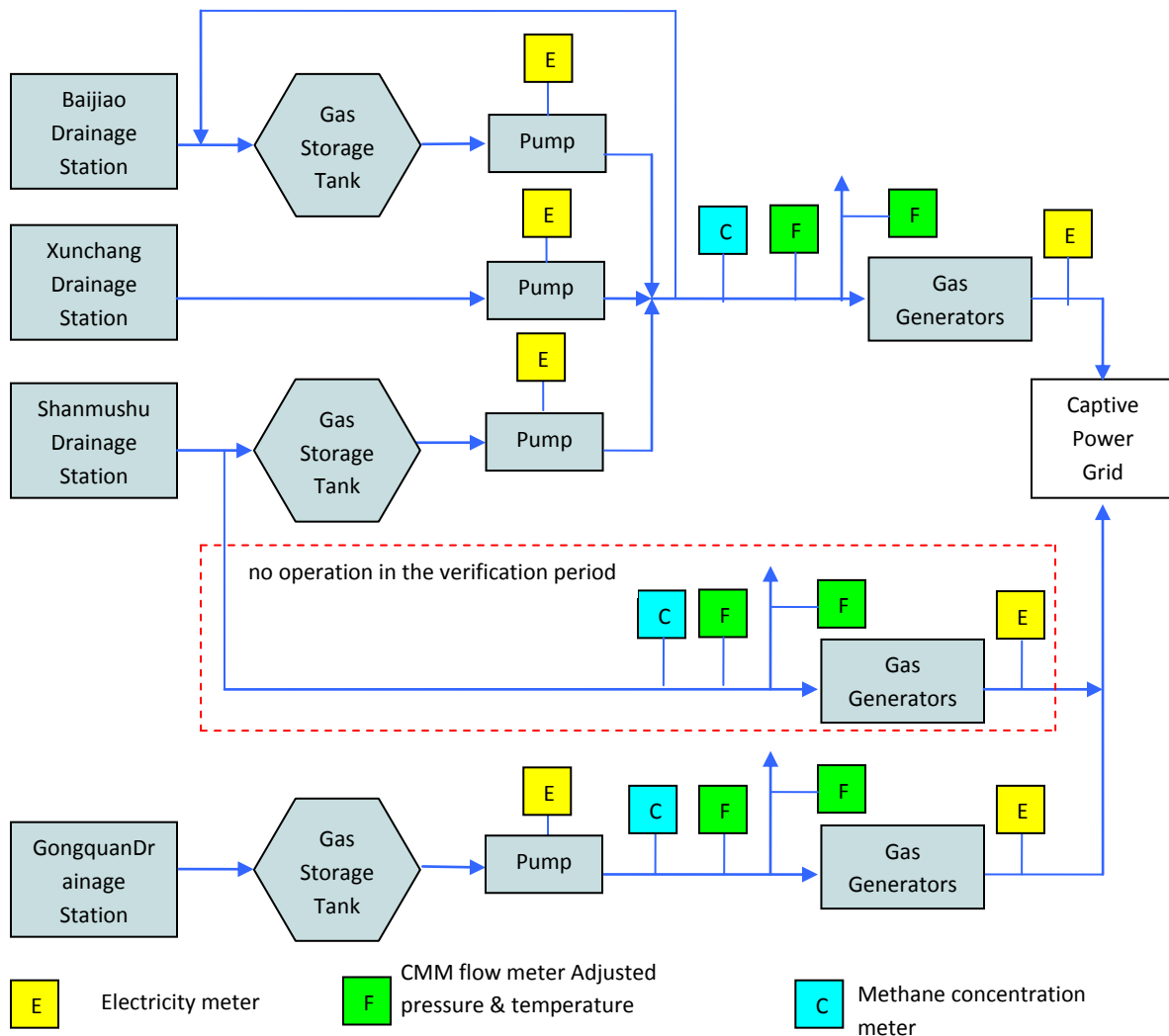


Fig. 3-1 Monitoring Instruments and Installation

CMM flow meters, methane concentration meters (temperature and pressure can be monitored simultaneously) and a modern display cabinet will be supplied by CQCCRI, which is responsible for the instrument installation and will provide the training for the operation and maintenance of these instruments by the operating staff.

The accuracy and applicable standards of these meters are shown in the Table 3-1 below.

Table 3-1 Main Monitoring Instruments

Symbol	Instrument	Function	Applied Standards	Model	Accuracy
C	Methane concentration meter	Measuring CH <sub>4</sub> concentration of the drained CMM sent to the gas generators	AQ 6211-2008 JJG 678-2007	GJG100H(B) Infra red	0.5
F	Gas flow meter	Measuring the CMM volume sent to the gas generators	JJG 640-1994	GLY series	0.5
E	Electricity meter	Measuring electricity delivered by the project	JJG 307-2006 JJG 596-1999	N/A	0.2/0.5(s)

## 2. Monitoring Organization

The structure of the CDM team is shown as follows.

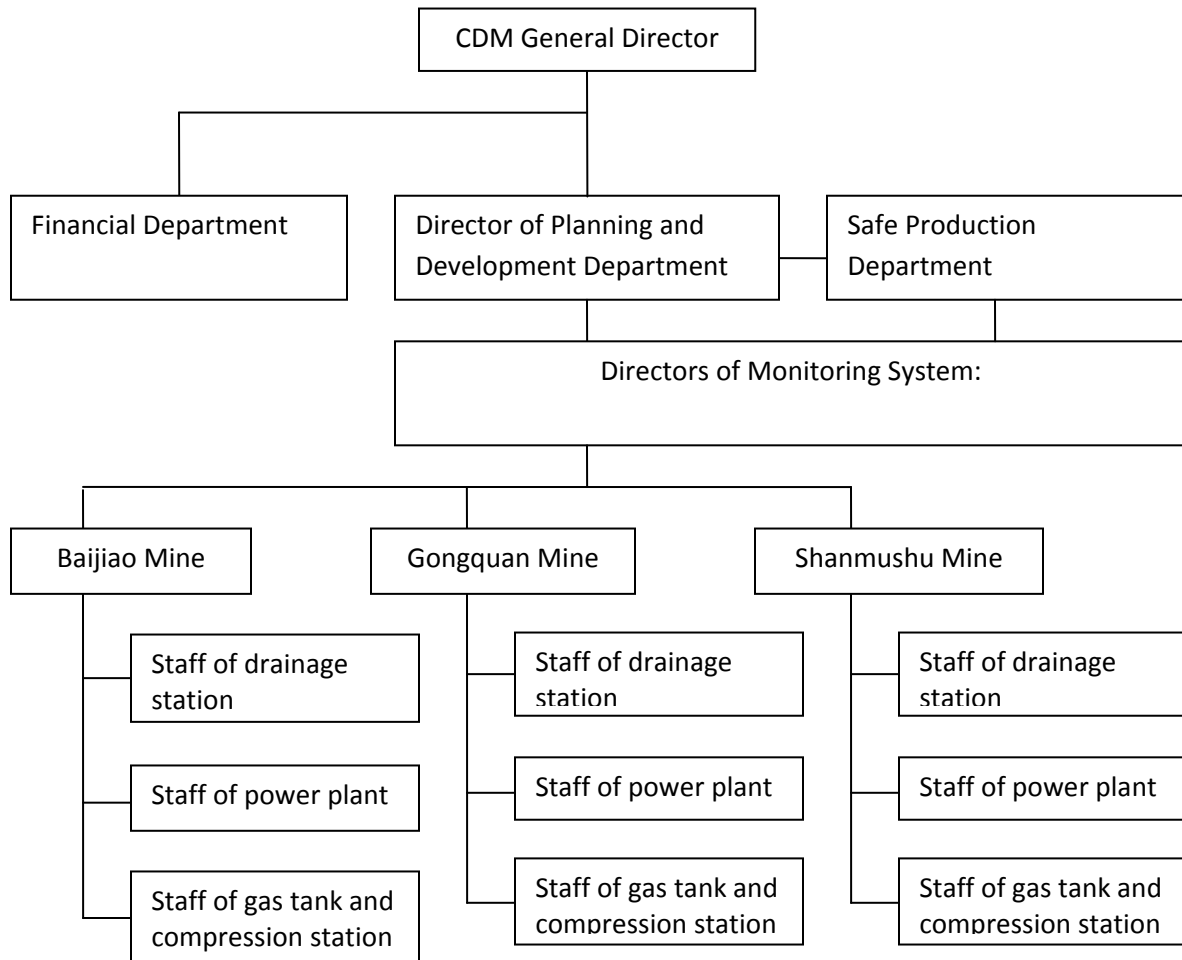


Fig. 3-2 Furong Group CDM Team

One competent CDM General Director, who will be designated by the project owner, has the overall responsibility for the monitoring plan and to supervise the collection of data. The CDM General Director designed Director of Planning and Development Department as the leader of monitoring activity. During the crediting period, CDM General Director will be the main contact person for the verifiers, the DNA, as well as relevant local authorities, etc., and Director of Planning and Development Department will responsible the monitoring management.

All other monitoring staff have clearly defined roles and responsibilities to ensure the accurate implementation of the monitoring plan, including:

(1) Directors of Monitoring System

- ◆ Provide training for the monitoring staff to ensure high quality of monitoring activities.
- ◆ Calculate ERs using collected data.
- ◆ Compiling periodical monitoring reports for verification of ERs.
- ◆ Reporting to the Director of Planning and Development Department with any issues related to project's performance.

(2) Monitoring staff

- ◆ Collect and store monitoring data in a safe manner.

- ◆ Maintain monitoring system and equipment under their normal operating conditions.
- ◆ Calibrate monitoring devices and instruments in accordance with the manufacturer's specifications and national or sectoral standards and requirements.

## 4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

### 4.1 Baseline Emissions

The project activity includes supplying CMM to power plant, no other technologies such as flaring, catalytic oxidation, etc., are being applied. Although the CMM directly used for heat generation is not included in the project activity, it will be monitored if any CMM destroyed through heat generation occurs in the crediting period. In addition, CMM supplied to gas grid or vehicle use will be monitored too. If the overlap occurs between CMM used for power generation and baseline use of CMM for households and vehicles, it will be used for calculating the project emissions. If total annual CMM volumes are more than enough to cover annual thermal energy and power requirements, no project emissions will be accounted for. Therefore, the formula is expressed as follows:

Baseline emissions are given by the following equation:

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

Where:

$BE_y$  Baseline emissions in year y (tCO<sub>2</sub>e)

$BE_{MD,y}$  Baseline emissions from destruction of methane in the baseline scenario in year y (tCO<sub>2</sub>e)

$BE_{MR,y}$  Baseline emissions from release of methane into the atmosphere in year y that is avoided by the project activity (tCO<sub>2</sub>e)

$BE_{Use,y}$  Baseline emissions from the production of power and supply to gas grid replaced by the project activity in year y (tCO<sub>2</sub>e)

#### 1.1 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.

#### 1.2 Methane released into the atmosphere

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

Where:

$GWP_{CH_4}$  Global warming potential of methane (21tCO<sub>2</sub>e/tCH<sub>4</sub>)

$MM_{ELEC}$  Methane measured sent to power plant (tCH<sub>4</sub>)

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 4-1 Methane sent to Baijiao CMM power plant, under baseline scenario would be released into the atmosphere

Year	$MM_{ELEC}$	$MM_{ELEC}$	$BE_{MR,y}$
	(m <sup>3</sup> )	(tCH <sub>4</sub> )	(tCO <sub>2</sub> e)
	A	B=A* $Density_{CH_4}$	C=B* $GWP_{CH_4}$
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 Methane sent to Gongquan CMM power plant, under baseline scenario would be released into the atmosphere

Year	$MM_{ELEC}$	$MM_{ELEC}$	$BE_{MR,y}$
	(m <sup>3</sup> )	(tCH <sub>4</sub> )	(tCO <sub>2</sub> e)
	A	B=A* $Density_{CH4}$	C=B* $GWP_{CH4}$
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

### 1.3 Emissions from power and heat generation replaced by the project

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

Where:

$GEN_y$  Electricity generated by project activity in year y (MWh)

$CEF_{ELEC}$  Carbon emissions factor of electricity used by Furong coal mines

The electricity generated by the project will displace the electricity from both the on-site captive plant and the CCPG in the baseline scenario. Because the on-site captive plant was closed as per the government requirement, only considering the electricity from the CCPG is displaced. So the  $CEF_{ELEC}$  will be CCPG emissions factor, this is conservative.

Table 4-3 Emissions from electricity displaced by Baijiao CMM power plant

Year	$GEN_y$ (MWh)	$BE_{Use,y}$ (tCO <sub>2</sub> e)
	D	E=D* $CEF_{ELEC}$
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 4-4 Emissions from electricity displaced by Gongquan CMM power plant

Year	$GEN_y$ (MWh)	$BE_{Use,y}$ (tCO <sub>2</sub> e)
	D	$E=D * CEF_{ELEC}$
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

**Total Baseline Emissions**

Baseline emissions are given by the following equation:

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

$BE_y$  Baseline emissions in year y (tCO<sub>2</sub>e)

$BE_{MD,y}$  Baseline emissions from destruction of methane in the baseline scenario in year y (tCO<sub>2</sub>e)

$BE_{MR,y}$  Baseline emissions from release of methane into the atmosphere in year y that is avoided by the project activity (tCO<sub>2</sub>e)

$BE_{Use,y}$  Baseline emissions from the production of power, heat or supply to gas grid replaced by the project activity in year y (tCO<sub>2</sub>e)

Table 4-5 Baseline emissions of Baijiao CMM power plant

Year	$BE_{MD,y}$ (tCO <sub>2</sub> e)	$BE_{MR,y}$ (tCO <sub>2</sub> e)	$BE_{Use,y}$ (tCO <sub>2</sub> e)	$BE_y$ (tCO <sub>2</sub> e)
------	-------------------------------------	-------------------------------------	--------------------------------------	--------------------------------

	F	C	E	G=F+C+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 4-6 Baseline emissions of Gongquan CMM power plant

Year	$BE_{MD,y}$ (tCO <sub>2</sub> e)	$BE_{MR,y}$ (tCO <sub>2</sub> e)	$BE_{Use,y}$ (tCO <sub>2</sub> e)	$BE_y$ (tCO <sub>2</sub> e)
	F	C	E	G=F+C+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

## 4.2 Project Emissions

Project emissions are defined by the following equation:

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

Where:

$PE_y$  Project emissions in year y (tCO<sub>2</sub>e)

$PE_{ME}$  Project emissions from energy use to capture and use methane (tCO<sub>2</sub>e)

$PE_{MD}$  Project emissions from methane destroyed (tCO<sub>2</sub>e)

$PE_{UM}$  Project emissions from un-combusted methane (tCO<sub>2</sub>e)

### 1.1 Combustion emissions from additional energy required for CMM capture and use

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

Where:

$CONS_{ELEC,PJ}$  Additional electricity consumption for capture and use of methane (MWh)

$CEF_{ELEC}$  Carbon emissions factor of electricity used by Furong coal mines

Consequently, the result of  $PE_{ME}$  is shown in the table below.

Table 4-7 Project emissions from additional energy use in Baijiao, Shanmushu and Xunchang coal mines

Years	$CONS_{ELEC,PJ}$ (MWh)	$PE_{ME}$ (tCO <sub>2</sub> e)
	H	I=H * $CEF_{ELEC}$
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 4-8 Project emissions from additional energy use in Gongquan coal mine

Years	$CONS_{ELEC,PI}$ (MWh)	$PE_{ME}$ (tCO <sub>2</sub> e)
	H	I=H * $CEF_{ELEC}$
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

## 1.2 Combustion emissions from use of captured methane

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

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

Where:

$MD_{ELEC}$  Methane destroyed through power generation (tCH<sub>4</sub>)

$CEF_{CH_4}$  Carbon emission factor for combusted methane (2.75 tCO<sub>2</sub>/tCH<sub>4</sub>)

$CEF_{NMHC}$  Carbon emission factor for combusted non methane hydrocarbons (the concentration varies and, therefore, to be obtained through periodical analysis of captured methane) (tCO<sub>2</sub>/tNMHC)

$r$  Relative proportion of NMHC compared to methane

$Pc_{CH_4}$  Concentration (in mass) of methane in extracted gas (%)

$Pc_{NMHC}$  NMHC concentration (in mass) in extracted gas (%)

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 tCO<sub>2</sub>/tCH<sub>4</sub>,  $PE_{MD}$  is calculated and shown in the table below.

Table 4-9 Combustion emissions from use of captured methane from Baijiao Shanmushu and Xunchang coal mines

Years	$MM_{ELEC}$	$MD_{ELEC}$	$PE_{MD}$
	(tCH <sub>4</sub> )	(tCH <sub>4</sub> )	(tCO <sub>2</sub> e)
	B	J=B* $Eff_{ELEC}$	K =J* $CEF_{CH_4}$
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 4-10 Combustion emissions from use of captured methane from Gongquan coal mine

Years	$MM_{ELEC}$ (tCH <sub>4</sub> )	$MD_{ELEC}$ (tCH <sub>4</sub> )	$PE_{MD}$ (tCO <sub>2</sub> e)
	<b>B</b>	<b>J=B* Eff<sub>ELEC</sub></b>	<b>K =J* CEF<sub>CH4</sub></b>
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

### 1.3 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 4-11 Un-combusted methane from end uses in Baijiao, Shanmushu and Xunchang coal mines

Year	$MM_{ELEC}$	Total CH <sub>4</sub> emissions	$PE_{UM}$
	(tCH <sub>4</sub> )	(tCH <sub>4</sub> )	(tCO <sub>2</sub> e)
	<b>B</b>	<b>L=B*(1- Eff<sub>ELEC</sub>)</b>	<b>M=L* GWP<sub>CH4</sub></b>
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 4-12 Un-combusted methane from end uses in Gongquan coal mine

Year	$MM_{ELEC}$	Total CH <sub>4</sub> emissions	$PE_{UM}$
	(tCH <sub>4</sub> )	(tCH <sub>4</sub> )	(tCO <sub>2</sub> e)
	<b>B</b>	<b>L=B*(1- <math>Eff_{ELEC}</math> )</b>	<b>M=L* <math>GWP_{CH4}</math></b>
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

**Total Project Emissions**

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

Table 4-13 Project emissions of Baijiao, Shanmushu and Xunchang coal mines

Year	$PE_{ME}$	$PE_{MD}$	$PE_{UM}$	$PE_y$
	(tCO <sub>2</sub> e)	(tCO <sub>2</sub> e)	(tCO <sub>2</sub> e)	(tCO <sub>2</sub> e)
	I	K	M	N=I+K+M
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 4-14 Project emissions of Gongquan coal mine

Year	$PE_{ME}$	$PE_{MD}$	$PE_{UM}$	$PE_y$
	(tCO <sub>2</sub> e)	(tCO <sub>2</sub> e)	(tCO <sub>2</sub> e)	(tCO <sub>2</sub> e)
	I	K	M	N=I+K+M
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

### 4.3 Leakage

The formula for leakage is given as follows:

$$LE_y = LE_{d,y} + LE_{o,y}$$

Where:

$LE_y$  Leakage emissions in year y (tCO<sub>2</sub>e)

$LE_{d,y}$  Leakage emissions due to displacement of other baseline thermal energy uses of methane in year y (tCO<sub>2</sub>e)

$LE_{o,y}$  Leakage emissions due to other uncertainties in year y (tCO<sub>2</sub>e)

According to the approved revised PDD, the leakage is 0.

### 4.4 Net GHG Emission Reductions and Removals

The formula for emission reduction is given as follows:

$$ER_y = BE_y - PE_y - LE_y$$

$ER_y$  Emissions reductions of the project activity during the year y (tCO<sub>2</sub>e)

$BE_y$  Baseline emissions during the year y (tCO<sub>2</sub>e)

$PE_y$  Project emissions during the year y (tCO<sub>2</sub>e)

$LE_y$  Leakage emissions in year y (tCO<sub>2</sub>e)

Table 4-15 Emission reduction of Baijiao, Shanmushu and Xunchang coal mines

Year	$BE_y$	$PE_y$	$LE_y$	$ER_y$
------	--------	--------	--------	--------

	(tCO <sub>2</sub> e)	(tCO <sub>2</sub> e)	(tCO <sub>2</sub> e)	(tCO <sub>2</sub> e)
	<b>G</b>	<b>N</b>	<b>O</b>	<b>P=G-N-O</b>
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 4-16 Emission reduction of Gongquan coal mine

Year	$BE_y$	$PE_y$	$LE_y$	$ER_y$
	(tCO <sub>2</sub> e)	(tCO <sub>2</sub> e)	(tCO <sub>2</sub> e)	(tCO <sub>2</sub> e)
	<b>G</b>	<b>N</b>	<b>O</b>	<b>P=G-N-O</b>
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
<b>Total</b>	<b>188,897</b>	<b>22,041</b>	<b>0</b>	<b>166,856</b>

Table 4-17 Emission reduction of the Project

Year	$BE_y$	$PE_y$	$LE_y$	$ER_y$
	(tCO <sub>2</sub> e)	(tCO <sub>2</sub> e)	(tCO <sub>2</sub> e)	(tCO <sub>2</sub> e)
	<b>G</b>	<b>H</b>	<b>J</b>	<b>O</b>
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
<b>Total in 2010</b>	<b>128,708</b>	<b>15,031</b>	<b>0</b>	<b>113,677</b>
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
<b>Total in 2011</b>	<b>187,154</b>	<b>22,218</b>	<b>0</b>	<b>164,936</b>
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
<b>Total in 2012</b>	<b>176,823</b>	<b>21,057</b>	<b>0</b>	<b>155,766</b>
<b>Total</b>	<b>492,685</b>	<b>58,306</b>	<b>0</b>	<b>434,379</b>

During this monitoring period from 16/04/2010 to 31/12/2012 (total 991 days). The actual emission reductions are 434,379tCO<sub>2</sub>e. According to the revised registered PDD approved by EB, the emission reductions for this monitoring period should be 519,986tCO<sub>2</sub>e<sup>4</sup>. In comparison, the actual emission reductions are -16.46% lower than the estimated emission reductions in the registered PDD.

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<sup>4</sup> As per the approved revised PDD, the estimated emission reductions are 167,439tCO<sub>2</sub>e in 2010, 200,372tCO<sub>2</sub>e in 2011, 200,343tCO<sub>2</sub>e in 2012. There are 260 days in 2010(16/04/2010-31/12/2010). The estimated emission reductions are 519,986 tCO<sub>2</sub>e (=167,439\*(260/365)+200,372+200,343).