

Sichuan Furong Coal Mine Methane Utilization Project

Project Title	Sichuan Furong Coal Mine Methane Utilization Project
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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 plant¹ and the Central China Power Grid (“CCPG”) for on-site use. CMM is extracted from four of Furong Group’s mines, including Baijiao, Shanmushu, Xunchang² 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; ^a 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 yet; 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. ^a
Total	16.192MW ^b

Note: ^aDuring 05/2012-06/2012, three domestic generators installed in Baijiao coal mine were moved to Gongquan coal mine.

^bThe 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.

¹ 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.

² 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 CH₄ 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 2,153,870tCO₂ equivalents of greenhouse gas emissions during the 10-year crediting period.

The monitoring period is 16/04/2010-31/12/2012(first and last days included). During this monitoring period, the total emission reductions are 429,933tCO₂e.

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 revised registered 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 429,933tCO₂e.

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 first 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, Xunchang3 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.

³ Please refer to footnote 2.

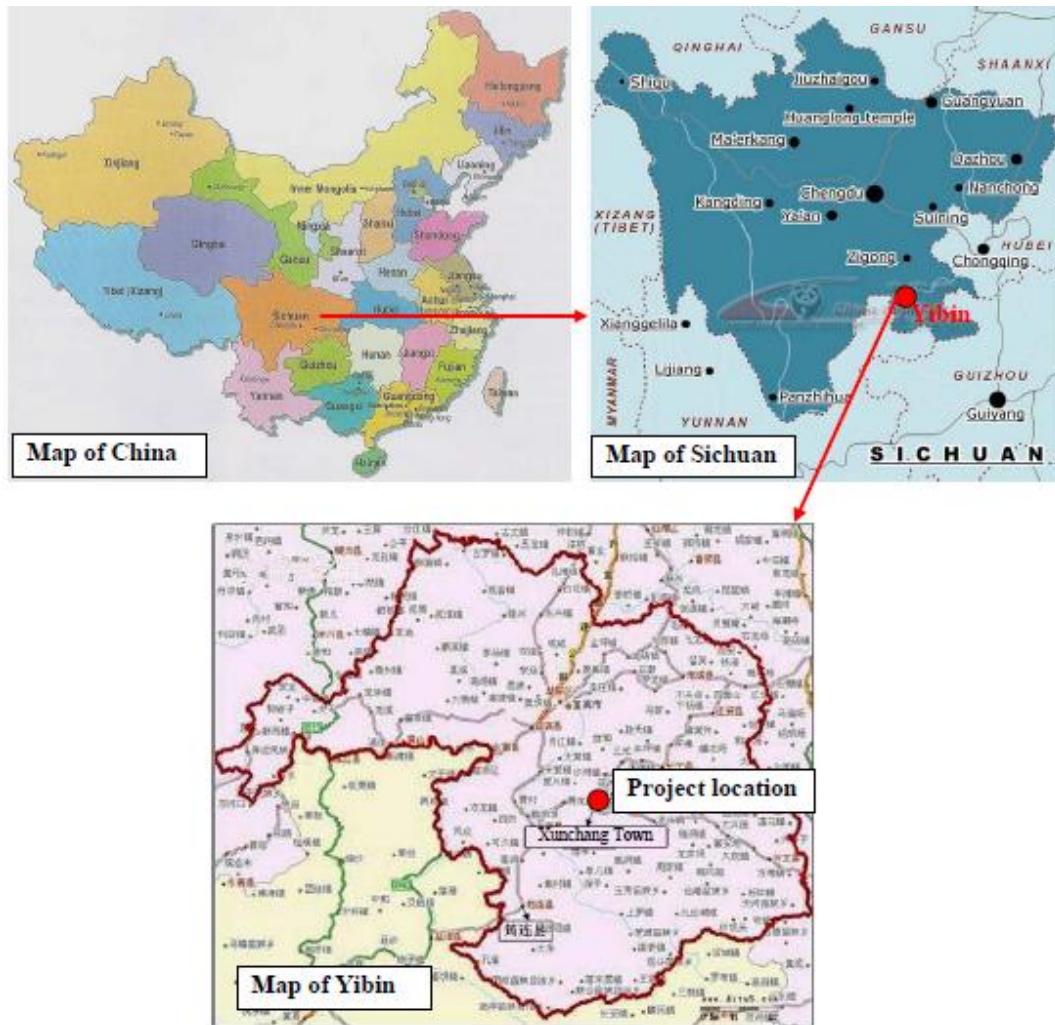


Fig.1-1 Project Location

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 VCUs 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, up to now, the total capacity commissioned and under installation is 13.144MW. 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.

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 were installed at Baijiao area in March 2008 and four waste heat boilers 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 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

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 04.1 dated 06/11/2013 and approved by EB on 18/12/2013.

The project was implemented as described in the revised registered PDD version 04.1 dated 06/11/2013. 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	$EF_{NG,upstream,y}$
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 ₂ e/CH ₄
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 ₂ e/tCH ₄
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 ₄ /m ³
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	-

3.2 Data and Parameters Monitored

Data / Parameter	$CONS_{ELEC,PJ}$
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 13/01/2011 10/01/2012	01/04/2010 13/01/2011 10/01/2012	01/04/2010	01/04/2010 13/01/2011 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 ₄
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 10/07/2012)	1528	2484/1101 (1101 replaced 2484 on 28/12/2012)	1245/1243 (1243 replaced 1245 on 24/12/2012)
	Calibration frequency	yearly	yearly	yearly	yearly
	Date of last calibration	28/06/2009 25/06/2010 23/06/2011 20/06/2012 20/06/2012	28/06/2009 25/06/2010 23/06/2011 20/06/2012	11/01/2010 10/01/2011 09/01/2012 20/06/2012 20/06/2012	25/12/2009 23/12/2010 21/06/2011 20/06/2012 20/06/2012
	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.

Data / Parameter	PC_{CH4}															
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.</p> <p>The continuously monitored methane concentration meter with accuracy of 0.5 will be installed.</p> <table border="1" data-bbox="716 1270 1373 1850"> <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> </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
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														

		11/01/2010	25/12/2009
		10/01/2011	23/12/2010
	Date of last calibration	09/01/2012	21/06/2011
		20/06/2012	20/06/2012
		20/06/2012	20/06/2012
	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	-		

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" style="width: 100%; text-align: center;"> <thead> <tr> <th>Year</th> <th>Baijiao CMM power plant</th> <th>Gongquan CMM power plant</th> </tr> </thead> <tbody> <tr> <td>2009</td> <td>0.016%</td> <td>0.016%</td> </tr> <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	2009	0.016%	0.016%	2010	0.016%	0.016%	2011	0.016%	0.016%	2012	0.014%	0.014%
Year	Baijiao CMM power plant	Gongquan CMM power plant																
2009	0.016%	0.016%																
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	The test will be carried out at least once a year in accordance																	

applied	with national standards.
Purpose of the data	Calculation of project emissions
Calculation method	N/A
Comments	CO ₂ 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 grid for Furong self-use.																											
Frequency of monitoring/recording	Continuously measured																											
Value monitored:	92,785.044																											
Monitoring equipment	<table border="1" style="width: 100%; border-collapse: collapse; margin-left: 40px;"> <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 rowspan="4">Date of last calibration</td> <td>02/05/2009</td> <td>02/05/2009</td> </tr> <tr> <td>30/04/2010</td> <td>30/04/2010</td> </tr> <tr> <td>28/04/2011</td> <td>28/04/2011</td> </tr> <tr> <td>25/04/2012</td> <td>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	02/05/2009	30/04/2010	30/04/2010	28/04/2011	28/04/2011	25/04/2012	25/04/2012	Validity	yes	yes
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	28/04/2011	28/04/2011																										
	25/04/2012	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.																											

Data / Parameter	$FC_{i,y}$
Data unit	mass or volume unit
Description	Amount of fossil fuel type i consumed by power plants

	connected to the CCPG in year y
Source of data	China Energy Statistical Yearbooks
Description of measurement methods and procedures to be applied	measured
Frequency of monitoring/recording	Yearly
Value monitored:	Please refer to the ER calculation sheet
Monitoring equipment	NA
QA/QC procedures to be applied	The grid emission factor will be updated annually based on the latest published statistics.
Purpose of the data	Calculation of the baseline and project emission
Calculation method	Annually monitored ex-post during the crediting period for the relevant year. Data from the latest available China Energy Statistical Yearbook, which is an authoritative publication, will be monitored and applied by the project developer.
Comments	NA

Data / Parameter	NCV_i
Data unit	GJ/mass or volume unit
Description	net calorific value (energy content) of fossil fuel type i in year y
Source of data	China Energy Statistical Yearbooks
Description of measurement methods and procedures to be applied	measured
Frequency of monitoring/recording	Yearly
Value monitored:	Please refer to the ER calculation sheet
Monitoring equipment	NA
QA/QC procedures to be applied	The grid emission factor will be updated annually based on the latest published statistics.
Purpose of the data	Calculation of the baseline and project emission
Calculation method	Annually monitored ex-post during the crediting period for the relevant year. Data from the latest available China Energy Statistical Yearbook, which is an authoritative publication, will be monitored and applied by the project

	developer.
Comments	NA

Data / Parameter	$EF_{CO_2,i,y}$
Data unit	tCO ₂ /GJ
Description	CO ₂ emission factor of fossil fuel type i in year y
Source of data	Default values from 2006 IPCC Guidelines for National Greenhouse Gas Inventories
Description of measurement methods and procedures to be applied	measured
Frequency of monitoring/recording	Yearly
Value monitored:	Please refer to the ER calculation sheet
Monitoring equipment	NA
QA/QC procedures to be applied	The grid emission factor will be updated annually based on the latest published statistics.
Purpose of the data	Calculation of the baseline and project emission
Calculation method	Annually monitored ex-post during the crediting period for the relevant year. Data from the latest available IPCC Guidelines for National Greenhouse Gas Inventories, which is an authoritative publication, will be monitored and applied by the project developer.
Comments	NA

Data / Parameter	EG_y
Data unit	MWh/year
Description	Electricity generation of each power source/plant connected to the CCPG
Source of data	China Electric Power Yearbook
Description of measurement methods and procedures to be applied	measured
Frequency of monitoring/recording	Yearly
Value monitored:	Please refer to the ER calculation sheet

Monitoring equipment	NA
QA/QC procedures to be applied	The grid emission factor will be updated annually based on the latest published statistics.
Purpose of the data	Calculation of the baseline and project emission
Calculation method	Annually monitored ex-post during the crediting period for the relevant year. Data from the latest available China Energy Statistical Yearbook, which is an authoritative publication, will be monitored and applied by the project developer.
Comments	NA

Data / Parameter	CEF_{ELEC}										
Data unit	tCO ₂ 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											
Description of measurement methods and procedures to be applied	Calculated										
Frequency of monitoring/recording	Yearly										
Value monitored:	<table border="1"> <thead> <tr> <th>Year</th> <th>CEF_{ELEC}</th> </tr> </thead> <tbody> <tr> <td>2010.04-2010.12</td> <td>0.9891</td> </tr> <tr> <td>2011.01-2011.10</td> <td>0.9289</td> </tr> <tr> <td>2011.11-2012.10</td> <td>0.8770</td> </tr> <tr> <td>2012.11-2012.12</td> <td>0.8641</td> </tr> </tbody> </table>	Year	CEF_{ELEC}	2010.04-2010.12	0.9891	2011.01-2011.10	0.9289	2011.11-2012.10	0.8770	2012.11-2012.12	0.8641
Year	CEF_{ELEC}										
2010.04-2010.12	0.9891										
2011.01-2011.10	0.9289										
2011.11-2012.10	0.8770										
2012.11-2012.12	0.8641										
Monitoring equipment	NA										
QA/QC procedures to be applied	The grid emission factor will be updated annually based on the latest published statistics.										
Purpose of the data	Calculation of the baseline and project emission										
Calculation method	<i>Referring to Tool to calculate the emission factor for an electricity system (version 01.1)</i>										
Comments	This parameter is ex post determined in revised PDD approved by EB on 18/12/2013 and update every year										

	during the fixed crediting period.
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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.

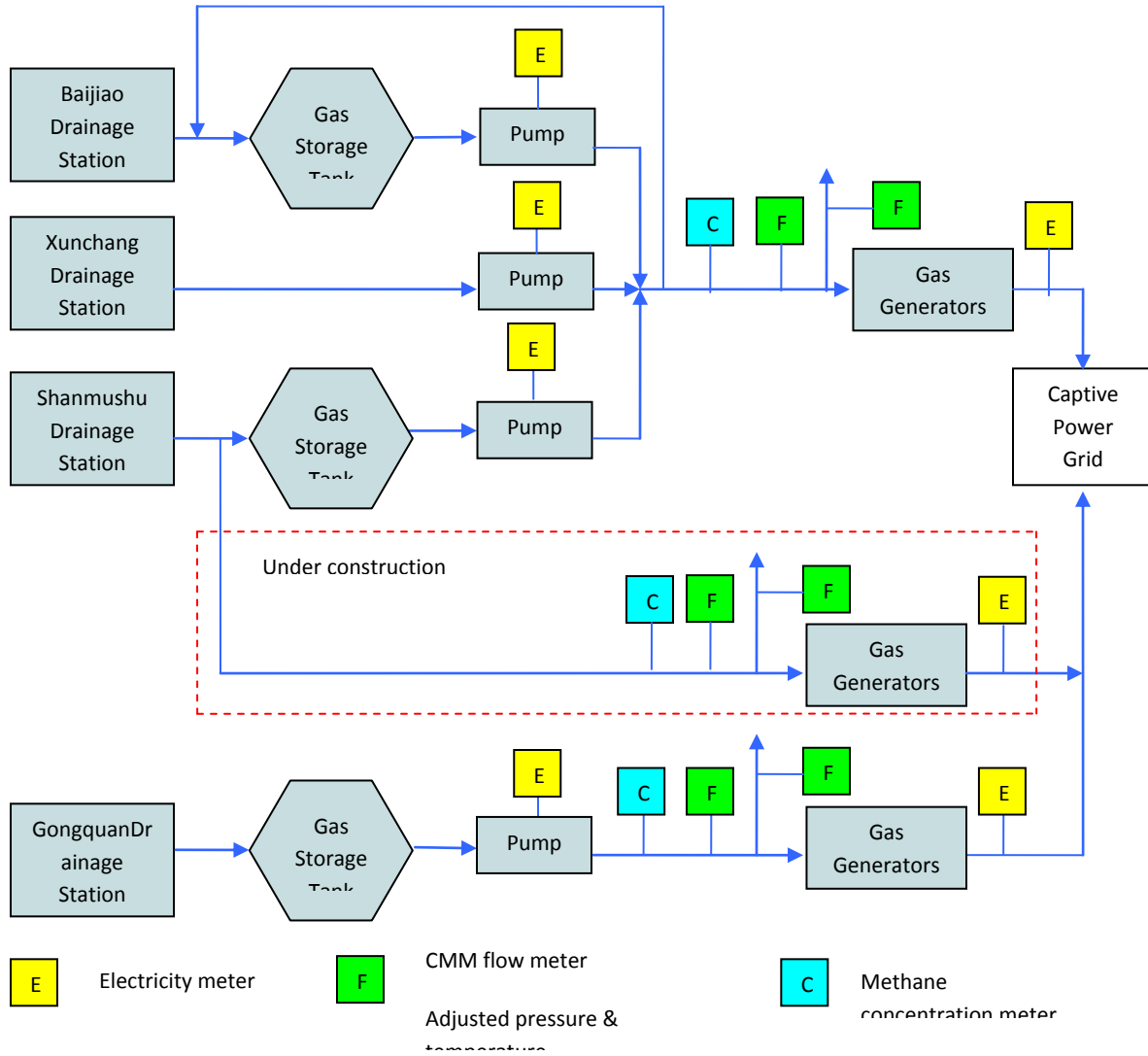


Fig. 3-1 Monitoring Instruments and Installation

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 ₄ 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.

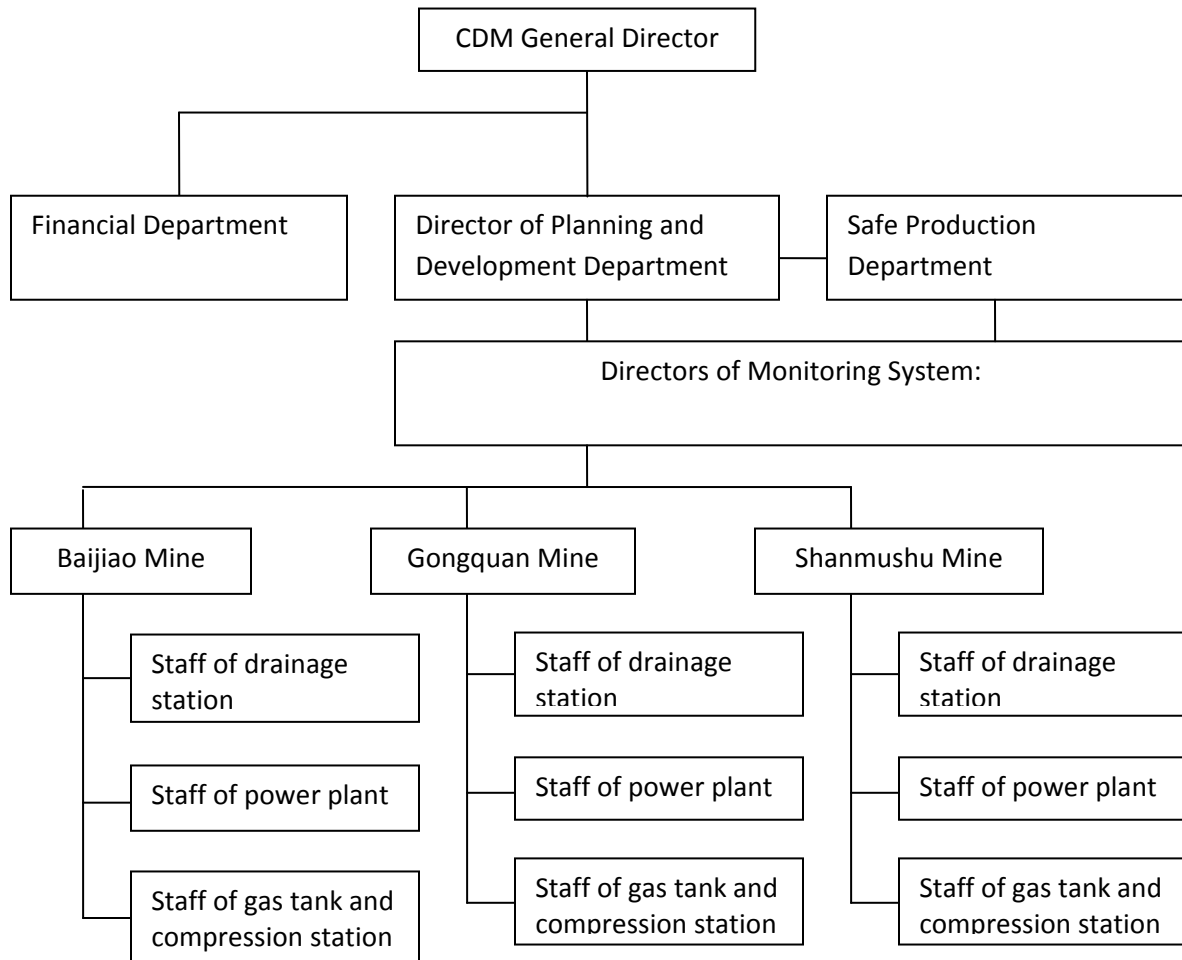


Fig. 3-2 Furong Group CDM Team

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 CERs using collected data.
- ◆ Compiling periodical monitoring reports for verification and certification of CERs.
- ◆ 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 (tCO₂e)

$BE_{MD,y}$ Baseline emissions from destruction of methane in the baseline scenario in year y (tCO₂e)

$BE_{MR,y}$ Baseline emissions from release of methane into the atmosphere in year y that is avoided by the project activity (tCO₂e)

$BE_{Use,y}$ Baseline emissions from the production of power and supply to gas grid replaced by the project activity in year y (tCO₂e)

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 (21tCO₂e/tCH₄)

MM_{ELEC} Methane measured sent to power plant (tCH₄)

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^3)	(tCH_4)	(tCO_2e)
	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 ³)	(tCH ₄)	(tCO ₂ 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 ₂ e)
	D	E=D* CEF_{ELEC}
16/04/2010-30/04/2010	977.760	967
01/05/2010-31/05/2010	2758.212	2,728
01/06/2010-30/06/2010	2310.624	2,285
01/07/2010-31/07/2010	2416.848	2,391
01/08/2010-31/08/2010	2403.300	2,377
01/09/2010-30/09/2010	2772.576	2,742
01/10/2010-31/10/2010	2405.472	2,379
01/11/2010-30/11/2010	1964.160	1,943
01/12/2010-31/12/2010	1711.392	1,693

01/01/2011-31/01/2011	992.640	922
01/02/2011-28/02/2011	1386.288	1,288
01/03/2011-31/03/2011	2015.040	1,872
01/04/2011-30/04/2011	2626.716	2,440
01/05/2011-31/05/2011	2604.324	2,419
01/06/2011-30/06/2011	2416.704	2,245
01/07/2011-31/07/2011	2292.144	2,129
01/08/2011-31/08/2011	2052.240	1,906
01/09/2011-30/09/2011	2113.752	1,963
01/10/2011-31/10/2011	1883.232	1,750
01/11/2011-30/11/2011	1975.872	1,733
01/12/2011-31/12/2011	1783.680	1,564
01/01/2012-31/01/2012	755.904	663
01/02/2012-29/02/2012	906.432	795
01/03/2012-31/03/2012	1503.168	1,318
01/04/2012-30/04/2012	2271.072	1,992
01/05/2012-31/05/2012	2198.592	1,928
01/06/2012-30/06/2012	1980.480	1,737
01/07/2012-31/07/2012	1470.528	1,290
01/08/2012-31/08/2012	1003.104	880
01/09/2012-30/09/2012	998.400	876
01/10/2012-31/10/2012	1177.824	1,033
01/11/2012-30/11/2012	1989.504	1,719
01/12/2012-31/12/2012	2499.744	2,160
Total	62617.728	58,126

Table 4-4 Emissions from electricity displaced by Gongquan CMM power plant

Year	GEN_y (MWh)	$BE_{Use,y}$ (tCO ₂ e)
	D	$E=D * CEF_{ELEC}$
16/04/2010-30/04/2010	574.164	568
01/05/2010-31/05/2010	902.628	893
01/06/2010-30/06/2010	939.132	929
01/07/2010-31/07/2010	860.94	852
01/08/2010-31/08/2010	685.764	678
01/09/2010-30/09/2010	538.992	533
01/10/2010-31/10/2010	566.1	560
01/11/2010-30/11/2010	796.248	788
01/12/2010-31/12/2010	692.82	685
01/01/2011-31/01/2011	921.492	856
01/02/2011-28/02/2011	1087.956	1,011
01/03/2011-31/03/2011	860.976	800
01/04/2011-30/04/2011	942.3	875
01/05/2011-31/05/2011	1080.36	1,004
01/06/2011-30/06/2011	960.804	892
01/07/2011-31/07/2011	784.584	729
01/08/2011-31/08/2011	959.184	891
01/09/2011-30/09/2011	884.196	821
01/10/2011-31/10/2011	913.104	848
01/11/2011-30/11/2011	764.676	671
01/12/2011-31/12/2011	821.232	720
01/01/2012-31/01/2012	977.04	857
01/02/2012-29/02/2012	685.08	601

01/03/2012-31/03/2012	721.944	633
01/04/2012-30/04/2012	787.248	690
01/05/2012-31/05/2012	1014.984	890
01/06/2012-30/06/2012	973.836	854
01/07/2012-31/07/2012	1146.744	1,006
01/08/2012-31/08/2012	1340.064	1,175
01/09/2012-30/09/2012	1330.452	1,167
01/10/2012-31/10/2012	1320.336	1,158
01/11/2012-30/11/2012	1253.376	1,083
01/12/2012-31/12/2012	1078.56	932
Total	30167.316	27,649

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 (tCO₂e)

$BE_{MD,y}$ Baseline emissions from destruction of methane in the baseline scenario in year y (tCO₂e)

$BE_{MR,y}$ Baseline emissions from release of methane into the atmosphere in year y that is avoided by the project activity (tCO₂e)

$BE_{Use,y}$ Baseline emissions from the production of power, heat or supply to gas grid replaced by the project activity in year y (tCO₂e)

Table 4-5 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)
	F	C	E	G=F+C+E

16/04/2010-30/04/2010	0	3,682	967	4,649
01/05/2010-31/05/2010	0	9,077	2,728	11,806
01/06/2010-30/06/2010	0	8,437	2,285	10,722
01/07/2010-31/07/2010	0	8,367	2,391	10,758
01/08/2010-31/08/2010	0	8,867	2,377	11,244
01/09/2010-30/09/2010	0	9,492	2,742	12,235
01/10/2010-31/10/2010	0	8,057	2,379	10,436
01/11/2010-30/11/2010	0	6,561	1,943	8,504
01/12/2010-31/12/2010	0	6,116	1,693	7,808
01/01/2011-31/01/2011	0	4,761	922	5,683
01/02/2011-28/02/2011	0	5,870	1,288	7,158
01/03/2011-31/03/2011	0	10,390	1,872	12,262
01/04/2011-30/04/2011	0	9,642	2,440	12,082
01/05/2011-31/05/2011	0	10,386	2,419	12,805
01/06/2011-30/06/2011	0	8,957	2,245	11,202
01/07/2011-31/07/2011	0	7,611	2,129	9,740
01/08/2011-31/08/2011	0	7,052	1,906	8,958
01/09/2011-30/09/2011	0	6,508	1,963	8,470
01/10/2011-31/10/2011	0	6,496	1,750	8,246
01/11/2011-30/11/2011	0	9,239	1,733	10,971
01/12/2011-31/12/2011	0	9,546	1,564	11,111
01/01/2012-31/01/2012	0	4,424	663	5,087
01/02/2012-29/02/2012	0	4,180	795	4,974
01/03/2012-31/03/2012	0	6,838	1,318	8,157
01/04/2012-30/04/2012	0	8,037	1,992	10,029
01/05/2012-31/05/2012	0	8,708	1,928	10,636
01/06/2012-30/06/2012	0	8,025	1,737	9,761
01/07/2012-31/07/2012	0	6,324	1,290	7,613

01/08/2012-31/08/2012	0	4,764	880	5,644
01/09/2012-30/09/2012	0	4,501	876	5,377
01/10/2012-31/10/2012	0	5,157	1,033	6,190
01/11/2012-30/11/2012	0	8,731	1,719	10,450
01/12/2012-31/12/2012	0	7,966	2,160	10,126
Total	0	242,766	58,126	300,893

Table 4-6 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)
	F	C	E	G=F+C+E
16/04/2010-30/04/2010	0	2,134	568	2,702
01/05/2010-31/05/2010	0	5,098	893	5,991
01/06/2010-30/06/2010	0	4,903	929	5,832
01/07/2010-31/07/2010	0	4,588	852	5,440
01/08/2010-31/08/2010	0	4,140	678	4,819
01/09/2010-30/09/2010	0	3,196	533	3,730
01/10/2010-31/10/2010	0	3,144	560	3,704
01/11/2010-30/11/2010	0	4,009	788	4,796
01/12/2010-31/12/2010	0	3,232	685	3,917
01/01/2011-31/01/2011	0	4,645	856	5,501
01/02/2011-28/02/2011	0	5,670	1,011	6,681
01/03/2011-31/03/2011	0	5,512	800	6,312
01/04/2011-30/04/2011	0	6,578	875	7,454
01/05/2011-31/05/2011	0	6,756	1,004	7,759
01/06/2011-30/06/2011	0	4,574	892	5,467
01/07/2011-31/07/2011	0	3,442	729	4,171

01/08/2011-31/08/2011	0	3,788	891	4,679
01/09/2011-30/09/2011	0	3,316	821	4,138
01/10/2011-31/10/2011	0	3,572	848	4,420
01/11/2011-30/11/2011	0	4,379	671	5,050
01/12/2011-31/12/2011	0	4,236	720	4,956
01/01/2012-31/01/2012	0	4,455	857	5,312
01/02/2012-29/02/2012	0	3,629	601	4,229
01/03/2012-31/03/2012	0	4,672	633	5,305
01/04/2012-30/04/2012	0	4,158	690	4,848
01/05/2012-31/05/2012	0	5,438	890	6,328
01/06/2012-30/06/2012	0	5,398	854	6,253
01/07/2012-31/07/2012	0	7,079	1,006	8,085
01/08/2012-31/08/2012	0	7,450	1,175	8,625
01/09/2012-30/09/2012	0	7,354	1,167	8,521
01/10/2012-31/10/2012	0	7,137	1,158	8,294
01/11/2012-30/11/2012	0	6,284	1,083	7,367
01/12/2012-31/12/2012	0	5,532	932	6,464
Total	0	159,499	27,649	187,149

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 (tCO₂e)

PE_{ME} Project emissions from energy use to capture and use methane (tCO₂e)

PE_{MD} Project emissions from methane destroyed (tCO₂e)

PE_{UM} Project emissions from un-combusted methane (tCO₂e)

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 ₂ e)
	H	I=H * CEF_{ELEC}
16/04/2010-30/04/2010	65.880	65
01/05/2010-31/05/2010	110.280	109
01/06/2010-30/06/2010	107.040	106
01/07/2010-31/07/2010	113.080	112
01/08/2010-31/08/2010	113.560	112

01/09/2010-30/09/2010	111.360	110
01/10/2010-31/10/2010	114.840	114
01/11/2010-30/11/2010	110.640	109
01/12/2010-31/12/2010	112.280	111
01/01/2011-31/01/2011	131.760	122
01/02/2011-28/02/2011	116.680	108
01/03/2011-31/03/2011	149.280	139
01/04/2011-30/04/2011	114.973	107
01/05/2011-31/05/2011	116.059	108
01/06/2011-30/06/2011	118.731	110
01/07/2011-31/07/2011	119.693	111
01/08/2011-31/08/2011	112.880	105
01/09/2011-30/09/2011	106.816	99
01/10/2011-31/10/2011	110.706	103
01/11/2011-30/11/2011	107.602	94
01/12/2011-31/12/2011	110.826	97
01/01/2012-31/01/2012	107.131	94
01/02/2012-29/02/2012	109.520	96
01/03/2012-31/03/2012	108.562	95
01/04/2012-30/04/2012	108.317	95
01/05/2012-31/05/2012	97.859	86
01/06/2012-30/06/2012	110.357	97
01/07/2012-31/07/2012	91.691	80
01/08/2012-31/08/2012	76.232	67
01/09/2012-30/09/2012	76.464	67
01/10/2012-31/10/2012	77.019	68
01/11/2012-30/11/2012	88.926	77

01/12/2012-31/12/2012	81.419	70
Total	3508.462	3,244

Table 4-8 Project emissions from additional energy use in Gongquan coal mine

Years	$CONS_{ELEC,PJ}$ (MWh)	PE_{ME} (tCO ₂ e)
	H	$I=H * CEF_{ELEC}$
16/04/2010-30/04/2010	8.654	9
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	18
01/08/2010-31/08/2010	17.962	18
01/09/2010-30/09/2010	17.772	18
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	13
01/02/2011-28/02/2011	8.916	8
01/03/2011-31/03/2011	9.903	9
01/04/2011-30/04/2011	9.832	9
01/05/2011-31/05/2011	12.618	10
01/06/2011-30/06/2011	13.346	14
01/07/2011-31/07/2011	13.938	13
01/08/2011-31/08/2011	13.981	13
01/09/2011-30/09/2011	13.098	12
01/10/2011-31/10/2011	13.616	13
01/11/2011-30/11/2011	13.230	12
01/12/2011-31/12/2011	14.395	13

01/01/2012-31/01/2012	13.516	12
01/02/2012-29/02/2012	12.318	11
01/03/2012-31/03/2012	13.750	12
01/04/2012-30/04/2012	13.392	12
01/05/2012-31/05/2012	13.680	12
01/06/2012-30/06/2012	13.462	12
01/07/2012-31/07/2012	14.058	12
01/08/2012-31/08/2012	18.822	17
01/09/2012-30/09/2012	14.380	13
01/10/2012-31/10/2012	14.183	12
01/11/2012-30/11/2012	15.129	13
01/12/2012-31/12/2012	14.456	12
Total	473.318	438

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 (tCH₄)

CEF_{CH_4} Carbon emission factor for combusted methane (2.75 tCO₂/tCH₄)

CEF_{NMHC} Carbon emission factor for combusted non methane hydrocarbons (the concentration varies and, therefore, to be obtained through periodical analysis of captured methane) (tCO₂/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 tCO₂/tCH₄, 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 ₄)	(tCH ₄)	(tCO ₂ 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 ₄)	MD_{ELEC} (tCH ₄)	PE_{MD} (tCO ₂ e)
	B	J=B* Eff_{ELEC}	K =J* CEF_{CH4}
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} (tCH ₄)	Total CH ₄ emissions (tCH ₄)	PE_{UM} (tCO ₂ e)
	B	L=B*(1- Eff_{ELEC})	M=L* GWP_{CH4}
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 ₄ emissions	PE_{UM}
	(tCH ₄)	(tCH ₄)	(tCO ₂ e)
	B	L=B*(1- Eff_{ELEC})	M=L* GWP_{CH4}
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 ₂ e)	(tCO ₂ e)	(tCO ₂ e)	(tCO ₂ e)
	I	K	M	N=I+K+M
16/04/2010-30/04/2010	65	480	18.41	563
01/05/2010-31/05/2010	109	1,183	45.39	1,337
01/06/2010-30/06/2010	106	1,099	42.18	1,247
01/07/2010-31/07/2010	112	1,090	41.84	1,244
01/08/2010-31/08/2010	112	1,155	44.34	1,312
01/09/2010-30/09/2010	110	1,237	47.46	1,394
01/10/2010-31/10/2010	114	1,050	40.29	1,204
01/11/2010-30/11/2010	109	855	32.80	997
01/12/2010-31/12/2010	111	797	30.58	938
01/01/2011-31/01/2011	122	620	23.80	767
01/02/2011-28/02/2011	108	765	29.35	903
01/03/2011-31/03/2011	139	1,354	51.95	1,544
01/04/2011-30/04/2011	107	1,256	48.21	1,411

01/05/2011-31/05/2011	108	1,353	51.93	1,513
01/06/2011-30/06/2011	110	1,167	44.79	1,322
01/07/2011-31/07/2011	111	992	38.05	1,141
01/08/2011-31/08/2011	105	919	35.26	1,059
01/09/2011-30/09/2011	99	848	32.54	980
01/10/2011-31/10/2011	103	846	32.48	982
01/11/2011-30/11/2011	94	1,204	46.19	1,344
01/12/2011-31/12/2011	97	1,244	47.73	1,389
01/01/2012-31/01/2012	94	576	22.12	693
01/02/2012-29/02/2012	96	545	20.90	662
01/03/2012-31/03/2012	95	891	34.19	1,020
01/04/2012-30/04/2012	95	1,047	40.18	1,182
01/05/2012-31/05/2012	86	1,135	43.54	1,264
01/06/2012-30/06/2012	97	1,046	40.12	1,182
01/07/2012-31/07/2012	80	824	31.62	936
01/08/2012-31/08/2012	67	621	23.82	711
01/09/2012-30/09/2012	67	587	22.51	676
01/10/2012-31/10/2012	68	672	25.78	765
01/11/2012-30/11/2012	77	1,138	43.65	1,258
01/12/2012-31/12/2012	70	1,038	39.83	1,148
Total	3,244	31,632	1213.83	36,090

Table 4-14 Project emissions of Gongquan coal mine

Year	PE_{ME}	PE_{MD}	PE_{UM}	PE_y
	(tCO ₂ e)	(tCO ₂ e)	(tCO ₂ e)	(tCO ₂ e)
	I	K	M	N=I+K+M
16/04/2010-30/04/2010	9	278	10.67	297
01/05/2010-31/05/2010	18	664	25.49	708

01/06/2010-30/06/2010	17	639	24.51	680
01/07/2010-31/07/2010	18	598	22.94	638
01/08/2010-31/08/2010	18	539	20.70	578
01/09/2010-30/09/2010	18	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	560
01/12/2010-31/12/2010	18	421	16.16	455
01/01/2011-31/01/2011	13	605	23.23	642
01/02/2011-28/02/2011	8	739	28.35	775
01/03/2011-31/03/2011	9	718	27.56	755
01/04/2011-30/04/2011	9	857	32.89	899
01/05/2011-31/05/2011	10	880	33.78	924
01/06/2011-30/06/2011	14	596	22.87	633
01/07/2011-31/07/2011	13	448	17.21	479
01/08/2011-31/08/2011	13	494	18.94	526
01/09/2011-30/09/2011	12	432	16.58	461
01/10/2011-31/10/2011	13	465	17.86	496
01/11/2011-30/11/2011	12	571	21.90	604
01/12/2011-31/12/2011	13	552	21.18	586
01/01/2012-31/01/2012	12	581	22.28	615
01/02/2012-29/02/2012	11	473	18.14	502
01/03/2012-31/03/2012	12	609	23.36	644
01/04/2012-30/04/2012	12	542	20.79	574
01/05/2012-31/05/2012	12	708	27.19	748
01/06/2012-30/06/2012	12	703	26.99	742
01/07/2012-31/07/2012	12	922	35.40	970
01/08/2012-31/08/2012	17	971	37.25	1,024

01/09/2012-30/09/2012	13	958	36.77	1,008
01/10/2012-31/10/2012	12	930	35.68	978
01/11/2012-30/11/2012	13	819	31.42	863
01/12/2012-31/12/2012	12	721	27.66	761
Total	438	20,782	797.50	22,018

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 (tCO₂e)

$LE_{d,y}$ Leakage emissions due to displacement of other baseline thermal energy uses of methane in year y (tCO₂e)

$LE_{o,y}$ Leakage emissions due to other uncertainties in year y (tCO₂e)

According to the registered 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 (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)

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

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

	(tCO ₂ e)	(tCO ₂ e)	(tCO ₂ e)	(tCO ₂ e)
	G	N	O	P=G-N-O
16/04/2010-30/04/2010	4,649	563	0	4,086
01/05/2010-31/05/2010	11,806	1,337	0	10,468
01/06/2010-30/06/2010	10,722	1,247	0	9,475
01/07/2010-31/07/2010	10,758	1,244	0	9,514
01/08/2010-31/08/2010	11,244	1,312	0	9,932
01/09/2010-30/09/2010	12,235	1,394	0	10,840
01/10/2010-31/10/2010	10,436	1,204	0	9,233
01/11/2010-30/11/2010	8,504	997	0	7,507
01/12/2010-31/12/2010	7,808	938	0	6,870
01/01/2011-31/01/2011	5,683	767	0	4,916
01/02/2011-28/02/2011	7,158	903	0	6,255
01/03/2011-31/03/2011	12,262	1,544	0	10,717
01/04/2011-30/04/2011	12,082	1,411	0	10,671
01/05/2011-31/05/2011	12,805	1,513	0	11,292
01/06/2011-30/06/2011	11,202	1,322	0	9,880
01/07/2011-31/07/2011	9,740	1,141	0	8,599
01/08/2011-31/08/2011	8,958	1,059	0	7,899
01/09/2011-30/09/2011	8,470	980	0	7,490
01/10/2011-31/10/2011	8,246	982	0	7,264
01/11/2011-30/11/2011	10,971	1,344	0	9,627
01/12/2011-31/12/2011	11,111	1,389	0	9,722
01/01/2012-31/01/2012	5,087	693	0	4,394
01/02/2012-29/02/2012	4,974	662	0	4,313
01/03/2012-31/03/2012	8,157	1,020	0	7,136
01/04/2012-30/04/2012	10,029	1,182	0	8,846

01/05/2012-31/05/2012	10,636	1,264	0	9,372
01/06/2012-30/06/2012	9,761	1,182	0	8,579
01/07/2012-31/07/2012	7,613	936	0	6,677
01/08/2012-31/08/2012	5,644	711	0	4,932
01/09/2012-30/09/2012	5,377	676	0	4,701
01/10/2012-31/10/2012	6,190	765	0	5,425
01/11/2012-30/11/2012	10,450	1,258	0	9,191
01/12/2012-31/12/2012	10,126	1,148	0	8,978
Total	300,893	36,090	0	264,803

Table 4-16 Emission reduction of Gongquan coal mine

Year	BE_y	PE_y	LE_y	ER_y
	(tCO ₂ e)	(tCO ₂ e)	(tCO ₂ e)	(tCO ₂ e)
	G	N	O	P=G-N-O
16/04/2010-30/04/2010	2,702	297	0	2,405
01/05/2010-31/05/2010	5,991	708	0	5,283
01/06/2010-30/06/2010	5,832	680	0	5,151
01/07/2010-31/07/2010	5,440	638	0	4,801
01/08/2010-31/08/2010	4,819	578	0	4,241
01/09/2010-30/09/2010	3,730	450	0	3,280
01/10/2010-31/10/2010	3,704	443	0	3,261
01/11/2010-30/11/2010	4,796	560	0	4,237
01/12/2010-31/12/2010	3,917	455	0	3,462
01/01/2011-31/01/2011	5,501	642	0	4,860
01/02/2011-28/02/2011	6,681	775	0	5,905
01/03/2011-31/03/2011	6,312	755	0	5,557
01/04/2011-30/04/2011	7,454	899	0	6,554

01/05/2011-31/05/2011	7,759	924	0	6,835
01/06/2011-30/06/2011	5,467	633	0	4,833
01/07/2011-31/07/2011	4,171	479	0	3,692
01/08/2011-31/08/2011	4,679	526	0	4,154
01/09/2011-30/09/2011	4,138	461	0	3,677
01/10/2011-31/10/2011	4,420	496	0	3,924
01/11/2011-30/11/2011	5,050	604	0	4,446
01/12/2011-31/12/2011	4,956	586	0	4,370
01/01/2012-31/01/2012	5,312	615	0	4,698
01/02/2012-29/02/2012	4,229	502	0	3,728
01/03/2012-31/03/2012	5,305	644	0	4,661
01/04/2012-30/04/2012	4,848	574	0	4,274
01/05/2012-31/05/2012	6,328	748	0	5,580
01/06/2012-30/06/2012	6,253	742	0	5,510
01/07/2012-31/07/2012	8,085	970	0	7,115
01/08/2012-31/08/2012	8,625	1,024	0	7,600
01/09/2012-30/09/2012	8,521	1,008	0	7,514
01/10/2012-31/10/2012	8,294	978	0	7,316
01/11/2012-30/11/2012	7,367	863	0	6,503
01/12/2012-31/12/2012	6,464	761	0	5,703
Total	187,149	22,018	0	165,131

Table 4-17 Emission reduction of the Project

Year	BE_y	PE_y	LE_y	ER_y
	(tCO ₂ e)	(tCO ₂ e)	(tCO ₂ e)	(tCO ₂ e)
	G	H	J	O
16/04/2010-30/04/2010	7,351	861	0	6,491

01/05/2010-31/05/2010	17,796	2,045	0	15,751
01/06/2010-30/06/2010	16,554	1,928	0	14,626
01/07/2010-31/07/2010	16,197	1,882	0	14,315
01/08/2010-31/08/2010	16,063	1,890	0	14,173
01/09/2010-30/09/2010	15,964	1,844	0	14,120
01/10/2010-31/10/2010	14,140	1,647	0	12,493
01/11/2010-30/11/2010	13,300	1,557	0	11,743
01/12/2010-31/12/2010	11,726	1,394	0	10,332
Total in 2010	129,092	15047	0	114,045
01/01/2011-31/01/2011	11,184	1,408	0	9,776
01/02/2011-28/02/2011	13,838	1,678	0	12,160
01/03/2011-31/03/2011	18,573	2,299	0	16,274
01/04/2011-30/04/2011	19,536	2,311	0	17,225
01/05/2011-31/05/2011	20,564	2,437	0	18,127
01/06/2011-30/06/2011	16,669	1,956	0	14,714
01/07/2011-31/07/2011	13,911	1,620	0	12,292
01/08/2011-31/08/2011	13,637	1,584	0	12,053
01/09/2011-30/09/2011	12,608	1,441	0	11,167
01/10/2011-31/10/2011	12,666	1,478	0	11,188
01/11/2011-30/11/2011	16,021	1,948	0	14,073
01/12/2011-31/12/2011	16,067	1,975	0	14,092
Total in 2011	185,274	22,133	0	163,141
01/01/2012-31/01/2012	10,399	1,307	0	9,092
01/02/2012-29/02/2012	9,204	1,163	0	8,041
01/03/2012-31/03/2012	13,461	1,665	0	11,797
01/04/2012-30/04/2012	14,877	1,757	0	13,120
01/05/2012-31/05/2012	16,964	2,012	0	14,952

01/06/2012-30/06/2012	16,014	1,925	0	14,089
01/07/2012-31/07/2012	15,698	1,906	0	13,792
01/08/2012-31/08/2012	14,269	1,736	0	12,533
01/09/2012-30/09/2012	13,898	1,684	0	12,214
01/10/2012-31/10/2012	14,484	1,743	0	12,741
01/11/2012-30/11/2012	17,816	2,121	0	15,695
01/12/2012-31/12/2012	16,591	1,909	0	14,681
Total in 2012	173,675	20,928	0	152,747
Total	488,041	58,108	0	429,933

During this monitoring period from 16/04/2010 to 31/12/2012 (total 991 days). The actual emission reductions are 429,933tCO₂e. According to the revised registered PDD approved by EB, the emission reductions for this monitoring period should be 437,143tCO₂e. In comparison, the actual emission reductions are 1.65% lower than the estimated emission reductions in the registered PDD.