



Monitoring report form (Version 03.1)

Monitoring report

Title of the project activity	Huainan Panyi and Xieqiao Coal Mine Methane Utilization Project
Reference number of the project activity	1887
Version number of the monitoring report	01
Completion date of the monitoring report	27/03/2013
Registration date of the project activity	27/11/2008
Monitoring period number and duration of this monitoring period	The 4th monitoring period, first and last days included (20/10/2011 – 31/12/2012)
Project participant(s)	Huainan Mining (Group) Co., Ltd. (the project Owner) Kommunalkredit Public Consulting GmbH representing the Republic of Austria Federal Ministry of Agriculture, Forestry, Environment and Water Management (the buyer)
Host Party(ies)	P.R.China
Sectoral scope(s) and applied methodology(ies)	Sectoral scope 1: Energy industries (renewable - / non-renewable sources) Sectoral scope 8: mining/mineral production Sectoral scope 10: fugitive emissions from fuels (solid, oil and gas) ACM0008 "Consolidated baseline methodology for coal bed methane and coal mine methane capture and use for power (electrical or motive) and heat and/or destruction by flaring" (Version 03). ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 06). "Tool for the demonstration and assessment of additionality" (Version 03)
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	420,064tCO ₂ e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	240,395tCO ₂ e

SECTION A. Description of project activity**A.1. Purpose and general description of project activity**

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Huainan Panyi and Xieqiao Coal Mine Methane Utilization Project (hereafter referred to as the Project) is located in Huainan City, Anhui Province, P.R.China. The objective of the Project is to utilize the gas which was vented into the atmosphere for energy supply and contribute to the sustainable development.

The Project is implemented in two coal mines, the Panyi and Xieqiao coal mines. The post mining methane in the gas (30%-70% methane content) will be used for gas-to-energy programs, including power and heat generation and supply of gas to households through a gas pipeline network. The exhaust gas from the power engines in Panyi South Station and Xieqiao coal mine will be recovered for cooling mine underground air.

The construction of the Project started on 25/04/2003. In Panyi Central Station, two gensets were commissioned in 2005; the other two were formally put into operation on 25/06/2010. In Panyi South Station, two gensets were commissioned on 29/12/2006 and the other two were formally put into operation on 12/04/2012. In Xieqiao Station, the first four gensets and the fifth were commissioned on 26/12/2006 and 14/12/2011 respectively.

The implementation status during this monitoring period is shown as Table A.1.

Table A.1 Project implementation status in this monitoring period

Location	Power generation installation capacity (kW)	Residential usage (Households)	CMM Boilers	Waste Heat Recovery for Cooling(kW)
Panyi Central Station	4*500	9,059	2*4t/h	-
Panyi South Station	4*1,360	-	-	7,200
Xieqiao	2*600 + 3*1,416	-	-	-
Total	12,888	9,059	8t/h	7,200

The gas boilers in Panyi Central Station weren't operated and monitored during this monitoring period due to the unstable gas supply. According to the registered PDD, the emission reductions achieved from waste heat recovery in the two mines of the Project will not be claimed for conservativeness. Therefore it will be claimed in this monitoring period that the emission reductions achieved in Panyi Central Station, Panyi South Station and Xieqiao Station from the power generation and gas supply.

During this monitoring period, the CMM gensets, gas supply pipelines and monitoring equipments were running in normal conditions when the stable gas was supplied by the coalmines. The data record and management system were in place, there was no malfunction or emergency occurred. The verification has been conducted three times¹. The total emission reductions achieved in this monitoring period is 240,395 tCO₂e.

A.2. Location of project activity

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The Project is sited in Panyi coal mine and Xieqiao coal mine, Anhui Province, P.R.China. The central geographical coordinate data of the Project measured by GPS are as follows.

Panyi Central Station: 32°48'04"N, 116°48'55"E

Panyi South Station: 32°48'42"N, 116°51'41"E

Xieqiao Station: 32°46'40"N, 116°23'21"E

A.3. Parties and project participant(s)

¹ <http://cdm.unfccc.int/Projects/DB/DNV-CUK1214550871.27/view>

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
P.R.China (host)	Huainan Mining (Group) Co., Ltd. (the project Owner)	No
Republic of Austria	Kommunalkredit Public Consulting GmbH representing the Republic of Austria Federal Ministry of Agriculture, Forestry, Environment and Water Management	No

A.4. Reference of applied methodology

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ACM0008 "Consolidated baseline methodology for coal bed methane and coal mine methane capture and use for power (electrical or motive) and heat and/or destruction by flaring" (Version 03).

ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 06).

"Tool for the demonstration and assessment of additionality" (Version 03)

A.5. Crediting period of project activity

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The 10 years' fixed crediting period is adopted. The start date of the crediting period of the Project is 27/11/2008.

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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The Project is implemented in two coal mines, the Panyi and Xieqiao coal mines. The post mining methane in the gas will be used for gas-to-energy programs, including power and heat generation and supply of gas to households through a gas pipeline network. The exhaust gas from the power engines in Panyi South Station and Xieqiao coal mine will be recovered for cooling mine underground air.

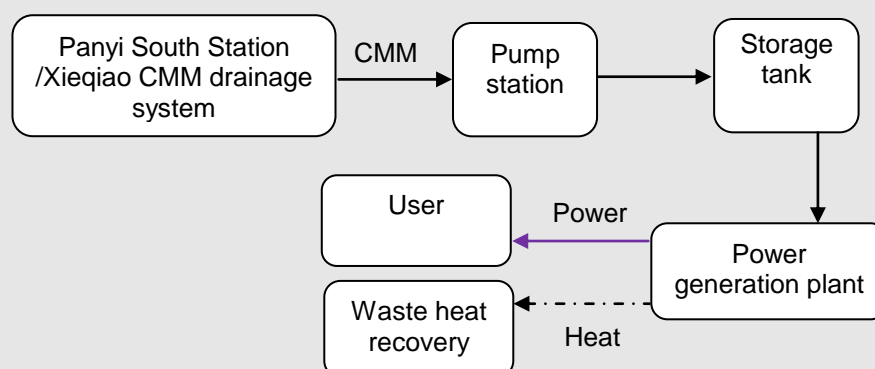


Figure B.1 Connection Diagram of Panyi South Station and Xieqiao Station

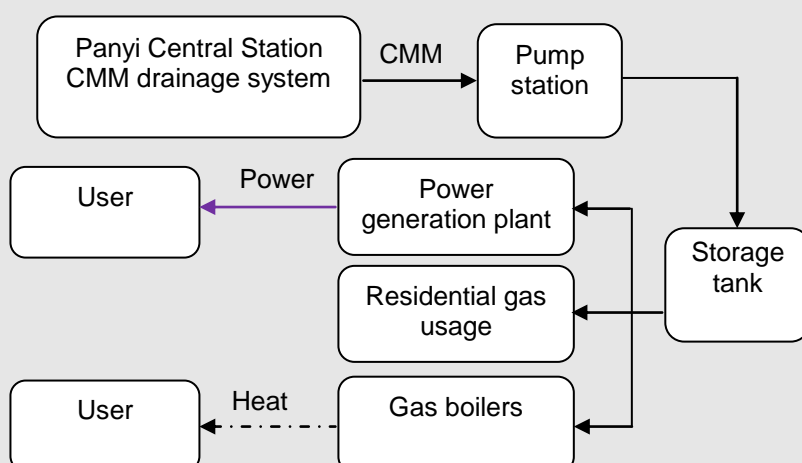


Figure B.2 Connection Diagram of Panyi Central Station

The construction starting date and commissioning date of the project are listed below.

Location	Activities	Capacity	Construction starting date	Commissioning date
Panyi Central Station	Power generation	2*500kW	25/04/2003	20/08/2005
		2*500kW	06/05/2010	25/06/2010
	Residential usage	9,059	25/04/2003	19/10/2005
	CMM boiler	2*4t/h	25/04/2003	23/08/2005
Panyi South Station	Power generation	2*1360kW	23/04/2005	29/12/2006
		2*1360kW	19/11/2011	12/04/2012
	Waste heat recovery for cooling	7,200kW	06/08/2007	23/06/2008
Xieqiao Station	Power generation	2*600kW + 2*1,416kW	16/04/2005	26/12/2006
		1*1,416kW	15/11/2011	14/12/2011

Due to financial problems, the project owner's investment plan was delayed. The comparison of implementation status during this monitoring period and the installation plan of the PDD of the Project are shown as Table B.1.

Table B.1 Comparison between Project implementation status and PDD

Location	Power generation installation capacity (kW)		Residential usage (Households)		CMM Boilers		Waste Heat Recovery for Cooling(kW)	
	PDD	Actual Status	PDD	Actual Status	PDD	Actual Status	PDD	Actual Status
Panyi Central Station	4*500	4*500	14,059	9,059	2*4t/h + 2*2t	2*4t/h	-	-
Panyi South Station	5*1,360	4*1,360	-	-	-	-	7,200	7,200
Xieqiao	2*600 + 5*1,416	2*600 + 3*1,416	-	-	-	-	5,000	-
Total	17,080	12,888	14,059	9,059	12t/h	8t/h	12,200	7,200

The gas boilers in Panyi Central Station weren't operated and monitored during this monitoring period due to the unstable gas supply. According to the registered PDD, the emission reductions achieved from waste heat recovery in the two mines of the Project will not be claimed for conservativeness. Therefore it will be claimed in this monitoring period that the emission reductions achieved in Panyi Central Station, Panyi South Station and Xieqiao Station from the power generation and gas supply.

During this monitoring period, the CMM gensets, gas supply pipelines and monitoring equipments were running in normal conditions when the stable gas was supplied by the coalmines. Data record and management system were in place and managed by designated persons. There was no malfunction or emergency happened, and there was no special events or situations may impact the applicability of the methodology occurred in this monitoring period.

B.2. Post registration changes

B.2.1. Temporary deviations from registered monitoring plan or applied methodology

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There is no temporary deviation from registered monitoring plan or applied methodology applied during this monitoring period.

B.2.2. Corrections

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There is no correction to project information or parameters fixed at validation approved or submitted during this monitoring period.

B.2.3. Permanent changes from registered monitoring plan or applied methodology

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There is no permanent change from the registered monitoring plan or applied methodology approved or submitted during this monitoring period.

B.2.4. Changes to project design of registered project activity

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There is no change to the project design of registered project activity approved or submitted during this monitoring period.

B.2.5. Changes to start date of crediting period

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There is no change to start date of crediting period.

B.2.6. Types of changes specific to afforestation or reforestation project activity

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Not applicable.

SECTION C. Description of monitoring system

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The monitoring plan of the Project is executed by the project participant and verified by the DOE. The current monitoring system structure is shown in Figure C.1 below.

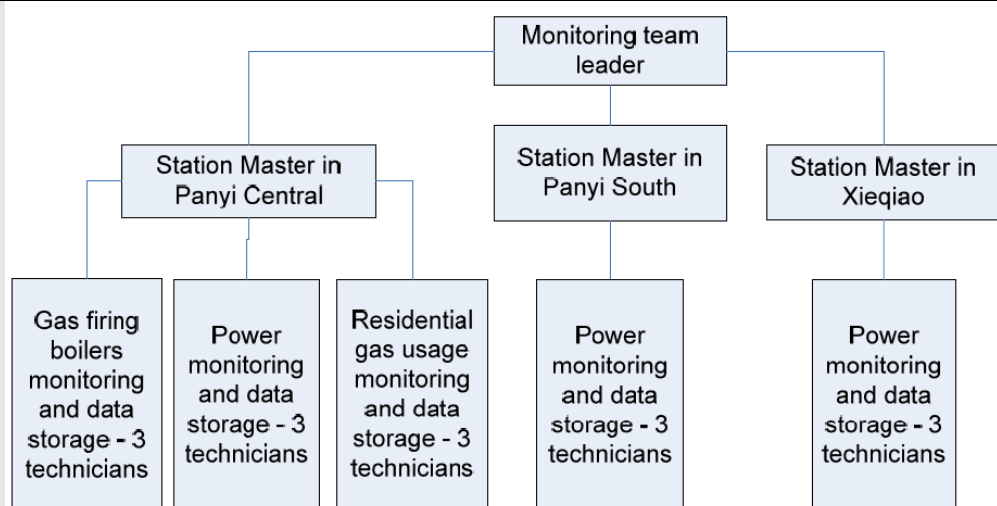


Figure C.1 Monitoring System Structure

Monitoring team leader/Project manager: responsible for implementation of the whole monitoring plan, including management of internal employee, control of operation process, communication and contact with external parties.

Principal for monitoring at each project site (power station masters): responsible for the summary and collection of the data and documents, and data reporting to project manager; periodically internal audit, including checking data recording and storage, and the staff's operation process; periodically training.

Technicians: responsible for normal operation of monitoring instruments and system, the data recording, archives and reporting.

According to the Monitoring Plan, the monitoring points of the project are shown in Figure C.2 and C.3. The monitoring instruments for gas boiler haven't been installed in this monitoring period.

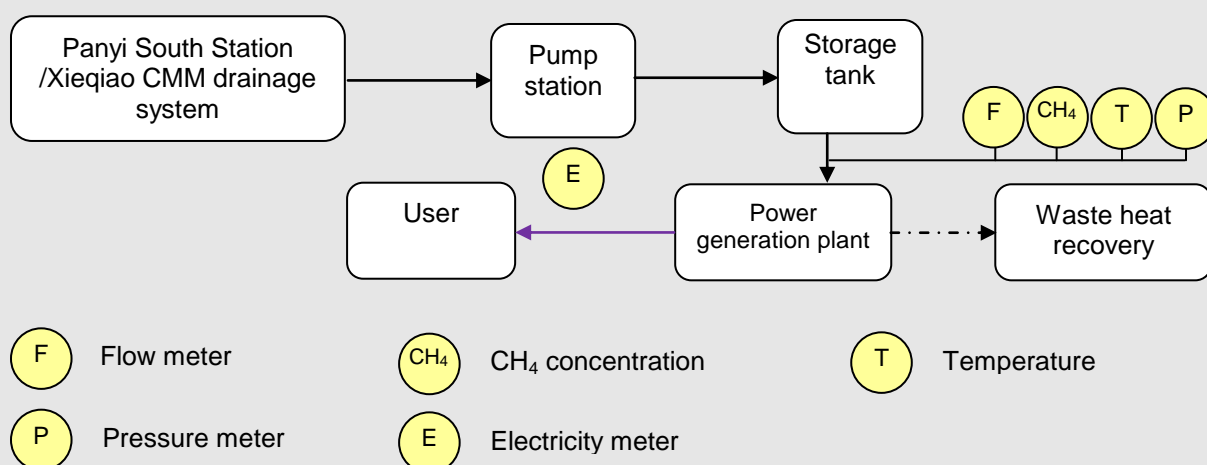


Figure C.2 Monitoring Point in Panyi South Station and Xieqiao

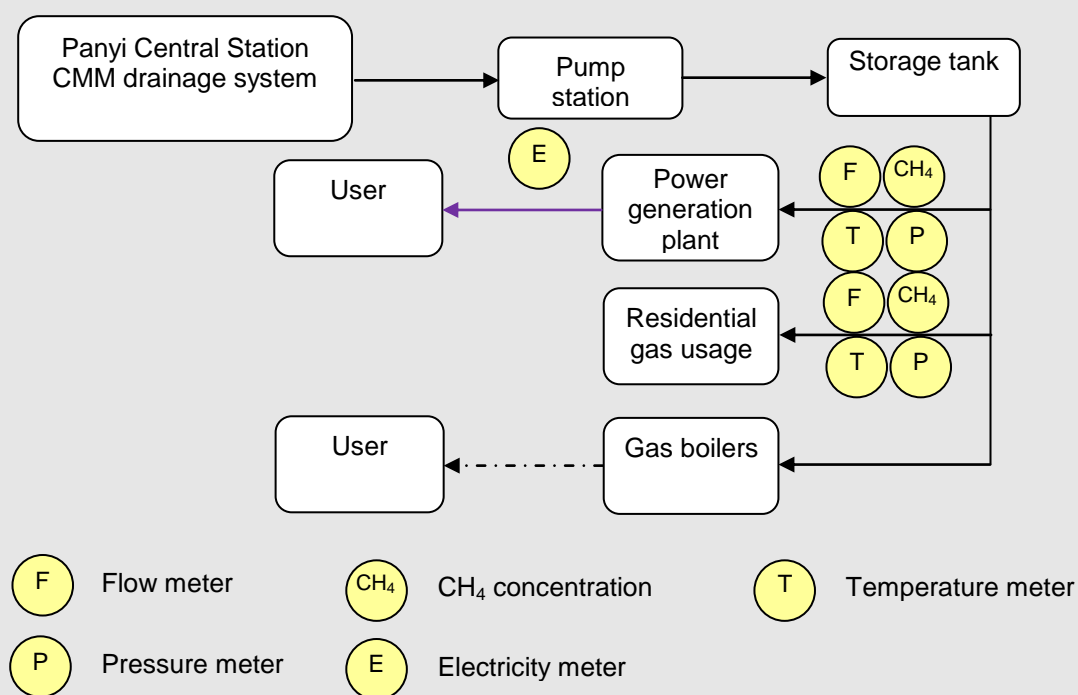


Figure C.3 Monitoring Point in Panyi Central Station

The power consumption and power supply are both continuously monitored by the electricity meters and accumulated automatically. The power supplied and consumed are both recorded every month. The monthly power data are double checked by settlement receipts.

Concentration, flow, pressure and temperature meters had been installed on the methane pipeline before power plant to continuously measure the methane sent to be utilised for power supply. The monitoring instruments also had been installed on the pipeline to households to measure the methane sent for residential use. The measured data can be shown on the meters as well as be transmitted to the data base in the computer of monitoring and management centre. The methane consumed and accumulated data are calculated constantly by the computer. The monitored data are recorded hourly.

The GHG emissions will not be claimed during the period when emergency happens.

NMHC test is carried out annually. The authorised laboratory tests the gas composition and presents the result report.

In order to ensure high accuracy and low risk of the monitoring system, the monitoring meters are calibrated by authorised parties once a year. The project owner organizes professional training periodically to improve the professional skill of the operators.

The monitored data had been stored electronically/manually. The original data and records will be kept for two years after the end of the crediting period.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

(Copy this table for each piece of data and parameter.)

Data / Parameter:	CEF _{CH₄}
Unit:	tCO ₂ e/tCH ₄
Description:	Carbon emission factor of methane
Source of data:	ACM0008
Value(s) applied:	2.75
Purpose of data:	The data is used for project emissions calculation.

Additional comment:	-
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Data / Parameter:	D_{CH_4}
Unit:	t/m^3
Description:	Density of methane under normal conditions of temperature and pressure
Source of data:	2006 IPCC
Value(s) applied:	0.00067
Purpose of data:	The data is used for baseline and project emissions calculation.
Additional comment:	-

Data / Parameter:	Eff_{ELEC}
Unit:	%
Description:	Efficiency of methane destruction/oxidation in power plant
Source of data:	2006 IPCC
Value(s) applied:	99.5
Purpose of data:	The data is used for project emissions calculation.
Additional comment:	-

Data / Parameter:	Eff_{GAS}
Unit:	%
Description:	Overall efficiency of methane destruction/oxidation through gas grid to various combustion end uses
Source of data:	2006 IPCC
Value(s) applied:	98.5
Purpose of data:	The data is used for project emissions calculation.
Additional comment:	-

Data / Parameter:	GWP_{CH_4}
Unit:	tCO_2e/tCH_4
Description:	Global warming potential of methane
Source of data:	ACM0008
Value(s) applied:	21
Purpose of data:	The data is used for baseline and project emissions calculation.
Additional comment:	-

Data / Parameter:	EF_{ELEC}
Unit:	tCO_2e/MWh
Description:	Emissions factor of electricity replaced by project, which is the emission factor of East China Power Grid, which is the same as CEF_{ELEC}

Source of data:	Ex-ante determined in Registered PDD (Version 08)
Value(s) applied:	0.8640
Purpose of data:	The data is used for baseline and project emissions calculation.
Additional comment:	-

D.2. Data and parameters monitored

(Copy this table for each piece of data and parameter.)

Data / Parameter:	GEN _y
Unit:	MWh
Description:	Power supplied by the project
Measured/ Calculated / Default:	Measured
Source of data:	Monthly records
Value(s) of monitored parameter:	45,454.260
Monitoring equipment:	The electricity meters installed at the transformer stations in the coal mines are used for monitoring this parameter. The meters are calibrated once a year. Detailed information of the meters is listed in Table D.1-D.2-D.3.
Measuring/ Reading/ Recording frequency:	Continuously measured and monthly recorded.
Calculation method (if applicable):	-
QA/QC procedures:	The meters are calibrated once a year. Cross check by monthly electricity settlement receipts.
Purpose of data:	The data is used for baseline emissions calculation.
Additional comment:	-

Data / Parameter:	CONS _{ELEC,PJ}
Unit:	MWh
Description:	Additional electricity consumption by the project
Measured/ Calculated / Default:	Measured
Source of data:	Monthly records
Value(s) of monitored parameter:	394.308
Monitoring equipment:	The electricity meters installed at the transformer stations in the coal mines are used for monitoring this parameter. The meters are calibrated once a year. Detailed information of the meters is listed in Table D.1-D.2-D.3.

Measuring/ Reading/ Recording frequency:	Continuously measured and monthly recorded.
Calculation method (if applicable):	-
QA/QC procedures:	The meters are calibrated once a year. Cross check by monthly electricity settlement receipts.
Purpose of data:	The data is used for project emissions calculation.
Additional comment:	-
Data / Parameter:	MM _{ELEC}
Unit:	tCH ₄
Description:	Methane sent to power plant
Measured/ Calculated / Default:	Measured
Source of data:	Hourly records
Value(s) of monitored parameter:	9,699.364
Monitoring equipment:	Continuously monitored by gas flow meter in association with temperature meter, pressure meter and gas concentration meter and calculated based on the density. The meters are calibrated once a year. Detailed information of the meters is listed in Table D.1-D.2-D.3.
Measuring/ Reading/ Recording frequency:	Continuously measured and hourly recorded.
Calculation method (if applicable):	-
QA/QC procedures:	The meters are calibrated once a year to ensure accuracy.
Purpose of data:	The data is used for baseline and project emissions calculation.
Additional comment:	-
Data / Parameter:	MM _{GAS}
Unit:	tCH ₄
Description:	Methane sent to residential gas grid
Measured/ Calculated / Default:	Measured
Source of data:	Hourly records
Value(s) of monitored parameter:	1,409.361

Monitoring equipment:	Continuously monitored by gas flow meter in association with temperature meter, pressure meter and gas concentration meter and calculated based on the density. The meters are calibrated once a year. Detailed information of the meters is listed in Table D.1-D.2-D.3.
Measuring/ Reading/ Recording frequency:	Continuously measured and hourly recorded.
Calculation method (if applicable):	-
QA/QC procedures:	The meters are calibrated once a year to ensure accuracy.
Purpose of data:	The data is used for baseline and project emissions calculation.
Additional comment:	-

Data / Parameter:	PC _{CH4}
Unit:	%
Description:	Concentration of methane in extracted gas
Measured/ Calculated / Default:	Measured
Source of data:	Hourly records
Value(s) of monitored parameter:	The statistics of concentration of methane are summarized in Table D.4. The more detailed information is shown in the ER spreadsheet.
Monitoring equipment:	Continuously measured on wet basis by CH ₄ concentration meters. The meters are calibrated according to industrial standard. Detailed information of the meters is listed in Table D.1-D.2-D.3.
Measuring/ Reading/ Recording frequency:	Continuously measured and hourly recorded.
Calculation method (if applicable):	-
QA/QC procedures:	The meters are calibrated once a year.
Purpose of data:	The data is used for baseline and project emissions calculation.
Additional comment:	-

Data / Parameter:	PC _{NMHC}
Unit:	%
Description:	Non methane Hydrocarbon concentration in coal mine gas
Measured/ Calculated / Default:	Measured
Source of data:	Annually test report

Value(s) of monitored parameter:	The CMM was sampled and measured by the qualified third party in September 2011 and September 2012 respectively to monitor NMHC concentration in the extracted gas. The monitoring result is: <table><tr><td>Date</td><td>PC_{NMHC} (%)</td></tr><tr><td>September 2011</td><td>0.00</td></tr><tr><td>September 2012</td><td>0.00</td></tr></table>		Date	PC _{NMHC} (%)	September 2011	0.00	September 2012	0.00
Date	PC _{NMHC} (%)							
September 2011	0.00							
September 2012	0.00							
Monitoring equipment:	Sampled and measured by the qualified third party annually.							
Measuring/ Reading/ Recording frequency:	Annually measured and recorded.							
Calculation method (if applicable):	-							
QA/QC procedures:	The gas analysis reports are provided by the qualified third party annually.							
Purpose of data:	The data is used for project emissions calculation. Since PC _{NMHC} <1%, there is no need to examine CEF _{NMHC} .							
Additional comment:	-							

Data / Parameter:	MM _{HEAT}
Unit:	tCH ₄
Description:	Methane sent to gas fuelled boilers
Measured/ Calculated / Default:	Measured
Source of data:	Hourly records
Value(s) of monitored parameter:	N.A. (The gas boilers in Panyi Central Station weren't operated and monitored during this monitoring period due to the unstable gas supply. The emission reductions achieved from the heat generation will not be claimed in this monitoring period.)
Monitoring equipment:	It shall be continuously monitored by gas flow meter in association with temperature meter, pressure meter and gas concentration meter and calculated based on the density.
Measuring/ Reading/ Recording frequency:	Continuously measured and hourly recorded.
Calculation method (if applicable):	-
QA/QC procedures:	The meters will be calibrated once a year to ensure accuracy.
Purpose of data:	The data is used for baseline and project emissions calculation.
Additional comment:	-

Data / Parameter:	HEAT _y
Unit:	GJ
Description:	Heat supply by CMM fuelled boilers

Measured/ Calculated / Default:	Measured
Source of data:	Monthly records
Value(s) of monitored parameter:	N.A. (The gas boilers in Panyi Central Station weren't operated and monitored during this monitoring period due to the unstable gas supply. The emission reductions achieved from the heat generation will not be claimed in this monitoring period.)
Monitoring equipment:	Thermal meter shall be adopted to continuously monitor the amount of heat supply.
Measuring/ Reading/ Recording frequency:	Continuously measured and monthly recorded.
Calculation method (if applicable):	-
QA/QC procedures:	Thermal meter will be subject to a regular maintenance regime to ensure accuracy.
Purpose of data:	The data is used for baseline emissions calculation.
Additional comment:	-

Data / Parameter:	CEF _{NMHC}
Unit:	tCO ₂ e/tNMHC
Description:	Carbon emission factor for combusted non methane hydrocarbons
Measured/ Calculated / Default:	Measured
Source of data:	To be obtained through annual analysis of the fractional composition of captured gas. If the NMHC concentration is less than 1%, its emissions can be ignored.
Value(s) of monitored parameter:	N.A. (The CMM was sampled and measured by the qualified third party in September 2011 and September 2012 respectively to monitor NMHC concentration in the extracted gas. The monitoring result shows that the NMHC concentration is zero. Since PC _{NMHC} <1%, there is no need to examine CEF _{NMHC} .)
Monitoring equipment:	Analyzed by the qualified third party annually if the NMHC concentration is more than 1%.
Measuring/ Reading/ Recording frequency:	Annually monitoring and analyzing NMHC concentration. If it is above 1%, determining each carbon emission factor of different components.
Calculation method (if applicable):	-
QA/QC procedures:	The gas analysis report will be provided by the qualified third party annually if the NMHC concentration is more than 1%.
Purpose of data:	The data is used for project emissions calculation.
Additional comment:	-

Table D.1 Monitoring Instruments in Panyi Central Station

Instrument	Installed position	Type	Accuracy Class	Serial number	In-use in this monitoring period	Calibration date	Validity
electricity meter	transformer station of Panyi Central Station	DSSD311	1.0	3586868	20/10/2011-20/09/2012	11/10/2011	10/10/2016
				1190379	20/09/2012-31/12/2012	12/09/2012	11/09/2017
concentration meter	main gas pipeline to generators	Guardian Plus 97460	2.5%	26675	20/10/2011-31/12/2012	28/10/2010	27/10/2011
						26/10/2011	25/10/2012
						16/10/2012	15/10/2013
flow meter	main gas pipeline to generators	TX5922	1.5%	1740	20/10/2011-31/12/2012	15/09/2011	14/09/2012
						30/08/2012	29/08/2013
temperature meter	main gas pipeline to generators	WZPK1-2608	Grade B	080910070	20/10/2011-31/12/2012	28/10/2010	27/10/2011
						25/10/2011	24/10/2012
						12/10/2012	11/10/2013
pressure meter	main gas pipeline to generators	3051TG	0.04%	4939331	20/10/2011-31/12/2012	04/11/2010	03/11/2011
						27/10/2011	26/10/2012
						23/10/2012	22/10/2013
concentration meter	main gas pipeline to households	Guardian Plus 97460	2.5%	26682	20/10/2011-26/10/2011	28/10/2010	27/10/2011
				23328	26/10/2011-31/12/2012	26/10/2011	25/10/2012
						16/10/2012	15/10/2013
flow meter	main gas pipeline to households	KVW06II AB23FWN	0.5%	9021301	20/10/2011-31/12/2012	24/02/2011	23/02/2012
		KVW10II AB23FWN	0.5%	9021302	20/10/2011-31/12/2012	15/02/2012	14/02/2013
						24/02/2011	23/02/2012
		KVW16II AB23FWN	0.5%	9021303	20/10/2011-31/12/2012	13/02/2012	12/02/2013
						01/03/2011	29/02/2012
						27/02/2012	26/02/2013
temperature meter	main gas pipeline to households	WZPK1-2608	Grade B	080910073	20/10/2011-31/12/2012	28/10/2010	27/10/2011
						25/10/2011	24/10/2012
						12/10/2012	11/10/2013
pressure meter	main gas pipeline to households	3051TG	0.04%	4939340	20/10/2011-31/12/2012	04/11/2010	03/11/2011
						27/10/2011	26/10/2012
						23/10/2012	22/10/2013

Table D.2 Monitoring Instruments in Panyi South Station

Instrument	Installed position	Type	Accuracy Class	Serial number	In-use in this monitoring period	Calibration date	Validity
electricity meter	transformer station of Panyi South Station	DSSD331	0.5S	66020395	20/10/2011-24/10/2011	12/11/2010	11/11/2015
				20080830 012274	24/10/2011-20/09/2012	12/10/2011	11/10/2016
				66020395	20/09/2012-31/12/2012	12/09/2012	11/09/2017
electricity meter	transformer station of Panyi South Station	DSSD331	0.5S	66020394	20/10/2011-24/10/2011	12/11/2010	11/11/2015
				20080830 012276	24/10/2011-20/09/2012	12/10/2011	11/10/2016
				66020394	20/09/2012-31/12/2012	12/09/2012	11/09/2017
concentration meter	main gas pipeline to generators	Guardian Plus 97460	2.5%	29553	20/10/2011-31/12/2012	28/10/2010	27/10/2011
						26/10/2011	25/10/2012
						16/10/2012	15/10/2013

flow meter	main gas pipeline to generators	TX5922	1.5%	1566	20/10/2011-31/12/2012	15/09/2011	14/09/2012
						30/08/2012	29/08/2013
temperature meter	main gas pipeline to generators	WZPK1-2608	Grade B	080910072	20/10/2011-31/12/2012	28/10/2010	27/10/2011
						25/10/2011	24/10/2012
						12/10/2012	11/10/2013
pressure meter	main gas pipeline to generators	3051TG	0.04%	5005962	20/10/2011-31/12/2012	04/11/2010	03/11/2011
						27/10/2011	26/10/2012
						23/10/2012	22/10/2013

Table D.3 Monitoring Instruments in Xieqiao Station

Instrument	Installed position	Type	Accuracy Class	Serial number	In-use in this monitoring period	Calibration date	Validity
electricity meter	transformer station of Xieqiao Station	DSSD311	1.0	0490498	20/10/2011-31/12/2012	08/10/2011	07/10/2016
						18/09/2012	17/09/2017
electricity meter	transformer station of Xieqiao Station	DSSD311	1.0	0490499	20/10/2011-31/12/2012	08/10/2011	07/10/2016
						18/09/2012	17/09/2017
concentration meter	main gas pipeline to generators	TX6363	2.5%	689	20/10/2011-26/10/2011	28/10/2010	27/10/2011
				688	26/10/2011-31/12/2012	26/10/2011	25/10/2012
						16/10/2012	15/10/2013
flow meter	main gas pipeline to generators	TX5922	1.5%	1571	20/10/2011-16/12/2011	15/09/2011	14/09/2012
				2895	16/12/2011-31/12/2012	15/12/2011	14/12/2012
						12/12/2012	11/12/2013
temperature meter	main gas pipeline to generators	WZPK-3606	Grade B	05129925	20/10/2011-10/01/2012	18/01/2011	17/01/2012
		WZPK1-2608	Grade B	080910074	10/01/2012-31/12/2012	25/10/2011	24/10/2012
						12/10/2012	11/10/2013
pressure meter	main gas pipeline to generators	SITRANS 0-6kPa	0.075%	GYJ04537	20/10/2011-31/12/2012	18/01/2011	17/01/2012
						09/01/2012	08/01/2013

Table D.4 Statistics of the monitoring results of PC_{CH4}

Duration	Concentration of methane in the gas sent to Panyi Central Station for power generation
20/10/2011-18/11/2011	Range: 30%- 39%
19/11/2011-15/12/2011	Range: 30%- 38%
16/12/2011-18/01/2012	Range: 30%- 34%
19/01/2012-19/02/2012	Range: 30%- 37%
20/02/2012-21/03/2012	Range: 30%- 35%
22/03/2012-18/04/2012	Range: 30%- 49%
19/04/2012-22/05/2012	Range: 30%- 76%
23/05/2012-21/06/2012	Range: 31%- 58%
22/06/2012-23/07/2012	Range: 36%- 61%
24/07/2012-22/08/2012	Range: 35%- 58%
23/08/2012-20/09/2012	Range: 32%- 58%
21/09/2012-19/10/2012	Range: 30%- 49%
20/10/2012-16/11/2012	Range: 30%- 56%
17/11/2012-31/12/2012	Range: 30%- 57%

Duration	Concentration of methane in the gas sent to Panyi Central Station for household use
20/10/2011-18/11/2011	Range: 30%- 39%

19/11/2011-15/12/2011	Range: 30%- 38%
16/12/2011-18/01/2012	Range: 30%- 35%
19/01/2012-19/02/2012	Range: 30%- 36%
20/02/2012-21/03/2012	Range: 30%- 35%
22/03/2012-18/04/2012	Range: 30%- 49%
19/04/2012-22/05/2012	Range: 30%- 76%
23/05/2012-21/06/2012	Range: 31%- 58%
22/06/2012-23/07/2012	Range: 36%- 61%
24/07/2012-22/08/2012	Range: 35%- 58%
23/08/2012-20/09/2012	Range: 32%- 57%
21/09/2012-19/10/2012	Range: 30%- 49%
20/10/2012-16/11/2012	Range: 30%- 56%
17/11/2012-31/12/2012	Range: 30%- 58%

Duration	Concentration of methane in the gas sent to Panyi South Station for power generation
20/10/2011-18/11/2011	Range: 31%- 35%
19/11/2011-15/12/2011	Range: 31%- 39%
16/12/2011-18/01/2012	Range: 30%- 36%
19/01/2012-19/02/2012	Range: 30%- 37%
20/02/2012-21/03/2012	Range: 30%- 39%
22/03/2012-18/04/2012	Range: 30%- 39%
19/04/2012-22/05/2012	Range: 30%- 41%
23/05/2012-21/06/2012	Range: 30%- 42%
22/06/2012-23/07/2012	Range: 30%- 39%
24/07/2012-22/08/2012	Range: 35%- 38%
23/08/2012-20/09/2012	Range: 32%- 42%
21/09/2012-19/10/2012	Range: 30%- 51%
20/10/2012-16/11/2012	Range: 30%- 50%
17/11/2012-31/12/2012	Range: 30%- 37%

Duration	Concentration of methane in the gas sent to Xieqiao Station for power generation
20/10/2011-18/11/2011	0
19/11/2011-15/12/2011	0
16/12/2011-18/01/2012	0
19/01/2012-19/02/2012	0
20/02/2012-21/03/2012	0
22/03/2012-18/04/2012	0
19/04/2012-22/05/2012	0
23/05/2012-21/06/2012	0
22/06/2012-23/07/2012	0
24/07/2012-22/08/2012	0
23/08/2012-20/09/2012	0
21/09/2012-19/10/2012	0
20/10/2012-16/11/2012	0
17/11/2012-31/12/2012	0

The detailed information of monitoring results is shown in the ER spreadsheet.

D.3. Implementation of sampling plan

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Not applicable.

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

>>

$$(1) BE_v = BEMD + BEMR + BE_{Use}$$

where:

BE_v : Baseline emissions in the monitoring period (tCO_2e)

BE_{MD} : Baseline emissions from destruction of methane in the baseline scenario (tCO_2e)

BE_{MR} : Baseline emissions from release of methane into the atmosphere that is avoided by the project activity (tCO_2e)

BE_{Use} : Baseline emissions from the production of power by the project activity in the monitoring period (tCO_2e)

(2) As stated in the registered PDD (Version 08) Section B.6.1, there is no methane destruction in the baseline. Therefore, $BE_{MD} = 0$.

$$(3) BE_{MR} = GWP_{CH_4} \times (MM_{ELEC} + MM_{HEAT} + MM_{GAS})$$

where:

GWP_{CH_4} : Global warming potential of methane

MM_{ELEC} : Methane measured sent to power plant (tCH_4)

MM_{HEAT} : Methane measured sent to heat plant (tCH_4)

MM_{GAS} : Methane measured supplied to gas grid for heat generation off-site (tCH_4)

Since the boilers were not operated and monitored in this monitoring period, $MM_{HEAT}=0$, $BE_{MR} = GWP_{CH_4} \times (MM_{ELEC} + MM_{GAS})$

$$(4) BE_{Use} = GEN_v \times EF_{ELEC} + HEAT_v \times EF_{HEAT}$$

where:

GEN_v : Electricity supplied by project activity (MWh)

EF_{ELEC} : Emissions factor of electricity replaced by project, which is the emission factor of East China Power Grid in the project (tCO_2/MWh)

$HEAT_v$: Heat generation by project activity (GJ)

EF_{HEAT} : Emissions factor for heat production replaced by project activity (tCO_2/GJ)

Since $HEAT_v=0$, $BE_{Use} = GEN_v \times EF_{ELEC}$

Therefore, $BE_v = GWP_{CH_4} \times (MM_{ELEC} + MM_{GAS}) + GEN_v \times EF_{ELEC} = 21 \times (9,699.364 + 1,409.361) + 45,454.260 \times 0.8640 = 272,556 tCO_2e$

The more detailed information and calculation process please refer to the ER spreadsheet.

E.2. Calculation of project emissions or actual net GHG removals by sinks

>>

$$(1) PE_v = PE_{ME} + PE_{MD} + PE_{UM}$$

where:

PE_v : Project emissions in the monitoring period (tCO_2e)

PE_{ME} : Project emissions from energy use to capture and use methane (tCO_2e)

PE_{MD} : Project emissions from methane destroyed (tCO_2e)

PE_{UM} : Project emissions from un-combusted methane (tCO_2e)

$$(2) PE_{ME} = CONS_{ELEC, PJ} \times CEF_{ELEC}$$

Where:

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

CEF_{ELEC} : Carbon emissions factor of electricity used by coal mine, which is the emission factor of East China Power Grid in this project (tCO_2e/MWh)

$$(3) PE_{MD} = (MD_{ELEC} + MD_{HEAT} + MD_{GAS}) \times (CEF_{CH_4} + r \times CEF_{NMHC})$$

with:

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

where:

PE_{MD}: Project emissions from CMM destroyed (tCO₂e)

MD_{ELEC}: Methane destroyed through power generation (tCH₄)

MD_{GAS}: Methane destroyed after being supplied to gas grid (tCH₄)

MD_{HEAT}: Methane destroyed through heat generation (tCH₄)

CEF_{CH₄}: Carbon emission factor for combusted methane (2.75tCO₂e/tCH₄)

CEF_{NMHC}: Carbon emission factor for combusted non methane hydrocarbons (tCO₂e/tNMHC)

r: Relative proportion of NMHC compared to methane

PC_{CH₄}: Concentration (in mass) of methane in extracted gas (%), measured on wet basis

PC_{NMHC}: NMHC concentration in extracted gas (%)

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

where:

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

Eff_{ELEC}: Efficiency of methane destruction/oxidation in power plant (%)

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

where:

MM_{HEAT}: Methane measured sent to heat plant (tCH₄)

Eff_{HEAT}: Efficiency of methane destruction/oxidation in heat plant

Since MM_{HEAT}=0, MD_{HEAT}=0.

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

where:

MM_{GAS}: Methane measured supplied to gas grid for heat generation off-site (tCH₄)

Eff_{GAS}: Overall efficiency of methane destruction/oxidation through gas grid to various combustion end uses, combining fugitive emissions from the gas grid and combustion efficiency at end user

According to gas sample analysis in the coalmine, the NMHC concentration in the project is less than 1% of the coalmine gas (see Section D.2), thus the combustion emissions from non-methane hydrocarbons can be ignored. Therefore,

$$PE_{MD} = (MD_{ELEC} + MD_{GAS}) \times CEF_{CH_4} = (MM_{ELEC} \times Eff_{ELEC} + MM_{GAS} \times Eff_{GAS}) \times CEF_{CH_4}$$

$$(4) PE_{UM} = GWP_{CH_4} \times [MM_{ELEC} \times (1 - Eff_{ELEC}) + MM_{HEAT} \times (1 - Eff_{HEAT}) + MM_{GAS} \times (1 - Eff_{GAS})]$$

where:

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

GWP_{CH₄}: Global warming potential of methane

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

Eff_{ELEC}: Efficiency of methane destruction/oxidation in power generation

MM_{HEAT}: Methane measured sent to heat generation (tCH₄)

Eff_{HEAT}: Efficiency of methane destruction/oxidation in heat generation

MM_{GAS}: Methane measured sent to gas grid (tCH₄)

Eff_{GAS}: Overall efficiency of methane destruction/oxidation through gas grid to various combustion end uses, combining fugitive emissions from the gas grid and combustion efficiency at end user

Since MM_{HEAT}=0,

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

$$\text{Therefore, } PE_y = CONS_{ELEC, PJ} \times CEF_{ELEC} + (MM_{ELEC} \times Eff_{ELEC} + MM_{GAS} \times Eff_{GAS}) \times CEF_{CH_4} + GWP_{CH_4} \times [MM_{ELEC} \times (1 - Eff_{ELEC}) + MM_{GAS} \times (1 - Eff_{GAS})] = 394.308 \times 0.8640 + (9,699.364 \times 99.5\% + 1,409.361 \times 98.5\%) \times 2.75 + 21 \times [9,699.364 \times (1 - 99.5\%) + 1,409.361 \times (1 - 98.5\%)] = 32,161 \text{ tCO}_2\text{e}$$

The more detailed information and calculation process please refer to the ER spreadsheet.

E.3. Calculation of leakage

>>

According to the registered PDD,

 $LE_y = 0$

Where:

 LE_y , leakage in year y (tCO₂e).**E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks**

Item	Baseline emissions or baseline net GHG removals by sinks (t CO ₂ e)	Project emissions or actual net GHG removals by sinks (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO ₂ e)
Total	272,556	32,161	0	240,395

E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO ₂ e)	420,064tCO ₂ e ²	240,395tCO ₂ e

E.6. Remarks on difference from estimated value in registered PDD

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It can be seen from the table that emission reductions achieved from power generation and household use are lower than those designed in PDD. This situation is due to unstable gas supply of the coal mine, which is common and reasonable for CMM utilization project.

E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO ₂ e)	240,395	0

² According to the registered PDD, the annual emission reductions from power generation of the Project are 420,367tCO₂e. Considering the duration of this monitoring period is 439 days and the installed capacity is 12.888MW, the estimate of the emission reductions in this monitoring period can be calculated as 420,367/17.08/365*12.888*439=381,503tCO₂e. According to the registered PDD, the annual emission reductions from household use of the Project are 49,756tCO₂e. Considering the duration of this monitoring period is 439 days and the number of household in most of this monitoring period is 9,059, the estimate of the emission reductions in this monitoring period can be calculated as 49,756/14,059/365*9,059*439=38,561tCO₂e. Therefore, the estimate total emission reductions in this monitoring period are 381,503+38,561=420,064tCO₂e.

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net anthropogenic GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
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