MONITORING REPORT FORM (CDM-MR) *
Version 01 - in effect as of: 28/09/2010

CONTENTS

* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

MONITORING REPORT
Version 1 Date: 16/12/2011
Zhumadian Zhongyuan Gas-Steam Combined Cycle Power Project in Henan China
Reference Number: 2344
5th Monitoring period (01/04/2011-30/11/2011) (first and last days included)

SECTION A. General description of the project activity

A.1. Brief description of the project activity:

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As described in PDD, the Zhumadian Zhongyuan Gas-Steam Combined Cycle Power Project in Henan China (hereinafter referred as the Project) is located at the southeast corner of the Zhumadian City, Henan Province, China. The designed installed capacity of the proposed project is 2×377.2MW, which is aimed to deliver 2,584.4235GWh electricity per year to the Central China Power Grid (CCPG). The Central China Power Grid is dominated by coal-fired power plants. By displace equal amount of electricity generated by coal-fired thermal power plants which would have been built otherwise, greenhouse gas (GHG) emission reductions could be achieved. The estimated annual GHG emission reductions are 858,165 tCO_2e.

The NGCC technology adopted in the project consists of two phases of combined dynamic cycles for electricity generation: Gas Cycle and Steam Cycle. Two phases of the cycles are combined to generate electricity with quite high efficiency.

The construction staring date of the project is 10/08/2005; the commenced electricity generation of the gas turbine #1 is in June 2007, and the commenced electricity generation of the gas turbine #2 is in December 2007. The commenced electricity generation of the steam turbine #1 is in August 2007 and the steam turbine #2 is in January 2008.

The current monitoring period is the 5th period that covers 01/04/2011-30/11/2011 including 244 days.

The total Emission Reductions achieved by the project in this period is 102,619 tCO_2e.

A.2. Project Participants

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Name of Party involved ((host) indicates a host Party)	Private and/or public entity (ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
China (host county)	Huaneng Henan Zhongyuan Gas Power Company Ltd.	No
Sweden	Carbon Asset Management Sweden AB	No
Switzerland	Carbon Asset Management Sweden AB	No

A.3. Location of the project activity:

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The proposed project is located at the planned industrial zone in the southeast corner of the Zhumadian City, Henan Province, China.

The geographic coordinate of the project site is situated as:
North-west corner: East longitude 114°03’39” North latitude 32°57’31”
South-west corner: East longitude 114°03’39” North latitude 32°57’22”
South-east corner: East longitude 114°03’52” North latitude 32°57’22”
North-east corner: East longitude 114°03’52” North latitude 32°57’31”

The geographic coordinate of the mark points within the project site are situated as
1＃Cooling tower: East longitude 114°03’41” North latitude 32°57’24”
2＃Cooling tower: East longitude 114°03’46” North latitude 32°57’24”
1＃Boiler stack: East longitude 114°03’48” North latitude 32°57’27”
2＃Boiler stack: East longitude 114°03’48” North latitude 32°57’29”

A.4. Technical description of the project

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The NGCC technology adopted in the project consists of two phases of combined dynamic cycles: the first phase takes place in the gas turbine where the high temperature gas with about 1400^{o}C generated by the natural gas combustion can power to rotate a coupled AC power generator to generate electricity - this is the Gas Cycle. In the second phase, the exhausted gas discharged from the gas turbine with about 600^{o}C can generate steam with 540^{o}C temperature and 10.67MPa pressure in a heat recovery boiler, which then expands in the followed up steam turbine to generate electric power in the AC power generator again - this is the Steam Cycle. Two phases of the cycles is combined to generate electricity with quite high efficiency. The electricity generated by the project is delivered to the Central China Power Grid through 500 kV transmission line.

The technical performance indicators of the advanced technologies employed in the project are listed in the table below.

Table A.1 Technical Performance Indicators

Gas Turbine		
Manufacturer and Country of origin	Siemens Co. in Germany	
Type	V94.3A	
Rated speed	rpm	3000
Flow rate of flue gas at the gas turbine	t/h	2396.5
Temperature of flue gas at the gas turbine	℃	586.5
Gas turbine output	MW	243.4
Steam Turbine		
Manufacturer and Country of origin	Shanghai Steam Turbine Co., Ltd.	
Type	TCF-1	
Rated Speed	rpm	3000
Steam turbine output	MW	133.8
HRSG in Combined Cycle		
Manufacturer and Country of origin	Wuhan Boiler Manufacture Co.	
Feed water temperature of HRSG	℃	55
Output of generator	MVA	478
Generator		
Manufacturer and country of origin	Shanghai Elec. Group Co.	
Rated voltage	KV	21
Rated current	A	13142
Rated frequency	Hz	50
Rated speed	rpm	3000
Total output for one set	MW	377.2

The technology process was shown in the diagram below:

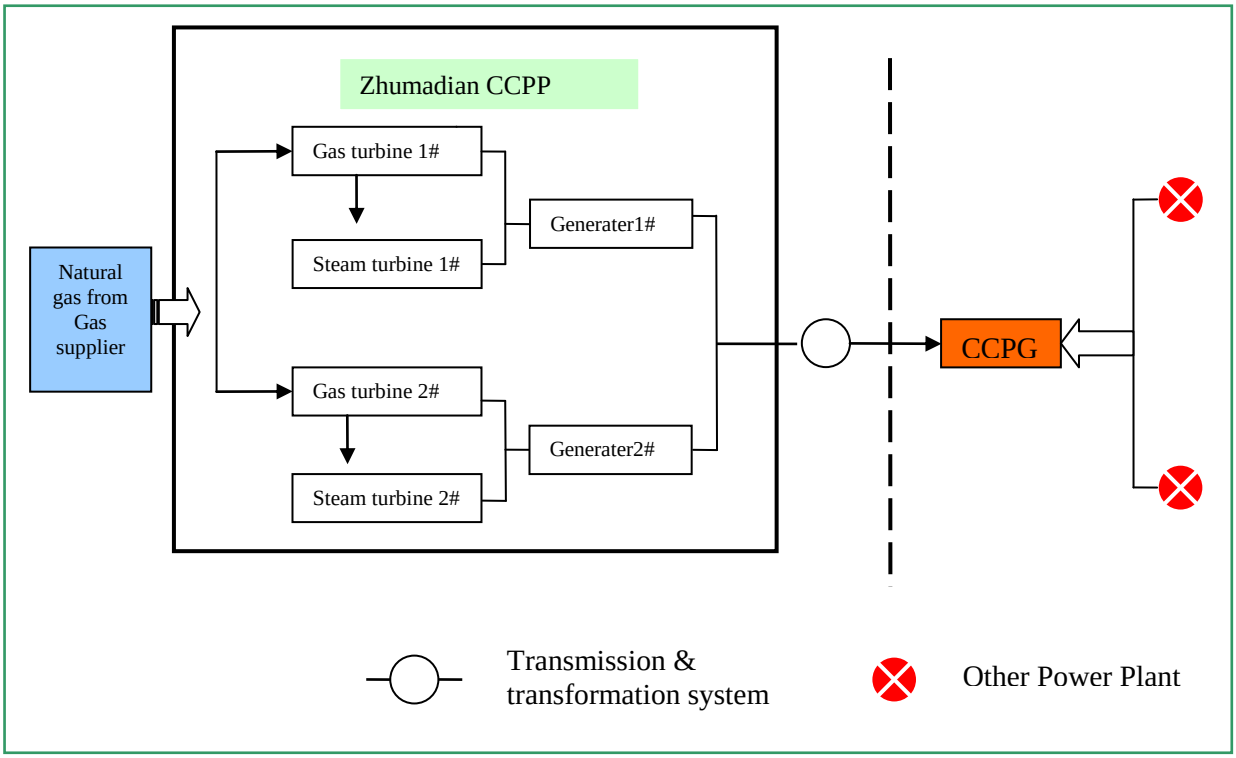

Diagram A.1 Technology Process

A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

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● Baseline methodology AM0029, Version 03: "Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas"

● Monitoring methodology AM0029, Version 03: "Grid Connected Electricity Generation Plants using Non-Renewable and Less GHG Intensive Fuel"

● "Tool to Calculate the Emission Factor for an Electricity System", Version 01

For more information about the methodology and the methodological tools see the webpage:
http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

A.6. Registration date of the project activity:

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The registration date of the project activity is: 25/08/2009

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

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The renewable crediting period is selected for the proposed project. The first crediting period is 25/08/2009 – 24/08/2016, and this monitoring period is 01/04/2011-30/11/2011.

A.8. Name of responsible person(s)/entity(ies):

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Miss. Elva Feng Haiying
BEIJING MD ENERGY TECHNOLOGY CO. LTD.[1]
elva.feng@mdenergy.cn

[1] The entity is a consultation company, not a PP.

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

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The commenced electricity generation of the gas turbine #1 is in June 2007, and the commenced electricity generation of the gas turbine #2 is in December 2007. The commenced electricity generation of the steam turbine #1 is in August 2007 and the steam turbine #2 is in January 2008. The 1st renewable crediting period (7 years) started on 25/08/2009.

During this monitoring period (01/04/2011-30/11/2011), the project has operated normally and no special event occurred. And total emission reduction achieved is 102,691tCO_2e. The key milestones of the proposed project were listed in Table B1 below:

	Date	Milestone
1	10/08/2005	The project construction started
2	04/06/2007	Operation started
3	25/08/2009	Registered as a CDM project
4	25/08/2009-24/08/2016 (Renewable)	The first Crediting period
5	25/08/2009-28/02/2010	1st monitoring period (Issued)
6	01/03/2010-30/06/2010	2nd monitoring period (Issued)
7	01/07/2010-30/11/2010	3rd monitoring period (Issued)
8	01/12/2010-31/03/2011	4th monitoring period (Issued)
9	01/04/2011-30/11/2011	5th monitoring period

Table B.1 Key Milestones of the Proposed Project

B.2. Revision of the monitoring plan

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The monitoring plan was not revised.

B.3. Request for deviation applied to this monitoring period

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No deviation has been applied to this monitoring period.

B.4. Notification or request of approval of changes

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No notification and request of approval of changes from the project activity happened.

SECTION C. Description of the monitoring system

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C.1 Metering System

As described in PDD, two bidirectional **meter No.1** and **meter No.2** (Backup meter to **meter No.1**) were installed as gateway meters at 500kV Chaya substation for automatically measuring the exported and imported electricity by the proposed project. The **meter No.3** was installed at the high voltage side of the 110KV/6KV transformer at the project site is used for measuring the import-grid electricity purchased. The total net electricity delivered to the grid is calculated based on readings from **meter No.1** and **meter No.3**.

As described in PDD, the main gas metering point is set up in front of the natural gas delivery point, where two gas flow meters are installed (**#1** and **#2**). Meanwhile, behind the natural gas delivery point, two cross-check ultrasonic flow meters (**#3** and **#5**) are installed before the gas inlet for unit 1# and 2#

at the project site. Ultrasonic Meter **#4** and **#6** has also been installed before **#3** and **#5** as their further backup meters.

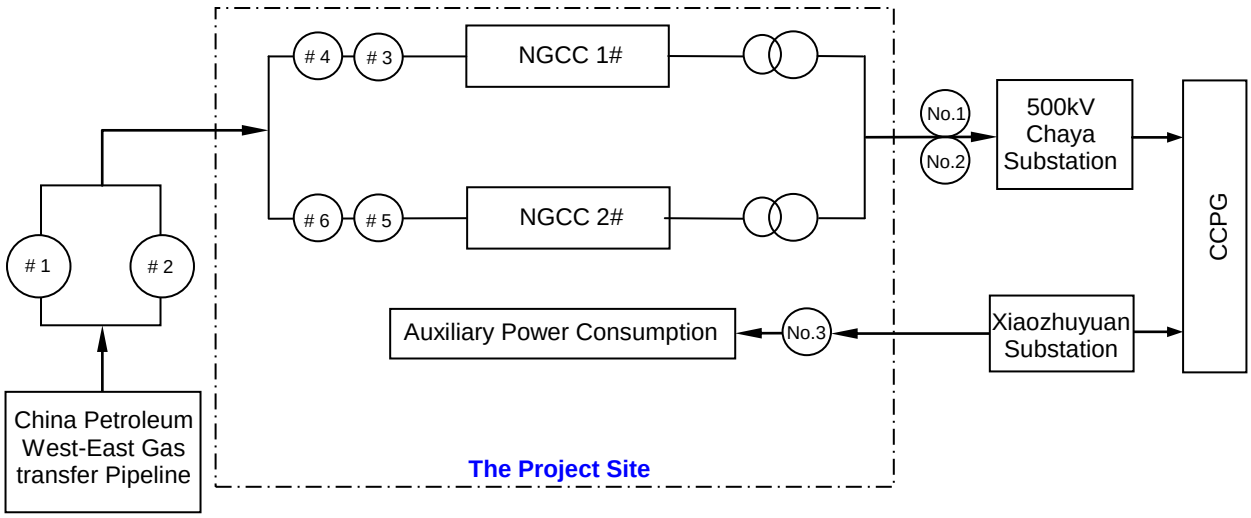

Diagram C.1 Electric and Nature Gas Monitoring System

The value of natural gas NCV is measured by an on-line gas chromatography analyzer.

C.2 Data Collection

The representatives from the project owner and the grid company have read the gateway meter **meter No.1** and the **meter No.3** on the last day of every month and the data has been recorded by the hard & soft means for monitoring, verifying, billing and cross checking. During this monitoring period, no abnormal difference has been found regarding calculation of emission reduction.

According to "GBT 18603-2001(Technical requirements of measuring systems for natural)", natural gas is measured by volume under the normal condition of 20℃ (293.15K) and absolute pressure 101.325KPa (one standard atmospheric pressure). The gas supplier and the project owner have verified the amount of natural gas supplied and consumed based on the reading from Gas meter **#1** and **#2** currently installed at the Zhumadian gas supply terminal, which are approved by both sides. The natural gas consumption has been recorded daily and cross-checked with receipt.

The measurement of NCV is conducted by an on-line gas chromatography analyzer by China Petroleum West-East Gas Transfer Pipeline Company Henan Province Xuedian Branch Station (GB/T-13610-2003), the value of NCV is recorded every ten days.

Everything worked fine during this monitoring period.

C.3 Monitoring Group & QA/QC

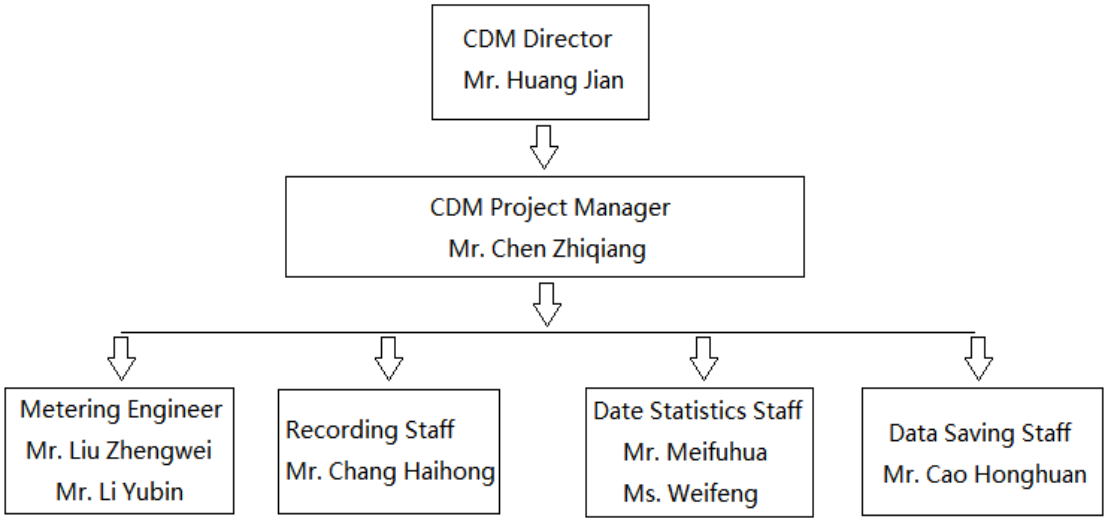

Figure C.3 Monitoring Group

Mr. Huang Jian, the Director of the proposed project exercised oversight on behalf of the Chairman.

The CDM Project Manager is Mr. Chen Zhiqiang who is responsible for monitoring plan implementation.

Mr. Liu Zhengwei and Mr. Li Yubin is responsible for Meters' operation and calibration.

Mr. Chang Haihong is in charge of the data recording.

Mr. Meifuhua and Ms. Weifeng is in charge of data statistics. Mr. Cao Honghuan is responsible for data saving.

All electricity meters installed have been calibrated by certified Parties quarterly in accordance with manufacturer's recommendations and National Regulations (SD109-83 & JJG569-1999) for ensuring reliability of the system. Calibrations have been evidenced with certificates of calibration for the relevant meters issued by the qualified third party.

The calibration and testing for the natural gas metering devices and the on-line gas chromatography was conducted periodically according to the national measurement standard and regulation (JJG1029-2007, JJG1037-2008, JG-700 1999) by the qualified measurement technology verification institution authorized by the Chinese government.

In summary, during this monitoring period, all meters and devices have been working normally and calibrated according to the registered monitoring plan and relevant national standards.

C.4 Emergency & Trouble Solving Procedure

Once error or emergency issue occurred during the operation and monitoring of the project, regulations on the Project Operation Manual and the CDM Monitoring Manual will be followed. All data of the monitoring of the project will be stored for more than two years after the end of the crediting period. Once an error occurred, these stored data will be the backup information for monitoring. No error occurred during this monitoring period.

SECTION D. Data and parameters

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors

Data / Parameter:	$EF_{Coal,upstream,CH4}$
Data unit:	t CH_4/kt coal
Description:	Emission Factor for upstream fugitive methane emissions from coal production, transportation, distribution.
Source of data used:	Revised 1996 IPCC Guideline Vol.3, default value, as required by AM0029, version 03.
Value(s) :	**13.4**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data used for Leakage Emission Calculation
Additional comment:	-

Data / Parameter:	$EF_{oil,upstream,CH4}$
Data unit:	t CH_4/PJ
Description:	Emission Factor for upstream fugitive methane emissions from crude oil production, transportation, refining and storage processes.
Source of data used:	Revised IPCC 1996 Guidance default value, Tables 1-60 to 1-64, p. 1.129 - 1.131
Value(s) :	**4.1**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data used for Leakage Emission Calculation
Additional comment:	-

Data / Parameter:	$EF_{NG,upstream,CH4}$
Data unit:	t CH_4/PJ
Description:	Emission Factor for upstream fugitive methane emissions of natural gas from production, transportation, distribution, and, in the case of LNG, liquefaction, transportation, re-gasification and compression into a transmission or distribution system.
Source of data used:	Revised IPCC 1996 Guidance default value, Table 1-63 and 1-64, p.1.130 and p.1.131
Value(s) :	**296**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data used for Leakage Emission Calculation
Additional comment:	-

Data / Parameter:	GWP_{CH4}
Data unit:	t CO_2e/tCH_4
Description:	Global Warming Potential for methane
Source of data used:	IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories
Value(s) :	**21**
Indicate what the data are	Data used for Leakage Emission Calculation

used for (Baseline/ Project/ Leakage emission calculations)	
Additional comment:	-

D.2. Data and parameters monitored		
Data / Parameter:	$FC_{NG,y}$	
Data unit:	Nm^3 (Volume unit Nm^3 measured under the normal condition of 20℃ (293.15K) and absolute pressure 101.325KPa (one standard atmospheric pressure).	
Description:	Quantity of natural gas consumed in project activity.	
Measured /Calculated /Default:	Measured.	
Source of data:	NG flow meter reading at the power supplier terminal.	
Value(s) of monitored parameter:	**460,393,600**	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data used for Project Emission calculation.	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Gas flow meter **1#** Type：TRZ-IFSG14000DN300ANSI600 Accuracy class: 1.0 Serial number: 83034891 Calibration frequency: every 1yr Calibration date: 06/12/2010 Validity: 05/12/2011 Calibration entity: Henan Institute of metrology and Testing	Gas flow meter **2#** Type：TRZ-IFSG14000DN300ANSI600 Accuracy class: 1.0 Serial number: 83034059 Calibration frequency: every 1yr Calibration date: 17/11/2010 Validity: 16/11/2011 Calibration entity: Henan Institute of metrology and Testing Calibration date: 09/10/2011 Validity: 08/10/2012 Calibration entity: Nanjing Branch of National Station of Petroleum &Natural Gas Flow Meter
Measuring/ Reading/ Recording frequency:	The monitoring data of the NG consumption was aggregated and recorded daily.	
Calculation method (if applicable):	Meter Reading	
QA/QC procedures applied:	The total NG consumption was monitored both by Gas supplier and project owner. The monitoring readings were cross-checked with the receipts provided by the gas supply company. All the Gas Flow Meters have been calibrated once a year by a qualified third party. All the electronic and paper documents will be archived during the crediting period and two years after the end of the crediting period or the last issuance of CERs for this project activity.	

Data / Parameter:	$NCV_{NG,y}$
Data unit:	MJ/Nm^3

Description:	Net Calorific Value of NG
Measured /Calculated /Default:	Weighted average value calculated was applied for emission reduction calculation.
Source of data:	Specific value on natural gas resource, provided by the Petro China Company Ltd.
Value(s) of monitored parameter:	**34.11** (weighted average value)
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data used for Project Emission calculation.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	On-line Gas Chromatograph of Petro China Company. Type：BTU-8000 Serial number: 100839 Calibration frequency: every 1yr Last calibration date: 28/05/2010 and 26/05/2011 Validity: 27/05/2011 and 25/05/2012 Calibration entity: National Institute of Metrology of P. R. China
Measuring/ Reading/ Recording frequency:	The NCV value were measured continuously, read daily, and recorded every ten days.
Calculation method (if applicable):	- Weighted average value of every ten days NCV values
QA/QC procedures applied:	The value of NCV was measured by the gas chromatography analyzer on-line, which has been record by the China National Petroleum Corporation (Gas supplier), and then provided to the project owner. The calibration and testing for on-line gas chromatography analyer was carried out once a year by the qualified measurement technology verification institution authorized by National Institute of Metrology of P.R. China. The calibration results showed that the Gas Chromatograph runs OK. All the electronic and paper documents will be archived during the crediting period and two years after the end of the crediting period or the last issuance of CERs for this project activity.

Data / Parameter:	$OXID_{NG,}$
Data unit:	None
Description:	Oxidation factor of the Natural gas
Measured /Calculated /Default:	Default
Source of data:	"2006 IPCC Guidelines for National Greenhouse Gas Inventories" Volume 2 Energy, Chapter 1, Table 1.4, Page 1.24 (Please refer to Annex 3)
Value(s) of monitored parameter:	**1.00** for gas
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data used for Project Emission calculation.
Monitoring equipment (type, accuracy class, serial	-

number, calibration frequency, date of last calibration, validity)	
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures applied:	-

Data / Parameter:	$\boldsymbol{EF_{CO2,NG,y}}$
Data unit:	tCO_2/GJ
Description:	CO_2 emission factor per unit of energy of natural gas
Measured /Calculated /Default:	Default
Source of data:	Determined by National data which is cited from 2006 IPCC Guidelines for National Greenhouse Gas Inventories" Volume 2 Energy, Chapter I, Table1.4 in Page 1.24.[2]
Value(s) of monitored parameter:	**0.0561**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data used for $COEF_{NG,y,}$ calculation.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	Unit conversion: $\boldsymbol{EF_{CO2,NG,y}}$ = 15.30tC/TJ ×44/12/1000 = 0.0561 tCO_2/GJ
QA/QC procedures applied:	During implementing verification period for the project, the latest IPCC-value is applied.

Data / Parameter:	$\boldsymbol{COEF_{NG,y,}}$
Data unit:	tCO_2/Nm^3
Description:	CO_2 emission coefficient in year y for natural gas.
Measured /Calculated /Default:	Calculated
Source of data:	-
Value(s) of monitored parameter:	See ER Calculation Excel Table
Indicate what the data are	Data used for Project Emission calculation.

[2]The project owner had sent a letter to the Gas supplier (China National Petroleum Corporation) on 12/02/2010 requiring them to provide the $EF_{CO2,NG,}$value, and the Gas supplier had replied this letter. But according to the letter from supplier, the value is unavailable and cannot be provided by gas supplier. Therefore, according to PDD, the country value of 15.3tC/TJ (i.e. 0.0561tCO_2/GJ)[6] which sourced from IPCC default value has been applied here.

used for (Baseline/ Project/ Leakage emission calculations)	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	$COEF_{NG,y} = NCV_{NG,y} \times EF_{CO2,NG,y} \times OXID_{NG}$
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures applied:	-

Data / Parameter:	PE_y
Data unit:	tCO_2e
Description:	CO_2 emissions from the power plant of the project due to combustion of natural gas fuel in y year.
Measured /Calculated /Default:	Calculated
Source of data:	-
Value(s) of monitored parameter:	**881,166,601**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	$PE_y = FC_{NG,y} \times COEF_{NG,y}$ $COEF_{NG,y} = NCV_{NG,y} \times EF_{CO2,NG,y} \times OXID_{NG}$
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures applied:	-

Data / Parameter:	$EG_{pj,y}$ (Gateway **meter No.1** and **meter No.3**)	
Data unit:	MWh	
Description:	The net electricity delivered by the project activity, measured by the meter No.1 and meter No.3.	
Measured /Calculated /Default:	Measured	
Source of data:	Reading at project boundary by electricity energy meter with bidirectional reading function, and the electricity purchase receipt from the power grid company.	
Value(s) of monitored parameter:	**2,347,518.06**	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data used for Baseline emission calculation.	
Monitoring equipment (type, accuracy class, serial	Electricity **meter No.1** Type：WU.TE432S	Electricity **meter No.3** Type: SL7000

number, calibration frequency, date of last calibration, validity)	Accuracy class: 0.2s Serial number: 18450580 Calibration frequency: every 3 months Calibration date: 12/01/2011, 10/04/2011, 08/07/2011, and 06/10/2011 Validity: 11/04/2011, 09/07/2011 and 07/10/2011, 05/01/2012 Calibration entity: Henan Province Research Institute	Accuracy class: 0.2s Serial number: 33049113 Calibration frequency: every 3 months Calibration date: 12/01/2011, 10/04/2011, 08/07/2011 and 06/10/2011 Validity: 11/04/2011, 09/07/2011, 07/10/2011 and 05/01/2012 Calibration entity: Henan Province Research Institute
Measuring/ Reading/ Recording frequency:	Measuring frequency: continuously Recording frequency: daily and monthly record.	
Calculation method (if applicable):	Net electricity supplied is calculated as exported electricity measured by meter No.1 minus imported electricity measured by meter No.1, then minus the imported electricity measured by meter No.3	
QA/QC procedures applied:	The electricity output was monitored and recorded at the on-site computer control centre. The record of electricity delivered and the receipt of the electricity purchase was cross-checked by both the project owner and the power grid company. All the electricity meters (meter No.1, meter No.2 and meter No.3) have been calibrated once three months by a qualified third party. All the electronic and paper documents will be archived during the crediting period and two years after the end of the crediting period or the last issuance of CERs for this project activity.	

Data / Parameter:	***m***
Data unit:	None
Description:	A sample group m including recent capacity additions in the CCPG that comprise 20% of the total installed capacity in year 2010.
Measured /Calculated /Default:	Default
Source of data:	China's DNA CDM official Website: http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf
Value(s) of monitored parameter:	See ER Calculation Table
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data used for Baseline Emission calculation.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-

QA/QC procedures applied:	According to registered PDD, the latest value available at the DNA website of the crediting year has been used for the calculation.

Data / Parameter:	$F_{i,j,y}$
Data unit:	t or Nm^3
Description:	Fossil fuel *i* consumption in year y for electricity generation in province *j* which is covered under CCPG. Used for calculation of λ_i and $EF_{BM,y}$
Measured /Calculated /Default:	Default
Source of data:	China's DNA CDM official Website: http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf
Value(s) of monitored parameter:	See ER Calculation Table
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data used for Baseline Emission calculation.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures applied:	According to registered PDD, the latest value available at the DNA website of the crediting year has been used for the calculation.

Data / Parameter:	$COEF_{i,j}$
Data unit:	tCO_2/t or Nm^3
Description:	The CO_2 emission factor for fuel type *i* in Province *j*, taking into account the carbon content of the fuels used and the percent oxidation of the fuel. Used for calculation of λ_i and $EF_{BM,y}$
Measured /Calculated /Default:	Default
Source of data:	China's DNA CDM official Website: http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf
Value(s) of monitored parameter:	See ER Calculation Table
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data used for Baseline Emission calculation.
Monitoring equipment (type, accuracy class, serial number, calibration	-

frequency, date of last calibration, validity)	
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures applied:	According to registered PDD, the latest value available at the DNA website of the crediting year has been used for the calculation.

Data / Parameter:	$\lambda_{Coal}, \lambda_{Oil}, \lambda_{Gas}$
Data unit:	-
Description:	The ratio λ_i of the CO_2 emissions from solid (coal), liquid (oil) and gas fuels consumed for power generation to the CO_2 emissions from total thermal power generation under CCPG.
Measured /Calculated /Default:	Default
Source of data:	China's DNA CDM official Website: http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2552.pdf
Value(s) of monitored parameter:	λ_{Coal} =97.66%, λ_{Oil} =0.13%, λ_{Gas} =2.21%.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data used for Baseline Emission calculation.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures applied:	According to registered PDD, the latest value available at the DNA website of the crediting year has been used for the calculation.

Data / Parameter:	$EF_{Coal,Adv}$, $EF_{Oil,Adv}$, $EF_{Gas,Adv}$
Data unit:	tCO_2/MWh
Description:	The emission factors in line with the efficiency level of the best technology commercially available in China's power grid for each fuel type as coal, oil and gas respectively.
Measured /Calculated /Default:	Default
Source of data:	China's DNA CDM official Website: http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2552.pdf
Value(s) of monitored parameter:	$EF_{Coal,Adv}$ = 0.7967 $EF_{Oil,Adv}$ = 0.5250

	$EF_{Gas,Adv}$= 0.3776
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data used for Baseline Emission calculation.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures applied:	According to registered PDD, the latest value available at the DNA website of the crediting year has been used for the calculation.

Data / Parameter:	$EF_{Thermal}$
Data unit:	tCO_2/MWh
Description:	The weighted averaged emission factor $EF_{Thermal}$ of the thermal power capacity under CCPG.
Measured /Calculated /Default:	Default
Source of data:	China's DNA CDM official Website: http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2552.pdf
Value(s) of monitored parameter:	**0.7871**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data used for Baseline Emission calculation.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures applied:	According to registered PDD, the latest value available at the DNA website of the crediting year has been used for the calculation.

Data / Parameter:	CAP_{Total}
Data unit:	MW
Description:	The total capacity addition of CCPG in year 2007, 2008nd 2009.
Measured /Calculated /Default:	Default
Source of data:	China's DNA CDM official Website:

	http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf
Value(s) of monitored parameter:	**38,088.3**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data used for Baseline Emission calculation.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures applied:	According to registered PDD, the latest value available at the DNA website of the crediting year has been used for the calculation.

Data / Parameter:	$CAP_{Thermal}$
Data unit:	MW
Description:	The capacity addition by thermal power of CCPG in year 2007, 2008 and 2009.
Measured /Calculated /Default:	Default
Source of data:	China's DNA CDM official Website: http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf
Value(s) of monitored parameter:	**20,280**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data used for Baseline Emission calculation.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures applied:	According to registered PDD, the latest value available at the DNA website of the crediting year has been used for the calculation.

Data / Parameter:	$EF_{grid,BM,y}$
Data unit:	tCO2e/MWh
Description:	Build marginal emission factor of the CCPG during the project operation period
Measured /Calculated /Default:	Calculated
Source of data:	Notification on Determining 2010 Baseline Emission Factors for

	Regional Power Grids in China issued by China's DNA CDM official, and please see the Website: http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf
Value(s) of monitored parameter:	**0.4191**
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data is used for Baseline Emission calculation.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures applied:	According to registered PDD, the latest value available at the DNA website of the crediting year has been used for the calculation.

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

>>

Baseline Emissions

According to the registered PDD, Baseline emissions are given as:

$$BE_y = EG_{pj,y} \times EF_{BL,CO2,y}$$

Where:

***EG*$_{PJ,y}$** : Net amount of electricity generated by the project and sold into CCPG (MWh). The monitored data is listed in Section Annex 1 of this monitoring report.

***EF*$_{BL,CO2,y}$** : As mentioned in PDD, $EF_{BL,CO_2} = \min(EF_{grid,BM,y}, EF_{grid,CM,y}, EF_{BL,CO_2,Option3})$, so ***EF*$_{grid,BM,y}$** is selected as the baseline emission factor of CCPG, which is ex-post calculated and updated.

Calculation of EF $_{BL,CO2,y}$ of CCPG in this monitoring period.

Step a: calculate the proportion λ_i of the CO_2 emissions of solid, liquid and gas fuel type consumed for power generation to the total CO_2 emissions from the total thermal power generation.

$$\lambda_{Coal} = \frac{\sum_{i \in COAL, j} F_{i,j,y} \times COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \times COEF_{i,j}}$$

$$\lambda_{Oil} = \frac{\sum_{i \in OIL, j} F_{i,j,y} \times COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \times COEF_{i,j}}$$

$$\lambda_{Gas} = \frac{\sum_{i \in GAS, j} F_{i,j,y} \times COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \times COEF_{i,j}}$$

Where:

$F_{i,j,y}$: = the amount of fuel i (in unit t or Nm^3) consumed by relevant power sources in provincial grid j in year y;

$COEF_{i,j,y}$: = the CO_2 emission coefficient of fuel i (tCO_2 /t or Nm^3), taking into account the carbon content of the fuels used by relevant power sources j and the percent oxidation of the fuel in year(s) y.

In this monitoring period, the details are as follow:

Parameter	Value
λ_{Coal}	97.66%
λ_{oil}	0.13%
λ_{gas}	2.21%

For the detailed information, please see the Annex 2.

Step b: calculate the emission factor $EF_{Thermal}$ of the corresponding thermal power.

$$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv}$$

Where:

$EF_{Coal,Adv}$, $EF_{Oil,Adv}$ and $EF_{Gas,Adv}$ are the emission factors in line with the efficiency level of the best technology commercially available (tCO_2e/MWh) in China's power grid for each fuel type respectively.

The most advanced and commercially available coal power technology in China in 2009 is 600MW sub-critical unit with power supply coal consumption of 311.5gce/kWh, which is equivalent to a power supply efficiency of 39.45%.

And the best oil and gas fired power technology commercially available in China's power grid is defined as 200 MW combined cycle unit (the efficiency level technology is equivalent to the 9E type unit of GE Company) with power supply coal consumption of 237.4gce/kWh, which is equivalent to a power supply efficiency of 51.77%.

The detail data is listed in below table:

	Variable	**Power Supply Efficiency**	**Emission Factor for Fuels ($kgCO_2/TJ$)**	**Emission Factor (tCO_2e/MWh) O=3.6/L/1,000,000 ×I**
Coal-fired Power Plant	$EF_{Coal,Adv}$	39.45%	87,300	0.7967
Gas-fired Power Plant	$EF_{Gas,Adv}$	51.77%	75,500	0.5250
Oil-fired Power Plant	$EF_{Oil,Adv}$	51.77%	54,300	0.3776

In this monitoring period,

$EF_{Thermal}$ = 97.66%×0.7967 + 0.13% × 0.5250 + 2.21% × 0.3776 = 0.7870 tCO_2e/MWh

Step c: calculate the $\boldsymbol{EF_{grid,BM,y}}$ of the grid:

$$EF_{Grid,BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal}$$

Where:
CAP_{Total} is the total new capacity addition (MW),
$CAP_{Thermal}$ is the new capacity addition of thermal power plants (MW).

The share of thermal power of recent capacity addition is 53.25% (See Annex 2 for details), thus, the Build Margin emission factor ($EF_{grid,BM,y}$) of this monitoring period is calculated as:

$$EF_{grid,BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal} = 53.25\% \times 0.7870 = \mathbf{0.4191}\ tCO_2e/MWh.$$

During this monitoring period, the $EG_{pj,y}$ is 2,347,518.06 MWh, the $EF_{grid,BM,y}$ is **0.4191** tCO_2e/MWh. Thus, BE_y is calculated as:

$BE_y = EG_{pj,y} \times EF_{BL,CO2,y} = EG_{pj,y} \times EF_{grid,BM,y}$
$= 2,347,518.06 \times 0.4191 =$ **983,786.339** (tCO_2e).

E.2. Project emissions calculation

>>

Project Emissions

According to section 6.1 of the registered PDD, Project Emissions are given as:

$$PE_y = FC_{NG,y} \times COEF_{NG,y}$$

Where

$FC_{NG,y}$**:** the total volume of NG combusted (Nm^3) during this monitoring period[3]. The monitored data is listed in Annex 1 of this monitoring report.

$COEF_{NG,y}$**:** the CO_2 emission coefficient (tCO_2/Nm^3) during this monitoring period for NG, which is calculated as follows:

$$COEF_{NG,y} = NCV_{NG,y} \times EF_{CO2,NG,y} \times OXID_{NG}$$

Where:

$NCV_{NG,y}$: the net calorific value (energy content) per volume unit of NG during this monitoring period (GJ/Nm^3) as provided by the fuel supplier.

$EF_{CO2,NG,y}$ **:** the CO_2 emission factor per unit of energy value of NG in this monitoring period . It was determined by national data which is cited from the updated edition of *IPCC* 2006, page 24 according to the registered PDD. The $EF_{CO2,NG,y}$ is $0.0561tCO_2e/GJ$

$OXID_{NG}$ **:** the IPCC default value 100% is used according to the registered PDD.

The every month's weighted averaged $\mathbf{NCV_{NG,y}}$ value of this monitoring period are listed as follow:

Period	**01/04/2011-30/04/2011**	**01/05/2011-31/05/2011**	**01/06/2011-30/06/2011**	**01/07/2011-31/07/2011**
$\mathbf{NCV_{NG,y}}$ **(**MJ/Nm^3**)**	34.15	34.20	34.02	34.14
Period	**01/08/2011-31/08/2011**	**01/09/2011-30/09/2011**	**01/10/2011-31/10/2011**	**01/11/2011-30/11/2011**
$\mathbf{NCV_{NG,y}}$ **(**MJ/Nm^3**)**	33.99	34.38	33.92	34.10

For the every month's Project Emission and the total Project Emission during this monitoring period, please refer to the table below.

[3] Nm^3 means volume unit (Nm^3) measured under the Normal condition of 20 ℃ (293.15K) and absolute pressure 101.325KPa (one standard atmospheric pressure)

Period	$NCV_{NG,y}$	$EF_{CO2,NG,Y}$	$OXID_{NG}$	$COEF_{NG,y}$	$PE_y = FC_{NG,y} \times COEF_{NG,y}$
	MJ/Nm^3	**tCO$_2$e/GJ**	**-**	**tCO$_2$/Nm^3**	**tCO$_2$e**
01/04/2011-30/04/2011	34.148028	0.0561	1	0.00192	132,000.675
01/05/2011-31/05/2011	34.195365	0.0561	1	0.00192	175,477.820
01/06/2011-30/06/2011	34.020348	0.0561	1	0.00191	151,650.938
01/07/2011-31/07/2011	34.140372	0.0561	1	0.00192	183,791.738
01/08/2011-31/08/2011	33.993354	0.0561	1	0.00191	73,060.803
01/09/2011-30/09/2011	34.378005	0.0561	1	0.00193	40,713.769
01/10/2011-31/10/2011	33.924633	0.0561	1	0.00190	38,877.326
01/11/2011-30/11/2011	34.097080	0.0561	1	0.00191	85,593.532
Total					**881,166.601**

E.3. Leakage calculation

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As mentioned in PDD, Leakage may result from upstream processes of fossil fuels outside of the project boundary. This includes mainly fugitive CH_4 emissions and CO_2 emissions from associated fuel combustion and flaring. In line with AM0029 version 03, as no LNG is used in the project plant, only leakage emissions from using natural gas ($\boldsymbol{LE_{CH4,y}}$) are considered, which can be calculated based on following steps as mentioned in the PDD:

Step $_{CH4}$ a): calculate the weight proportion $\boldsymbol{\lambda_{k,CH4}}$ which is defined as the ratio of the upstream CH_4 emissions associated with solid, liquid and gas fuel type consumed for power generation respectively to the total upstream CH_4 emissions for the total thermal power generation in the grid.

$$\lambda_{Coal,CH4} = \frac{\sum_{k \in COAL, j} F_{k,j,y} \times COEF_{k,j,CH4}}{\sum_{k,j} F_{k,j,y} \times COEF_{k,j,CH4}}$$

$$\lambda_{Oil,CH4} = \frac{\sum_{k \in OIL, j} F_{k,j,y} \times COEF_{k,j,CH4}}{\sum_{k,j} F_{k,j,y} \times COEF_{k,j,CH4}}$$

$$\lambda_{Gas,CH4} = \frac{\sum_{k \in GAS, j} F_{k,j,y} \times COEF_{k,j,CH4}}{\sum_{k,j} F_{k,j,y} \times COEF_{k,j,CH4}}$$

where:

$F_{k,j,y}$: the amount of *k* type fuel (in unit t or Nm^3) consumed by relevant electric power sources in provincial grid *j* in year *y*,

$COEF_{k,j,CH4}$: the upstream fugitive CH_4 emission coefficient of *k* type fuel (tCH_4/TJ) used by relevant power sources in provincial grid *j*

In this monitoring period, $\lambda_{Coal,CH4}$ =97.37%, $\lambda_{Oil,CH4}$ =0.00%, $\lambda_{Gas,CH4}$ =2.62%.

Step$_{CH4}$ b: calculate the weighted averaged upstream fugitive CH_4 emission factor for the thermal electric power (tCH_4/MWh), $EF_{Thermal,Upstream,CH4}$:

$$EF_{Thermal,Upstream,CH4} = \lambda_{Coal,CH4} \times EF_{Coal,Adv,CH4} + \lambda_{Oi,CH4} \times EF_{Oil,Adv,CH4} + \lambda_{Gas,CH4} \times EF_{Gas,Adv,CH4}$$

Where:

$EF_{Coal,Adv,CH4}$, $EF_{Oil,Adv,CH4}$ and $EF_{Gas,Adv,CH4}$ are the upstream fugitive CH_4 emission factors in line with the efficiency level of the best power technology commercially available (tCO_2/MWh) in China's power grid for each fuel type respectively.

The $EF_{Coal,Adv,CH4}$, $EF_{Oil,Adv,CH4}$ and $EF_{Gas,Adv,CH4}$ value for this monitoring period are listed as follow:

Type of Power Plant	Variable	Oxidation	Efficiency of Power Supply	Fugitive Methane Emission Factor of the Fuel (tCH_4/TJ)	Fugitive Methane Emission Factor (tCO_2/MWh)
Coal-Fired Power Plant	**$EF_{Coal,Adv,CH4}$**	1	39.45%	0.6462	0.0059
Oil-Fired Power Plant	**$EF_{Oil,Adv,CH4}$**	1	51.77%	0.0041	0.0000
Gas-Fired Power Plant	**$EF_{Gas,Adv,CH4}$**	1	51.77%	0.2960	0.0021

So, $EF_{Thermal,\ Upstream,CH4}$=97.37%×0.0059+0.00%×0.0000 +2.62%×0.0021=0.00579576 tCH_4/MWh

Step$_{CH4}$ c: Calculate the $\boldsymbol{EF}_{BL,upstream,CH4}$ in the context of CCPG grid BM (tCH_4/MWh):

$$EF_{BL,Upstream,CH4} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal,Upstream,CH4}$$

Here $\boldsymbol{CAP}_{Total}$ is the total recent capacity addition (MW); $\boldsymbol{CAP}_{Thermal}$ is the recent capacity addition of thermal power plants within the CCPG grid BM sample group *m* (MW).

For this monitoring period,

$$EF_{BL,Upstream,CH4} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal,Upstream,CH4}$$

=53.25%×0.00579576 tCH_4 MWh

=0.00308600 tCH_4/MWh

To estimated the fugitive methane emissions, one can multiply the *NG* quantity consumed by the project in year y with an emission factor for fugitive CH_4 emissions ($EF_{NG,upstream,CH4}$) due to *NG* consumption and subtract the fugitive CH_4 emissions occurring from fossil fuels used in the selected baseline power plant in the absence of the project activity, as follows:

$$LE_{CH_4,y} = \left[FC_y \times NCV_{NG,y} \times EF_{NG,upstream,CH4} - EG_{PJ,y} \times EF_{BL,upstream,CH4}\right] \times GWP_{CH4}$$

Where:

$\boldsymbol{LE}_{CH4,y}$**:** Leakage emissions due to fugitive upstream CH_4 emissions in the year y in tCO_2e.

$\boldsymbol{FC}_y$**:** Total volume of NG combusted (Nm^3) during this monitoring period.

$\boldsymbol{NCV}_{NG,y}$**:** Net calorific value of NG (GJ/ Nm^3), which is determined by the fuel supplier.

$\boldsymbol{EF}_{NG,upstream,CH4}$**:** Emission factor for upstream fugitive methane emissions of natural gas from production, transportation, distribution, in tCH_4/ GJ.

$\boldsymbol{EG}_{PJ,y}$**:** Electricity generation in the project plant during this monitoring period in MWh.

$\boldsymbol{EF}_{BL,upstream,CH4}$**:** The emission factor determined in step$_{CH4}$ c above for upstream fugitive methane emission occurring in the absence of the project activity in tCH_4/MWh.

GWP_{CH4}: Global warming potential of methane valid for the relevant commitment period, and the value is 21 tCO_2e/tCH_4.

The $EF_{NG,upstream,CH4}$, $EF_{BL,upstream,CH4}$, and GWP_{CH4} values for calculation the parameter $LE_{CH4,y}$ in this monitoring period are listed as follow:

Parameter	$EF_{NG,upstream,CH4}$	$EF_{BL,upstream,CH4}$	GWP_{CH4}
Unit	tCH_4/ GJ	tCH_4/MWh	tCO_2e/tCH_4
Value	0.000296	0.00308600	21

For this monitoring period, $LE_{CH4,y}$= -58,497.89(tCO_2e), which is a negative value. According to AM0029 version 3, the value of leakage is assumed as **0**, i.e., $LE_y = 0$.

E.4. Emission reductions calculation / table

>>

The emission reductions of the proposed project can be calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

***ER_y*:** emission reduction during this monitoring period (tCO_2e).
***BE_y*:** emission in the baseline scenario during this monitoring period (tCO_2e).
***PE_y*:** emission in the project activity during this monitoring period (tCO_2e).
***LE_y*:** leakage emission during this monitoring period (tCO_2e).

	ER_y	BE_y	PE_y	LE_y
Unit	tCO_2e	tCO_2e	tCO_2e	tCO_2e
Quantity	102,619	983,786.339	881,166.601	0

Therefore, the total amount of emission reductions for the project during this monitoring period is calculated as **102,619** (tCO_2e).

More calculation details are listed in Annex 1

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

>>

The annual emission reduction estimated in the registered CDM-PDD is 858,165tCO_2e/y. The comparison of the actual emission reduction during the whole year during 01/12/2010 to 30/11/2011, with that estimated in the CDM-PDD was shown in the table below. The result showed that the actual emission reduction achieved during this period is less than that estimated in the CDM-PDD by 81.65%[4]

Item	**Values applied in ex-ante calculation of the registered CDM-PDD**	**Actual values reached during the whole year (01/12/2010 to 30/11/2011)**
Emission reductions (tCO_2e)	858,165	157,500

The comparison of the actual emission reduction during this monitoring period (01/04/2011-30/11/2011, both days included) with that estimated in the CDM-PDD was shown in the table below. The result

[4] The whole year monitoring period (from 01/12/2010-30/11/2011, both days included) is 365 days. The actual CERs is 157,500tCO_2e, which is less than that estimated in the CDM-PDD (858,165tCO_2e) by 81.65%, calculated as :(858,165-157,500)/ 858,165×100%=81.65%.

showed that the actual emission reduction achieved during this monitoring period is less than that estimated in the CDM-PDD by 82.11%[5].

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO_2e)	573,677[6]	102,619

The PLF during this period (01/04/2011-30/11/2011) is calculated as:
2,347,518.06/(2×377.2)/(244×24)=53.14%, which is more than the value of 39.1% indicated in the registered PDD.
Moreover, the total net power generation from 25/08/2009 to 30/11/2011 (from the date on which this CDM project was registered to the cut-off date of 5th Monitoring period) is 5,902,249.98MWh, which is increased by only 0.67% than the net power generation estimated in the registered CDM-PDD (5,862,747MWh, total 828 days), which means that the influence is insignificant.

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

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The emission reduction during this monitoring period is lower than estimated in the PDD. No increase occurred. So no remarks are needed.

[5] This monitoring period (from 01/04/2011-30/11/2011, both days included) is 244 days. The actual CERs is 102,619 tCO_2e, which is less than that estimated in the CDM-PDD (573,677 tCO_2 for 244 days) by 82.11% , calculated as :(573,677-102,619)/ 573,677×100%=82.11%.

[6] The annul Emission Reduction estimated in the registered CDM-PDD is 858,165 tCO_2e, this monitoring period contains 244 days, so the Emission Reduction Values applied in ex-ante calculation of the registered CDM-PDD during this monitoring period is calculated as : 858,165/365×244=573,677

Annex 1 Calculation of GHG emission reductions

Summary of the emissions reductions during the monitoring period (Cont):

		Baseline Emission			**Project Emission**						**LE**				
Period	Emission Reduction	$EG_{pj,y}$ MWh	$EF_{grid,BM,y}$ tCO_2e/ MWh	$BE_y=EG_{pj,y} \times EF_{grid,BM,y}$ tCO_2e	$FC_{NG,y}$	$NCV_{NG,y}$	$EF_{CO2,NG,y}$	$OXID_{NG}$	$COEF_{NG,y}$	$PE_y = FC_{NG,y} \times COEF_{NG,y}$	$EF_{NG,upstream,CH4}$	$EF_{BL,upstream,CH4}$	GWP_{CH4}	LE_{CH4}	LE_y
					Nm^3	MJ/Nm^3	tCO_2/GJ		tCO_2e/Nm^3	tCO_2e	tCH_4/GJ	tCH_4/ MWh	tCO_2e/tCH_4	tCO_2e	tCO_2e
		A	**B**	**C=A×B**	**D**	**E**	**F**	**G**	**H=E×F×G/10^3**	**I=H×D**	**J**	**K**	**L**	**M=[D×E×J/1000-A×K]×L**	**N**
01/04/11 - 30/04/11	16,331.917	353,952.30	0.4191	148,332.591	68,904,512	34.148028	0.0561	1	0.00192	132,000.675	0.000296	0.0030858	21	-8310.498	0.000
01/05/11 - 31/05/11	24,243.666	476,576.85	0.4191	199,721.486	91,472,832	34.195365	0.0561	1	0.00192	175,477.820	0.000296	0.0030858	21	-11439.327	0.000
01/06/10 - 30/06/10	19,143.428	407,550.75	0.4191	170,794.367	79,459,072	34.020348	0.0561	1	0.00191	151,650.938	0.000296	0.0030858	21	-9606.438	0.000
01/07/11 - 31/07/11	23,460.590	494,547.00	0.4191	207,252.328	95,961,024	34.140372	0.0561	1	0.00192	183,791.738	0.000296	0.0030858	21	-11682.611	0.000
01/08/11 - 31/08/11	8,182.589	193,863.57	0.4191	81,243.393	38,311,360	33.993354	0.0561	1	0.00191	73,060.803	0.000296	0.0030858	21	-4467.255	0.000
01/09/11 - 30/09/11	4,092.834	106,917.84	0.4191	44,806.603	21,110,464	34.378005	0.0561	1	0.00193	40,713.769	0.000296	0.0030858	21	-2417.208	0.000
01/10/10 - 31/10/10	510.976	93,988.65	0.4191	39,388.302	20,427,648	33.924633	0.0561	1	0.00190	38,877.326	0.000296	0.0030858	21	-1782.865	0.000
01/11/11 - 30/11/11	6,653.738	220,121.10	0.4191	92,247.269	44,746,688	34.097080	0.0561	1	0.00191	85,593.532	0.000296	0.0030858	21	-4780.116	0.000
Total	**102,619.00**	**2,347,518.06**		**983,786.339**	**460,393,600**					**881,166.601**				**-54,486.32**	**0.00**

* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

Annex 2 The calculation of $EF_{grid,BM,y}$ of CCPG in the forth monitoring period

Table 1 Percentages of CO_2 emissions from the coal-fired, gas-fired and oil-fired power plants in total fuel-fired CO_2 emissions

		Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total	Average Low Calorific Value	Emission Factor (tC/TJ)	Oxidation	CO_2 Emission (tCO_2e)
Fuel	**Unit**	**A**	**B**	**C**	**D**	**E**	**F**	**G=A+…+F**	**H**	**I**	**J**	**K=G×H×I×J/100000**
Raw Coal	10^4 t	2,184.31	9,339.64	2,888.29	2,810.69	1,413.64	2,817.31	**21,453.88**	20,908	87,300	1	391,590,892
Cleaned Coal	10^4 t	0.00	3.35	0.00	0.00	0.00	0.00	**3.35**	26,344	87,300	1	77,044
Other Washed Coal	10^4 t	0.00	59.93	0.00	0.00	136.75	97.94	**294.62**	8,363	87,300	1	2,150,991
Briquette	10^4 t	0.00	0.00	0.00	2.63	0.00	0.00	**2.63**	20,908	87,300	1	48,005
Coke	10^4 t	0.00	1.08	0.06	0.09	0.00	0.00	**1.23**	28,435	95,700	1	33,471
Other Coke product	10^4 t	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	28,435	95,700	1	0
Subtotal												**393,900,403**
λ_{Coal}												**λ_{Coal} = 97.67%**
Crude Oil	10^4 t	0.00	0.10	0.00	0.00	0.00	0.00	**0.10**	41,816	71,100	1	2,973
Gasoline	10^4 t	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	43,070	67,500	1	0
Diesel	10^4 t	0.69	4.28	1.23	1.55	1.19	0.00	**8.94**	42,652	72,600	1	276,830
Fuel Oil	10^4 t	0.02	1.44	0.48	1.27	0.06	4.00	**7.27**	41,816	75,500	1	229,522
Other Petroleum product	10^4 t	0.00	0.00	0.29	0.00	0.00	0.00	**0.29**	41,816	72,200	1	8,755
Subtotal												**518,081**

λ_{Oil}												**λ_{Oil} = 0.13%**
Natural Gas	10^7 Nm^3	0.00	76.90	2.70	0.00	1.40	218.40	**299.4**	38,931	54,300	1	6,329,176
Coke Oven Gas	10^7 Nm^3	0.90	60.40	12.00	0.00	10.30	0.00	**83.6**	16,726	37,300	1	521,564
Other Gas	10^7 Nm^3	307.60	566.40	0.00	42.30	75.70	0.00	**992**	5,227	37,300	1	1,934,074
LPG	10^4 t	0.00	0.00	0.00	0.00	0.00	0.00	**0**	50,179	61,600	1	0
Refinery Gas	10^4 t	0.25	2.18	0.82	1.91	0.00	0.00	**5.16**	46,055	48,200	1	114,544
Subtotal												**8,899,358**
λ_{Gas}												**λ_{Gas} = 2.21%**
Total												**403,317,841**

The percentages of CO_2 emissions from the coal-fired, oil-fired and gas-fired power plants in total fuel-fired CO_2 emissions are calculated as:

λ_{Coal} = 97.67%， λ_{Oil} = 0.13%， λ_{Gas} =2.21%

Table 2 Installed Capacity of CCPG in 2009

Installed capacity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total
Thermal plant	MW	11,500	43,100	15,670	15,900	6,800	12,270	105,240
Hydropower plant	MW	3,770	3,650	30,010	11,460	4,530	25,810	79,230
Nuclear plant	MW	0	0	0	0	0	0	0
Wind plant and other	MW	60	50	10	2	10	0	132
Total	MW	15,330	46,800	45,690	27,362	11,340	38,080	184,602

Data Source: China Electric Power Yearbook 2010

Table 3 Installed Capacity of CCPG in 2008

Installed capacity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total
Thermal plant	MW	9,340	42,680	14,210	14,430	6,660	12,770	100,090
Hydropower plant	MW	3,710	3,020	29,050	10,650	4,060	22,240	72,730
Nuclear plant	MW	0	0	0	0	0	0	0
Wind plant and other	MW	30	30	10	0	0	0	70
Total	MW	13,080	45,730	43,270	25,080	10,720	35,010	172,890

Data Source: China Electric Power Yearbook 2009

Table 4 Installed Capacity of CCPG in 2007

Installed capacity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total
Thermal plant	MW	9,270	38,540	13,040	13,360	6,370	12,000	92,580
Hydropower plant	MW	3,570	2,740	24,020	9,220	2,240	19,860	61,650
Nuclear plant	MW	0	0	0	0	0	0	0
Wind plant and other	MW	0	0	10	17	24	0	51
Total	MW	12,840	41,280	37,070	22,597	8,634	31,860	154,281

Data Source: China Electric Power Yearbook 2008

Table 5 Building Emission Calculation of CCPG

	2007	2008	2009	New Capacity Additions from Year 2007-2009	New Capacity Additions from Year 2008-2009	Percentage to the newly installed capacity
	A	B	C	D= C-A	E= C-B	F
Thermal plant (MW)	92,580	100,090	105,240	20,280	10,467.5	**53.25%**
Hydropower plant (MW)	61,650	72,730	79,230	17,727	6,500	46.54%
Nuclear plant (MW)	0	0	0	0	0	0.00%
Wind plant & Others (MW)	51	70	132	81	62	0.21%
Total（MW）	154,281	172,890	184,602	38,088.3	17,029.5	100.00%
Percentage of newly added installed Capacity to 2009				20.63%	9.22%	

Table 6 Calculation parameter of BM

	Parameter	Efficiency of Power Supply	Emission Factor of Fuel (tc/TJ)	Oxidation Factor	Emission Factor (tCO_2e/MWh)
Coal-fired Power Plant	$EF_{Coal,Adv}$	39.45	87,300	100%	0.7967
Oil-fired Power Plant	$EF_{Oil,Adv}$	51.77	75,500	100%	0.5250
Gas-fired Power Plant	$EF_{Gas,Adv}$	51.77	54,300	100%	0.3776

λ_{Coal} = 97.67%， λ_{Oil} = 0.13%， λ_{Gas} = 2.21%

According to registered PDD, $EF_{Thermal,adv} = \lambda_{Coal} \times EF_{Coal.\ Adv} + \lambda_{Oil} \times EF_{Oil.Adv} + \lambda_{Gas} \times EF_{Gas.\ Adv}$

Thus, $EF_{thermal,adv}$ = 97.67% ×0.7967 + 0.13% ×0.5250 +2.21% ×0.3776 = 0.7871 tCO_2e/MWh

Then, $EF_{grid,BM,y}$ = 56.97% ×$EF_{Thermal,adv}$ =53.25% ×0.7871 = **0.4191** tCO_2e/MWh.