CLEAN DEVELOPMENT MECHANISM
PROGRAM ACTIVITY DESIGN DOCUMENT FORM (CDM-CPA-DD)
Version 01

CONTENTS

Annexes

NOTE:

(i) This form is for the submission of CPAs that apply a large scale methodology using provisions of the proposed PoA.

(ii) The coordinating/managing entity shall prepare a CDM Programme Activity Design Document (CDM-CPA-DD)[1,2] that is specified to the proposed PoA by using the provisions stated in the PoA DD. At the time of requesting registration the PoA DD must be accompanied by a CDM-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-CPA-DD (using a real case). After the first CPA, every CPA that is added over time to the PoA must submit a completed CDM-CPA-DD.

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[1] The latest version of the template form CDM-CPA-DD is available on the UNFCCC CDM web site in the reference/document section.

[2] At the time of requesting validation/registration, the coordinating managing entity is required to submit a completed CDM-POA-DD, the PoA specific CDM-CPA-DD, as well as one of such CDM-CPA-DD completed (using a real case).

SECTION A. General description of CDM programme activity (CPA)

A.1. Title of the CPA:

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Dafosi Coal Mine Ventilation Air Methane Power Generation Project (CPA-CVAM-1)

- Version: 01
- Date: 12/01/2011

Version	Date	Reason
Version: 01	12/01/2011	The first edition

A.2. Description of the CPA:

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Outline of the coal mine where the CPA is conducted

The CPA is operated by Shaanxi Binchang New Energy Co., Ltd. at Dafosi Coal Mine (Dafosi).

Binchang Co. has developed five coal mines including the Dafosi, Mengcun, Xiaozhuang, Hujiahe and Fenjiapo together attaining an annual production capacity of 50Mt. Dafosi has started production in January 2007 and will have an annual production capacity of 10Mt. Dafosi has been designated a gassy mine where ventilation is not enough to dilute the methane concentration of the airflow in the underground work area to levels below 0.75% as stipulated in the National Coal Mine Safety Regulation. Therefore, coal mine methane is also drained from the underground employing gas drainage system.

Option selected by the CPA for use of VAM

The Dafosi Coal Mine Ventilation Air Methane Power Generation Project (the CPA) will install VAM oxidizers manufactured by Shengli Oilfield Shengli Engine Machinery Group Co., Ltd. to destroy VAM and involve following options:

(i) Total number of oxidizers: 10 units

- Oxidizers for only oxidizing: 0 units
- Oxidizers for power generation: 5 units, capacity of steam turbine generator: 4 MW (The 1st phase)
- Oxidizers for heat generation: 5 units, capacity of hot water generation: 25.8 t/hr (95 ºC) (The 2nd phase)

(ii) CMM enrich VAM up to 1% only for power generation.

In the CPA, as the methane concentration in the VAM (normally 0.3 %) is considered to be low to ensure a reliable performance of VAM oxidizers, CMM of less than 8 % methane concentration would be added to the VAM stream. This could increase the methane concentration in the VAM up to 1.0 %. As any CMM added would be otherwise vented into the atmosphere, the addition to the VAM would not affect the performance of the existing CDM project and the CPA itself.

Special background of the CPA, if any

As methane concentration of VAM is very low (below 1.0 %), it is difficult to utilize VAM technically and economically. Therefore, all VAM has been emitted in the atmosphere in the business-as-usual (BAU) activity and the baseline scenario of the project. Current and prospective situation of methane gas emission from CMM and VAM, including volume of CMM utilization, is presented in Figure-1. CMM makes up approximately 70% of gas emissions, of which approximately 20% is used for power generation under the existing CDM project and the remainder is released into the atmosphere.

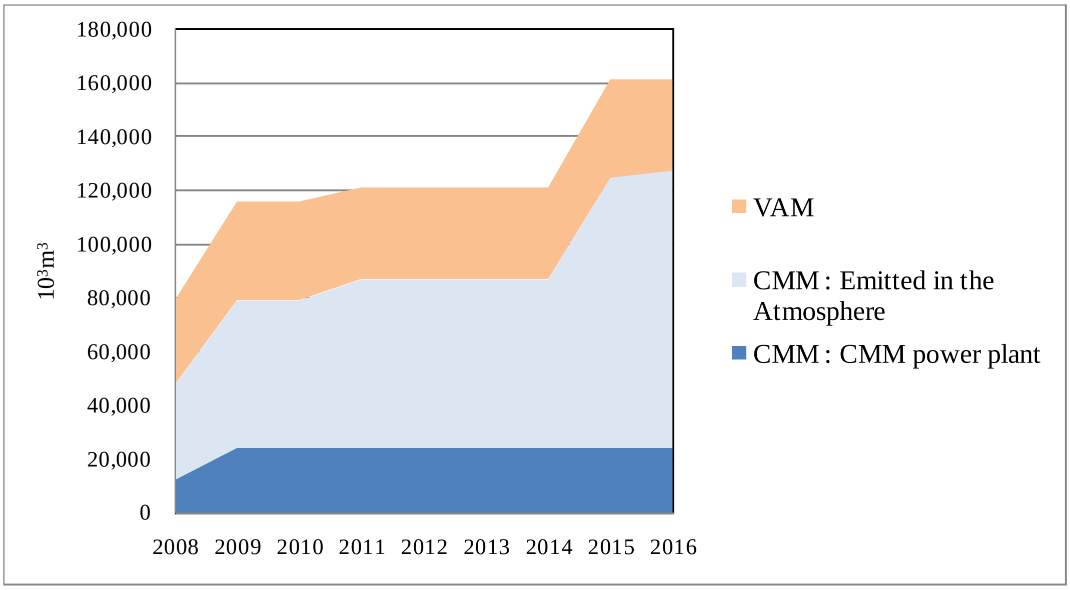

Figure-1 Volume of CMM/VAM at Dafosi

Before the initiation of the CPA, a part of CMM captured from Dafosi has been utilized for power generation with twenty-four 0.5 MW CMM power generation units at the CMM power plant. The CMM captured marked a low methane concentration of around 13 %, and thus a low concentration CMM power generation system have been installed. This activity has been promoted under the other CDM project which has been registered by the CDM Executive Board on 28 October 2009[3]. The registered CDM project has never use VAM, because the methane concentration of VAM is too low to use by the gas engine introduced of the CDM project.

CMM have been extracted through five routes from the underground at Dafosi. Further more, additional three CMM extraction lines have been under construction. Table-1 shows typical methane concentration and flow rate of each CMM extraction line in April 2010 (the values for #6, #7 and #8 are estimated by Dafosi). Although the CMM of more than 8 % methane concentration have been utilized for CMM power plant, it would be difficult to utilize CMM of less than 8 % methane concentration due to the lower limitation of CMM gas engine. Therefore, the CMM of less than 8 % methane concentration have been released even after the start of CMM power plant project.

[3] Project No.2428: http://cdm.unfccc.int/Projects/DB/TUEV-SUED1236267273.45/view

Table-1 Methane concentration and flow rate of each CMM extraction Line in April 2010

CMM Drainage Line	Gas Drainage Volume		Methane Consentration	Gas Drainage Volume (Pure Methane)	
	(Nm^3/min)	(Nm^3/h)	(%)	(Nm^3/min)	(Nm^3/h)
1#	189	11,340	0.80%	1.5	91
2#	167	10,020	2.20%	3.7	220
3#	233	13,980	13.20%	30.8	1,846
4#	294	17,640	13.50%	39.7	2,381
5#	201	12,060	4.30%	8.6	518
sub-total	1,084	65,040		84.3	5,056
6#	130~180	7,800~10,800	3~5%	3.9~9	234~540
7#	130~180	7,800~10,800	3~8%	3.9~14.4	234~864
8#	150~200	9,000~12,000	5~10%	7.5~20	450~1,200
Sub-total	410~560	4,600~33,600		15.3~43.4	918~2,604
Total CH4 > 8%	527	31,620		70.5	4,227
Total CH4 < 8%	967~1,117	8,020~67,020		29.1~57.2	1,746~3,432

*Drainage lines of 6#, 7# and 8# are under construction and their values are estimated by the mine.

Target of the CPA, VAM oxidization, power generation and reduction of GHG

When the CPA is fully operated, 600,000 Nm^3/hour of VAM (including CMM added) is oxidized by ten VAM oxidizers. CMM below 8% methane concentration is also destroyed by adding to enrich VAM stream up to 1% methane concentration in order to increase the efficiency of heat energy recovery for generating superheated steam to generate electricity with a 4MW steam turbine generator. Another five VAM oxidizers will destroy only methane contained in VAM, normally 0.3 % of methane concentration to produce hot water for mine use. Thus 543,000 Nm^3/hour of VAM (0.3% CH_4) and 56,800 Nm^3/hour of CMM (4 % CH_4) equal to 31,200,000 Nm^3/yr of pure methane, will be oxidized in ten VAM oxidizers to produce heat energy for generating 32,000 MWh/y of electricity and hot water.

The CPA will reduce greenhouse gas emission by destroying methane, 21 times more potent a greenhouse gas than CO_2, by oxidation in the VAM oxidizers and replacement of electric power from the NWPG. 325,367 tCO_2e/y of emission reductions are projected for fiscal year 2012, and 413,220 tCO_2e/y, for fiscal year 2013 to 2021, thus resulting in 4,044,337 tCO_2e of emission reductions during the ten years from January 2012 through December 2021.

Time schedule of the CPA

The time schedule of the CPA is as follows:

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Items	Date	Evidence

1st Feasibility study by Shandong Sheng Dong Gas Power Engineering Design & Consulting Co., Ltd	December 2007	1st Project FSR
Environment Impact Assessment (EIA) report made by Academy of General Electronics Research of the Ministry of Information Industry	November 2008	Project EIA Report
Project approval by Development and Reform Commission of Xianyang City	November 18, 2008	Xianyang DRC document [2008] No.637
EIA approval by Environmental Protection Bureau of Xianyang City	December 11, 2008	EIA approval by Environmental Protection Bureau of Xianyang City document [2008] No.360
2nd Feasibility study by Shandong Sheng Dong Gas Power Engineering Design & Consulting Co., Ltd	September 2010	2nd Project FSR
Groundbreaking of 1st stage of the project, five VAM oxidizers and a 4MW steam turbine power generator	Feb 2011	Planned
Start of operation of five VAM oxidizers and a 4MW steam turbine power generator	July 2011	Planned
Groundbreaking of 2nd stage of the project, five VAM oxidizers	Jan 2012	Planned
Start of operation of additional five VAM oxidizers	Jun 2012	Planned

A.3. Entity/individual responsible for CPA:

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The CPA operator is Shaanxi Binchang New Energy Co., Ltd.

A.4. Technical description of the CPA:

A.4.1. Identification of the CPA:

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A.4.1.1. Host Party:

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People's Republic of China

A.4.1.2. Geographic reference of other means of identification allowing the unique identification of the CPA (maximum one page):

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Dafosi Coal Mine locates in Binxian County, Shaanxi Province, located in the center of China. Its capital city, Xian, is situated almost in the center of the province. The VAM oxidizing plant will be built at Dafosi mining leasing area in Binxian County, at latitude 35°03′47” north and longitude 107°57′35” east, located to the northwest of Xianyang City, 140 km from Xian City.

Figure-2 Location of the project site

The contact details of the CPA operator are as follows:

Name of the CPA operator	Shaanxi Binchang New Energy Co., Ltd.
Address	Bin County
e-mail	tianzhenlin11@163.com
TEL	86-29-33277668
FAX	86-29-33277668

A.4.2. Duration of the CPA:

A.4.2.1. Starting date of the CPA:

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15/02/2011

The starting date marks the date at which construction work of VAM oxidizing plant under the CPA will start or has started.

A.4.2.2. Expected operational lifetime of the CPA:

>>
18 years

A.4.3. Choice of the crediting period and related information:

Fixed Crediting period

A.4.3.1. Starting date of the crediting period:

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1st of January 2012 or the date of inclusion of the CPA to the PoA, whichever is later.

A.4.3.2. Length of the crediting period, first crediting period if the choice is renewable CP:

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10 years

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

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The annual estimation of emission reductions is calculated based on the equations listed in the CDM-POA-DD of the China Coal Mine Ventilation Air Methane Oxidization Programme.

The annual estimation of emission reductions are 404,435 tCO2e. Over the chosen crediting period of 10 years, the total emission reductions are therefore expected to amount to 4,044,337 tCO2e.

A breakdown of estimated annual CERs is given in Table-2

Table-2 Estimated annual CERs from the CPA

Year	Annual estimation of emission reductions (tCO_2e)
2012	325,367
2013	413,220
2014	413,220
2015	413,220
2016	413,220
2017	413,220
2018	413,220

2019	413,220
2020	413,220
2021	413,220
Total emission reductions (tCO_2e)	4,044,337
Total number of crediting years	10
Annual average over the crediting years of estimated reductions (tCO_2e)	404,334

A.4.5. Public funding of the CPA:

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No public funding from Parties included in Annex I countries is involved.

A.4.6. Confirmation that CPA is neither registered as an individual CDM project activity nor is part of another Registered PoA:

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In order to avoid double accounting and to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA, the implementing entity of a CPA has, in accordance with the eligibility criteria stipulated in section A.4.2.2 of the CDM-PoA-DD, confirmed with a written statement that:

(i) The CPA and all VAM oxidizing system to be installed under the CPA have not been and will not be registered as a single CDM project activity nor as a CPA under another PoA.

(ii) The implementing entity is aware that the CPA will be subscribed to the present PoA.

SECTION B. Eligibility of CPA and Estimation of emissions reductions

B.1. Title and reference of the Registered PoA to which CPA is added:

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China Coal Mine Ventilation Air Methane Oxidization Programme (Ref. No.:)

B.2. Justification of the why the CPA is eligible to be included in the Registered PoA :

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The proposed CPA complies with all of the eligibility criteria that are described in A.4.2.2. of CDM-PoA-DD. The justifications are given as follows:

1) *The geographic boundary of a CPA lies within China;*

The geographic boundary of the CPA includes Dafosi coal mine, main fan and extraction station of the mine, VAM oxidizing plant and related apparatus, and the Grid (North West Power Grid). As all components of the boundary locates in Shaanxi Province, hence, the geographical boundary of the CPA lies within the geographical boundary of the proposed PoA.

2) *A CPA reduces GHG emission by destroying methane contained in VAM emitted from underground coal mines, which otherwise have been released in the atmosphere. And a CPA adopts one of following three options or combination of them for use of recovered heat energy:*
   - *(i) to release the thermal energy;*
   - *(ii) to use the thermal energy for heating;*
   - *(iii) to use the thermal energy to produce high temperature steam in order to generate electricity with steam turbine generators (with capacity below 10MW);*

The CPA introduces ten VAM oxidizers to destroy methane contained in VAM, which otherwise have been released in the atmosphere. The CPA adopts combination of option (ii) with 5 oxidizers to produce hot water for heating and (iii) with 5 oxidizers and a steam turbine generator (4MW).

3) *An existing Approved CDM Methodology ACM0008 (Version 07) is applicable to a CPA;*

ACM0008 defines the applicability of this methodology. The following Table-3 and Table-4 explain the reason why the methodology applies to the CPA:

Table-3 Comparison of extraction components of the CPA with applicability of ACM0008

ACM0008 Applicability	Extraction Components of a CPA
Surface drainage boreholes to capture CBM associated with mining activities	The project activity does not involve the extraction of CBM.
Underground boreholes in the mine to capture pre mining CMM	Included
Surface goaf wells, underground boreholes, gas drainage galleries or other goaf gas capture techniques, including gas from sealed areas, to	Underground boreholes, gas drainage galleries and some other goaf gas capture techniques are adopted to capture the post mining CMM.

capture post mining CMM	
Ventilation air methane that would normally vented	Included

Table-4 Comparison of the utilization components of the CPA with applicability of ACM0008

ACM0008 Applicability	Utilization Components of a CPA
The methane is captured and destroyed through flaring	No flaring is involved in the project
The methane is captured and destroyed through flameless oxidation with or without utilization of the thermal energy	The methane is destroyed by flameless oxidizers with utilization of the thermal energy.
The methane is captured and destroyed through utilization to produce electricity, motive power and/or thermal energy; emission reductions may or may not be claimed for displacing or avoiding energy from other sources	The methane is captured and destroyed through utilization to produce electricity and thermal energy; emission reduction only for displacing electricity from the Grid is claimed.
The remaining share of the methane, to be diluted for safety reason, may still be vented	Part of CMM/VAM is still vented in the project.
All the CBM or CMM captured by the project should either be used or destroyed, and cannot be vented	All of the VAM captured by the project should either be used or destroyed, and cannot be vented.

ACM0008 also define the types of activities that could not be applied to this methodology. The CPA does not apply to any of those activities (Table-5):

Table-5 Comparison of the CPA with incompatibility of ACM0008

ACM0008 Inapplicability	CPA
Capture methane from abandoned/decommissioned coal mines	The project is implemented in a working underground coal mine
Capture/use of virgin coal-bed methane, e.g. methane of high quality extracted from coal seams independently of any mining activities	All of methane captured/used in the project is dependent with mining activity
Use CO_2 or any other fluid/gas to enhance CBM drainage before mining takes place	No CBM extraction is involved in the project

It can be concluded from the above analysis that the Approved CDM Methodology ACM0008 (Version 07) is applicable to the CPA.

4) *A CPA implementer/operator confirms in a written statement that:*
   - *(i) All VAM oxidizing system to be newly installed under the CPA is not and will not be part of another CDM project or PoA;*
   - *(ii) They are aware and agree with the inclusion of the CPA to the proposed PoA.*

The CPA operator already submitted the written statements for above confirmation.

5) *Destroying methane is carried out by flameless VAM oxidizer developed by Shengli Oilfield Shengli Engine Machinery Group Co., Ltd. Major specification of the VAM oxidizer are presented in the Table-1 of A.4.2.1;*

The CPA will introduce flameless VAM oxidizers developed by Shengli Oilfield Shengli Engine Machinery Group Co., Ltd..

6) *CBM option for methane gas extraction through surface well is not included;*

CBM option is not included in the CPA.

7) *For the purpose of determining project emissions, a CPA should meet following requirements:*
   (i) *A CPA does not include the combustion of methane in a flare, engine, power plant or heat generation plant;*

The CPA includes destruction methane with VAM oxidizers, not include the combustion of methane in a flare, engine, power plant or heat generation plant;

   (ii) *A CPA does not consume any fuels such as oil and gas to operate VAM oxidizing system except electric power;*

The CPA consumes only additional electricity to operate draught fan, pre-heater of the VAM oxidizers and steam turbine generator.

8) *For the purpose of determining baseline emissions, a CPA should meet following requirements:*
   (i) *In the baseline scenario, all of VAM are released into the atmosphere without destruction and utilization;*

All VAM are released into the atmosphere without destruction and utilization in the baseline, because very low (below 0.75%) methane concentration of VAM is break in on destruction and utilization without special developed apparatus for oxidizing VAM, such as flameless VAM oxidizer.

   (ii) *If low methane concentration CMM is added to VAM, methane concentration of the CMM is below 30%, which would otherwise be released into the atmosphere without utilization/destruction, and have no regal requirement to utilize/destruct and prohibited matter for releasing in the atmosphere;*

Methane concentration of the CMM added to VAM is below 8%. The CMM cannot be used for low methane concentration CMM power generation, because the lower methane concentration limit of generation system is 8%. Thus the CMM would otherwise be released into the atmosphere.

   (iii) *If low methane concentration CMM power generation have been carried out, the CMM power generation is included another CDM project activity*[4]*;*

[4] Even if the low methane concentration CMM added to VAM would otherwise be used for CDM project of CMM power generation, CER calculated for adding VAM is more conservative, because the efficiency to generate

Low methane concentration CMM power generation has been carried out under the CDM project (Ref. No. 2428)[5]

9) *The spatial extent of the project boundary comprises followings;*
   (i) *All equipment used as part of a CPA for the extraction of CMM at extraction station and VAM at ventilation shaft, such as Blower and Ventilation fan, have been installed before the project would start, and no equipment for compression, storage and transportation to an off-site user would be installed;*

It is required for coal mines that methane concentration in the exhaust air of the mine to be below 0.75% to avoid the risk of explosion (National Coalmine Safety Regulation 2005 version, Section Two item 135). The absolute gas emission rate at Dafosi is projected to be over 220m^3/min of pure methane, as indicated in Table A-1 of Annex 3. At present, solely adopting ventilation in Dafosi could not satisfy the 0.75% requirement. Item 145 of the National Coalmine Safety Regulation requires methane to be extracted at gas drainage station built above ground when the flow rate is equivalent of or exceeds 40m^3/min. Therefore, all equipments for the extraction of CMM at extraction station and VAM at ventilation shaft, such as blower and ventilation fan, have been installed before the project would start.

Methane concentration of VAM is limited below 0.75% as described above. Since the VAM has no value for offsite users, thus no equipment for compression, storage and transportation to supply VAM to off-site users are installed.

   (ii) *Draught fans are installed between the ventilation fan and VAM oxidizers, and will be included in a CPA boundary;*

The installation of draught fans is requested as whole system design of VAM oxidizers. These fans are included in the CPA boundary.

   (iii) *In the case of adding low methane concentration (below 30%) CMM to VAM, safety CMM transport system approved as Safety Production Technology Standards (AQ 1076-2009 and AQ 1078-2009) is included in a CPA boundary;*

Under the CPA, CMM below 8% methane concentration is added to VAM. The installation of safety CMM transport system approved as Safety Production Technology Standards (AQ 1076-2009 and AQ 1078-2009) is required by National Coal Mining Regulations[6]. The system is included in the CPA boundary.

   (iv) *A CPA does not introduce flaring, captive power and heat generation facilities. VAM oxidizer is used as the major part of the project activity;*

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electricity of oxidizer and steam turbine generator is lower than that of gas engine and generator for low concentration CMM. That is, although project emissions from destroying methane is same, baseline emissions from power generation replaced by CMM power generation is more than that by VAM oxidization.

[5] CDM Project Reference No. 2428: http://cdm.unfccc.int/Projects/DB/TUEV-SUED1236267273.45/view

[6] National Coalmine Safety Regulation (03/2010) , item 148 (Revised)

As methane concentration of VAM is limited below 0.75% by National Coal Mining Regulations. It is difficult to use for flaring VAM and to combust VAM for captive power and heating. The CPA installs only VAM oxidizers to destroy methane contained in VAM and recover heat energy.

(v) The grid is included in a CPA boundary;

The CPA consumes additional electricity for draught fans and heating up the VAM oxidizers, which supplied by the grid, NWPG. The CPA contains an option of power generation for supplying power to Dafosi, and then the power replaces the electricity supplied from the grid, NWPG. Therefore the grid is included in the CPA boundary.

10) A CPA meets following criteria for assessing additionality:

(i) The FIRR of the CPA is calculated based on updated input parameters and assumptions and the method provided in section E.5.1;

The FIRR of the CPA is calculated according to E.5.1 of CDM-POA-DD, based on updated input parameters and assumptions as shown in the Table-6.

Table-6 Key parameters and assumptions for project investment analysis

Item	Value		Source
Volume of Oxidized VAM	10,000	Nm^3/min	FS Report
Methane Concentration of VAM	0.3 & 1.0	%	FS Report
Annual VAM Consumption (Pure Methane)	31.2	Million Nm^3/year	FS Report
Number of VAM Oxidizes	10	units	FS Report
Fixed Assets Cost	91.38	Million RMB	FS Report
O& M Costs (average)	5.72	Million RMB/year	FS Report
Power Generation Amount	31.89	GWh/year	FS Report
Additional Power Consumption	9,58	GWh/year	FS Report
Power Unit Price (without VAT)	0.5	RMB/kWh	FS Report
Power Cost for additional Use (without VAT from the Grid)	0.5	RMB/kWh	FS Report
Project Lifetime	19	years	FS Report
Income Tax Rate	25	%	Enterprise Income Tax Law
VAT	17	%	FS Report

City Maintenance and construction tax rate	5 %	FS Report
Education additive charge rate	3 %	FS Report
FIRR (benchmark after tax)	12 %	Economic Evaluation Method and Parameter of Construction Projects

(ii) The FIRR benchmark, 15 % (after tax) requirement under NDRC's investment approval criteria for coal mine sectors should be applied to estimate the financial at activity of the CPA under the proposed PoA;

The FIRR benchmark, 15% *(after tax) requirement under NDRC's investment approval criteria for coal mine sectors* is applied to the CPA.

(iii) The financial additionality is demonstrated by showing that the calculated FIRR (excluding CDM) is below the applied investment benchmark after carrying out sensitivity analysis.

The result of the FIRR calculation is presented in Table-7. Detail data of FIRR calculation is disclosed to the DOE during the validation process.

The FIRR (after tax) without CER revenues was -1.54 %, falling much less than the 15 % (after tax) requirement under NDRC's investment approval criteria for coal mine sectors. Thus the proposed project activity is considered to be not financially attractive at all without CER revenues. On the other hand, the FIRR with CER revenues was 27.90 %, satisfying the 15 % hurdle rate under the NDRC's investment approval criteria.

A sensitivity analysis was also carried out according to E.5.1 of the CDM-POA-DD. The result shows that FIRR were minus or it was difficult to analyse FIRR of the project without CER revenue (Table-8).

It can therefore be concluded that the proposed project activity is not financially attractive at all in the absence of the CDM.

Table-7 Results of investment analysis

Project FIRR without CER revenues	-1.54 %
Project FIRR with CER revenues	27.90 %

Table-8 Result of sensitivity analysis

Parameters	20 %	10 %	0	-10 %	-20 %
Capital Expenditure	-3.24%	-2.44%	-1.54%	-0.48%	0.77%
Operating Cost	-4.41%	-2.91%	-1.54%	-0.27%	0.92%

Power Sales Price	3.14%	0.93%	-1.54%	-4.39%	-
Power Sales Amount	3.14%	0.93%	-1.54%	-4.39%	-

B.3. Assessment and demonstration of additionality of the CPA, as per eligibility criteria listed in the Registered PoA:

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Key criteria listed in E.5.2. of the CDM-POA-DD for assessing additionality of a CPA are as follows:

Criteria related to the investment analysis

To demonstrate that a CPA under the proposed PoA is financially not attractive, the following three steps should be checked upon inclusion the CPA to the proposed PoA:

(i) The FIRR of the CPA is calculated based on updated input parameters and assumptions and the method provided in section E.5.1;
(ii) The FIRR benchmark, 15% (after tax) requirement under NDRC's investment approval criteria for coal mine sectors should be applied to the CPA under the proposed PoA in the CPA-DD;
(iii) The financial additionality is demonstrated by showing that the calculated FIRR (excluding CDM) is below the applied investment benchmark after carrying out sensitivity analysis.

These criteria are satisfied during the justification of the why the CPA is eligible to be included in the Registered PoA, for 10th eligibility criterion, in B.2. The CPA is therefore regarded as not financially attractive.

Criteria related to the common practice analysis

There is only one criteria related the common practice analysis. That is, a CPA under the proposed PoA introduce VAM oxidizer developed by Shengli Oilfield Shengli Engine Machinery Group Co., Ltd., which is included in the eligibility for inclusion of a CPA in the proposed PoA.

This is related to 5th eligibility criterion. If the CPA satisfied this criterion, it would be concluded that similar activity cannot observed in China except CPAs under the proposed PoA, as described in Step-4, E.5.1. of the CDM-POA-DD.

Therefore, it is demonstrated that the CPA under the proposed PoA is additional.

B.4. Description of the sources and gases included in the project boundary and proof that the CPA is located within the geographical boundary of the registered PoA.

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The boundary of the CPA includes the coal mine, main fan and extraction station of the mine, VAM oxidizing plant and related apparatus, and the Grid (NWPG). In Table-9 below, all sources of the baseline and the project activity are listed.

Based on the conditions required in the methodology, the project boundary for this project activity is presented in Figure-3, and the overview on emissions sources including in or excluded from the project boundary is presented in Table-9.

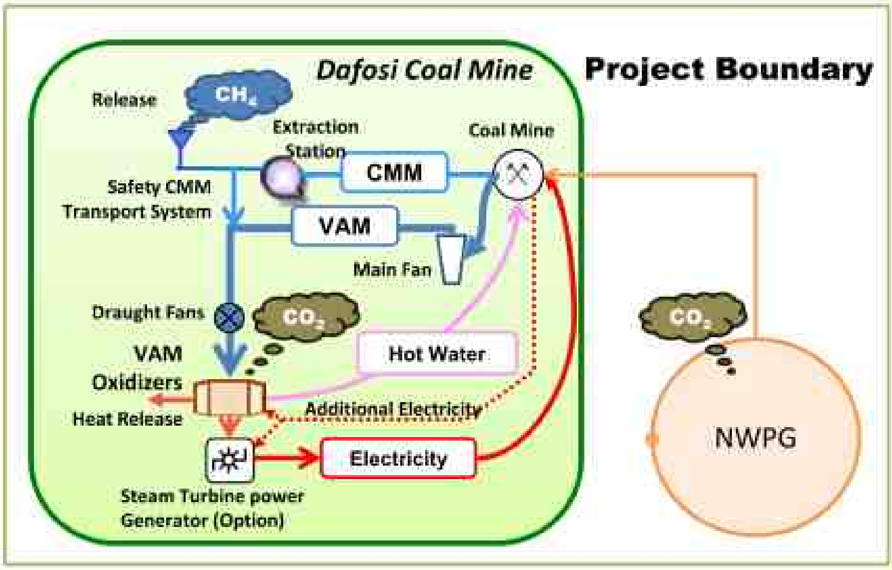

Figure-3 Project boundary of the CPA

Table-9 Overview on emissions sources included in or excluded from the project boundary

	Source	Gas	Included?	Justification / Explanation
Baseline Emissions	Emissions of methane as a result of venting	CH_4	Included	All of captured methane in the base line scenario is vented. This is the main emission source.
	Emissions from destruction of methane in the baseline	CO_2	Excluded	None of methane is destroyed in the baseline.
		CH_4	Excluded	None of methane is destroyed in the baseline.
		N_2O	Excluded	None of methane is destroyed in the baseline.
	Grid electricity generation (electricity provided to the grid)	CO_2	Included	Only emissions from NWPG equivalent to electricity generated by the project activity.
		CH_4	Excluded	According to ACM008.
		N_2O	Excluded	According to ACM0008.
	Captive power and/or heat, and vehicle fuel use	CO_2	Excluded	The heat generation would be introduced in the CPA, the CERs from displacement by steam or hot water recovered from VAM oxidizer will not be claimed.
		CH_4	Excluded	According to ACM0008.
		N_2O	Excluded	According to ACM0008.

Project Emissions	Emissions of methane as a result of continued venting	CH_4	Excluded	Only the change in VAM emissions release will be taken into account, by monitoring the methane destroyed by the project activity.
	On-site fuel consumption due to the project activity, including transport of the gas.	CO_2	Included	Only emissions due to the additional consumption of electricity from the Grid.
		CH_4	Excluded	According to ACM0008.
		N_2O	Excluded	According to ACM0008.
	Emission from methane destruction	CO_2	Included	Methane oxidized by VAM oxidizers.
	Emissions from NMHC destruction	CO_2	Exclude	In the CPA, NMHC accounts for less than 0.01% by volume of VAM (See Annex 3).
	Fugitive Emissions of unburned methane	CH_4	Included	Small amounts of methane will remain in the exhaust of VAM oxidizers.
	Fugitive methane emissions from on-site equipments	CH_4	Excluded	According to ACM0008
	Fugitive methane emissions from gas supply pipeline or in relation to use in vehicles	CH_4	Excluded	According to ACM0008
	Accidental methane release	CH_4	Excluded	According to ACM0008

The geographical boundary of the proposed PoA includes China. The geographical site of the CPA is located in Shaanxi Province as indicated in Figure 2, A.4.1.2., thus the CPA is located within the geographical boundary of the proposed PoA.

B.5. Emission reductions:

B.5.1. Data and parameters that are available at validation:

Data and parameters that are to be reported in CDM-CPA-DD are defined in the CDM-POA-DD as follows;

Data / Parameter:	$D_{CH4, corr, inflow}$
Data unit:	kg/Nm^3
Description:	Density of methane entering the flameless oxidation unit corrected for pressure and temperature.
Source of data used:	Calculated
Value applied:	0.714
Justification of the choice of data or	Under standard conditions, 1 mol of CH_4 (=16 g) is 22.4L. Hence the mass of 1Nm3 of CH_4 is 0.714kg under 0 degrees centigrade.

description of measurement methods and procedures actually applied :	
Any comment:	-

Data / Parameter:	$D_{CH4, corr, exh}$
Data unit:	kg/Nm^3
Description:	Density of methane in the exhaust gases corrected for pressure and temperature.
Source of data used:	Calculated
Value applied:	0.714
Justification of the choice of data or description of measurement methods and procedures actually applied :	Under standard conditions, 1 mol of CH_4 (=16 g) is 22.4L. Hence the mass of 1Nm3 of CH_4 is 0.714kg under 0 degrees centigrade.
Any comment:	-

Data / Parameter:	CEF_{CH4}
Data unit:	tCO_2e/tCH_4
Description:	Carbon emission factor for combusted methane
Source of data used:	ACM0008 default value
Value applied:	2.75
Justification of the choice of data or description of measurement methods and procedures actually applied :	ACM0008 / Version 07
Any comment:	-

Data / Parameter:	GWP_{CH4}
Data unit:	tCO_2e/tCH_4
Description:	Global warming potential of methane
Source of data used:	ACM0008 default value
Value applied:	21
Justification of the choice of data or description of measurement methods and procedures actually applied :	ACM0008 / Version 07
Any comment:	-

Data / Parameter:	$EF_{OM,y}$
Data unit:	tCO_2e/MWh
Description:	Operating margin emission factor of the North West China Power Grid
Source of data used:	"The Clarification of Determining Baseline Emission Factor for China Regional Grid" by NCCC
Value applied:	0.9947
Justification of the choice of data or description of measurement methods and procedures actually applied :	China Official Data of *National Bureau of Statistics of China* and *National Development and Reform Commission*
Any comment:	-

Data / Parameter:	$EF_{BM,y}$
Data unit:	tCO_2e/MWh
Description:	Build margin emission factor of the North West China Power Grid
Source of data used:	"The Clarification of Determining Baseline Emission Factor for China Regional Grid" by NCCC
Value applied:	0.6878
Justification of the choice of data or description of measurement methods and procedures actually applied :	China Official Data of *National Bureau of Statistics of China* and *National Development and Reform Commission*
Any comment:	-

Data / Parameter:	$EF_{grid,CM,y}$
Data unit:	tCO_2/MWh
Description:	Combined margin CO_2 emission factor for grid connected power generation in year *y*
Source of data used:	The calculation was conducted based on data calculated by the Office of National Coordination Committee on Climate Change.
Value applied:	0.8413
Justification of the choice of data or description of measurement methods and procedures actually applied :	China Official Data of *National Bureau of Statistics of China* and *National Development and Reform Commission*
Any comment:	-

Data / Parameter:	CEF_{ELEC}
Data unit:	tCO_2/MWh

Description:	CO_2 emission factor of the electricity used by coal mine
Source of data used:	The calculation was conducted based on data calculated by the Office of National Coordination Committee on Climate Change.
Value applied:	0.8413
Justification of the choice of data or description of measurement methods and procedures actually applied :	China Official Data of *National Bureau of Statistics of China* and *National Development and Reform Commission*
Any comment:	

Data / Parameter:	EF_{ELEC}
Data unit:	tCO_2/MWh
Description:	CO_2 baseline emission factor for the electricity displaced due to the project activity during the year *y*.
Source of data used:	The calculation was conducted based on data calculated by the Office of National Coordination Committee on Climate Change.
Value applied:	0.8413
Justification of the choice of data or description of measurement methods and procedures actually applied :	China Official Data of *National Bureau of Statistics of China* and *National Development and Reform Commission*
Any comment:	

Data / Parameter:	EG_y
Data unit:	MWh
Description:	Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost / must-run power plants / units, in year *y*
Source of data used:	China Electric Power Yearbook 2007,2008 and 2009
Value applied:	Please refer to annex 3.
Justification of the choice of data or description of measurement methods and procedures actually applied :	China Official Data of *National Bureau of Statistics of China* and *National Development and Reform Commission*
Any comment:	-

Data / Parameter:	$EF_{CO2i,y}$ / $COEF_{i, j, y}$
Data unit:	kgC/GJ / tCO_2/mass
Description:	CO_2 emission factor of fossil fuel type *i* in year *y*
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories” Volume2

	Energy, CHAPTER 1 P1.21 ,Table 1-3 and P1.23 ,Table 1-4
Value applied:	Please refer to annex 3.
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC's official data.
Any comment:	-

Data / Parameter:	$FC_{i,y}$ / $F_{i, j, y}$
Data unit:	mass or volume unit
Description:	Amount of fossil fuel type *i* consumed in the project electricity system in year *y*
Source of data used:	China Energy Statistical Yearbook 2007,2008 and 2009
Value applied:	Please refer to annex 3.
Justification of the choice of data or description of measurement methods and procedures actually applied :	China Official Data of *National Bureau of Statistics of China* and *National Development and Reform Commission*
Any comment:	-

Data / Parameter:	$NCV_{i,y}$
Data unit:	kJ/kg
Description:	Net calorific value (energy content) of fossil fuel type *i* in year *y*
Source of data used:	China Energy Statistical Yearbook, 2009
Value applied:	Please refer to annex 3.
Justification of the choice of data or description of measurement methods and procedures actually applied :	China Official Data of *National Bureau of Statistics of China* and *National Development and Reform Commission*
Any comment:	-

B.5.2. Ex-ante calculation of emission reductions:

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In this section, only the input values will be applied and the result calculated. For a detailed description of the calculation methods, see section E.6. 2. of CDM-PoA-DD.

The projected electricity generation and additional power consumption with VAM oxidizers and associate equipments are provided in Table-10. Methane consumption at the VAM oxidizing plant is also presented in the table.

Table-10 Power generation and additional power consumption with VAM oxidizers and associate equipments

Year	VAM Oxidizes	Steam Turbine Power Generators		Electricity Generation	Additional Power Consumption	Methane Consumption (CH_4 100%)
		Units of Generator	Installed Capacity			
	Units	Units	MW	MWh	MWh	10^3Nm^3
2012	5	1	4	32,000	5,830	24,000
2013	10	1	4	32,000	9,578	31,200
2014	10	1	4	32,000	9,578	31,200
2015	10	1	4	32,000	9,578	31,200
2016	10	1	4	32,000	9,578	31,200
2017	10	1	4	32,000	9,578	31,200
2018	10	1	4	32,000	9,578	31,200
2019	10	1	4	32,000	9,578	31,200
2020	10	1	4	32,000	9,578	31,200
2021	10	1	4	32,000	9,578	31,200
Total				320,000	92,029	304,800

1) Project Emissions

Project emissions are defined by the following equation

$PE_y = PE_{ME} + PE_{MD} + PE_{UM}$ **(E-1)**

where:

PE_y	Project emissions in year y (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)

Carbon emission factor of electricity used by the VAM oxidizing plant (CEF_{ELEC}) is calculated by the formulae presented in "The chapter of base line methodology procedure of Tool to calculate the emission factor for an electricity system (Version 02)" as follows;

BASELINE METHODOLOGY PROCEDURE of "the Tool to calculate emission factor for electricity systems (Version 02)"

STEP 1. Identify the relevant electricity system.
STEP 2. Choose whether to include off-grid power plants in the project electricity system (optional).
STEP 3. Select a method to determine operating margin (OM).
STEP 4. Calculate the operating margin emission factor according to the selected method.
STEP 5. Identify the group of power units to be included in the build margin (BM).
STEP 6. Calculate the build margin emission factor.
STEP 7. Calculate the combined margin (CM) emissions factor.

Step 1. Identify the relevant electric power system

According to the "Tool to calculate the emission factor for an electricity system", the data published by the DNA of China is selected. Therefore, in accordance to the most recent date published by DNA of China available at the time of submission of the CDM-CPA-DD to the DOE for validation, North West Power Grid (NWPG) is identified as the electricity system, from which would provide electricity in the baseline scenario. The spatial extent of the NWPG comprises all the power plants connected physically to it, which covers Shaanxi Province, Gansu Province, Qinghai Province, Ningxia Hui Autnomous Region, Xinjiang Uygur Autonomous Region. Therefore, the value for NWPG shall be employed as CEF_{ELEC} in the CPA.

Step 2. Choose whether to include off-grid power plants in the project electricity system (optional).

Option I is chosen**:** Only grid power plants are included in the calculation.

Step 3. Select a method to determine operating margin (OM)

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods:

(a) Simple OM, or
(b) Simple adjusted OM, or
(c) Dispatch data analysis OM, or
(d) Average OM.

Any of the four methods can be used, however, the simple OM method (option a) can only be used if low-cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production. Among the total electricity generations of the NWPG which the CPA is connected into, the amount of low-cost/must run resources accounts for about 21.21% in 2004, 25.36% in 2005, 24.71% in 2006, 23.15% in 2007 and 21.86% in 2008[7], all less than 50%. Thus, the method (a) Simple OM can be used to calculate the baseline emission factor of operating margin ($EF_{OM,y}$) for the CPA.

[7] China Electric Power Yearbook, 2005-2010 editions

For the simple OM, the emissions factor is selected to be calculated using either of the data vintages between any of: Ex ante option or Ex post. Ex ante option is selected for this CPA-DD, which is a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-CPA-DD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period.

Step 4. Calculate the operating margin emission factor according to the selected method

In accordance with the "Tool to calculate the emission factor for an electricity system" , the simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants / units. It may be calculated:

- • Based on the net electricity generation and a CO_2 emission factor of each power unit (Option A), or
- • Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system (option B)

According to the "Tool", Option B can only be used if:

(a) The necessary data for Option A is not available; and
(b) Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
(c) Off-grid power plants are not included in the calculation

However, due to the necessary data, including the fuel consumption and net electricity generation of each power plant, is not available in China, and the other two requirements are also satisfied, then Option B is adopted.

As per Option B, the simple OM emission factor is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including low-cost / must-run power plants / units, and based on the fuel type(s) and total fuel consumption of the project electricity system, as follows:

$$EF_{grid,OM,simple,y} = \frac{\sum_i \left(FC_{i,y} \cdot \times NCV_{i,y} \times EF_{CO2,i,y} \right)}{EG_y} \qquad \text{(T-1)}$$

Where:

$EF_{grid,OMsimple,y}$	=	Simple operating margin CO_2 emission factor in year *y* (tCO_2/MWh)
$FC_{i,y}$	=	Amount of fossil fuel type *i* consumed in the project electricity system in year *y* (mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ / mass or volume unit)
$EF_{CO2,i,y}$	=	CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2/GJ)

EG_y	=	Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost / must-run power plants / units, in year *y* (MWh)
i	=	All fossil fuel types combusted in power sources in the project electricity system in year *y*
y	=	The three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex ante option)

The simple OM is calculated with reference to the *Notification on Determining Baseline Emission Factor of China's Grid* issued by Chinese DNA (http://cdm.ccchina.gov.cn), (see Annex 3 for details).

The calculation results are provided in Table-11.

$EF_{grid,OMsimple,y}$ is 0.9947 tCO_2e/MWh.

Table-11 Simple operating margin CO_2 emission factor in recent 3 years

	2006	2007	2008	Average
$\sum_{i,m} FC_{i,m,y} \times NCV_{i,y} \times EF_{CO2,i,y}$ (tCO_2)	154,812,639	180,940,805	197,137,915	
EG_y (MWh)	156,142,241	178,920,940	200,640,770	
$EF_{grid,OMsimple,y}$ (tCO_2/ MWh)	0.99148	1.01129	0.98254	0.9947

Source: "China Power Grid Baseline CO_2 Emission Factor Annex 1 China Power Grid Baseline OM Calculation Process," published by the Office of National Coordination Committee on Climate Change. This data can be obtained at: http://cdm.ccchina.gov.cn/english/main.asp?ColumnId=47

Step 5. Identify the group of power units to be included in the build margin

The sample group of power units m used to calculate the build margin consists of either.

(a) The set of five power units that have been built most recently, or

(b) The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

Due to the information of the five power plants built most recently in each regional gird of China is not available. Therefore, the sample group of power units m used to calculate the build margin is chosen (b).

In terms of vintage of data, Option 1 is chosen:

Option1. For the first crediting period, calculate the build margin emission factor ex-ante based on the most recent information available on units already built for sample group m at the time of CDM-CPA-DD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

Step 6. Calculate the build margin emission factor

According to "Tool to calculate the emission factor for an electricity system", the build margin emissions factor is calculated ex-ante as the generation-weighted average emission factor (tCO_2/MWh) of all power units m during the most recent year y for which power generation data is available, as follows:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \qquad \textbf{(T-2)}$$

where:

$EF_{grid,BM,y}$	=	Build margin CO_2 emission factor in year *y* (tCO_2/MWh)
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
$EF_{EL,m,y}$	=	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
m	=	Power units included in the build margin
y	=	Most recent historical year for which power generation data is available

The sample group of power units *m* used to calculate the build margin is chosen (a) in step 4. According to the EB's guidance on DNV deviation request, "Request for clarification on use of approved methodology AM0005 for several projects in China", the EB accepted the following deviation[8]:

- Use of capacity additions during last 1-3 years for estimating the build margin emission factor for grid electricity;
- Use the efficiency level of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy, for each fuel type in estimating the fuel consumption to estimate the build margin (BM).

In accordance with the "Tool to calculate the emission factor for an electricity system", the CO_2 emission factor of each power unit m ($EF_{EL,m,y}$) should be determined as per the guidance of options A1, A2 or A3 to calculate the simple OM, using for *y* the most recent historical year for which power generation data is available, and using for m the power units included in the build margin.

[8] http://cdm.unfccc.int/Projects/Deviations.

Due to for a power unit *m* only data on electricity generation and the fuel types used is available in China, so the emission factor should be determined using Option A2 based on the CO_2 emission factor of the fuel type used and the efficiency of the power unit.

Therefore, $EF_{grid,BM,y}$ should be calculated by the above method, the calculation formula is:

$$EF_{grid,BM,y} = \frac{CAP_{thermal,y-n}}{CAP_{total,y-n,y}} \times EF_{thermal,y} \quad \textbf{(T-3)}$$

Where:

$EF_{thermal,y}$: The emission factor of fuel-fired power with best technology commercially available

$CAP_{thermal,y-n}$: The incremental installed capacity of thermal power (MW) in *y* year compared to that of *y-n* year

$CAP_{total,y-n,y}$: The total incremental installed capacity of various power sources in the grid during the years from *y* to *y-n* year

where, n is fixed by the following process:

The types of fossil fired power include coal-fired, oil-fired and gas-fired power, so the emission factor for fossil fuel fired power with the efficiency level of the best technology commercially available is calculated as follows:

$$EF_{BL,fossil,adv,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y} \quad \textbf{(T-4)}$$

Where:

λ is the different kinds of fuel emission share of total Emissions in ECPG. *Coal, Oil* and *Gas* is the feet for solid fuels, liquid fuels and gas fuels.

It is calculated as follows:

$$\lambda_{\mathrm{Coal,y}} = \frac{\sum_{i \in COAL,j} F_{i,j,y} \times COEF_{i,j,y}}{\sum_{i,j} F_{i,j,y} \times COEF_{i,j,y}} \quad \textbf{(T-5)}$$

$$\lambda_{\mathrm{oil,y}} = \frac{\sum_{i \in OIL,j} F_{i,j,y} \times COEF_{i,j,y}}{\sum_{i,j} F_{i,j,y} \times COEF_{i,j,y}} \quad \textbf{(T-6)}$$

$$\lambda_{\mathrm{gas,y}} = \frac{\sum_{i \in GAS,j} F_{i,j,y} \times COEF_{i,j,y}}{\sum_{i,j} F_{i,j,y} \times COEF_{i,j,y}} \quad \textbf{(T-7)}$$

Where:

$F_{i,j,y}$	is the amount of fuel *i* (in a mass or volume unit) consumed by plant *m* in year *y*;
$COEF_{i,j,y}$	is the CO_2 emission coefficient (tCO_2e / a mass or volume unit) of fuel *i*, taking into account the carbon content of the fuels used by plant *j* and the percent oxidation of the fuel in year *y*; *Coal, Oil* and *Gas* is the feet for solid fuels, liquid fuels and gas fuels.

$EF_{Coal,Adv,y}$, $EF_{Oil,Adv,y}$ and $EF_{Gas,Adv,y}$ in formula (T-4) represent the related Emission Factor of the commercially available most advanced coal, oil and gas fired power technology, which shall be determined using Option A2, as follows:

$$EF_{coal,adv,y} = \frac{COEF_{coal,y}}{\eta_{coal,adv,y}} \times 3.6 \qquad \textbf{(T-8)}$$

$$EF_{oil,adv,y} = \frac{COEF_{oil,y}}{\eta_{oil,adv,y}} \times 3.6 \qquad \textbf{(T-9)}$$

$$EF_{gas,adv,y} = \frac{COEF_{gas,y}}{\eta_{gas,adv,y}} \times 3.6 \qquad \textbf{(T-10)}$$

Where:

$\eta_{i,adv,y}$	net energy conversion efficiency of the best thermal power technology commercially. *Coal*, *Oil* and *Gas* is the feet for solid fuels, liquid fuels and gas fuels.

The build margin emissions factor ($EF_{grid,BM,y}$) is calculated with reference to the *Notification on Determining Baseline Emission Factor of China's Grid* issued by Chinese DNA (http://cdm.ccchina.gov.cn), (see Annex 3 for details).

Following the equations above, $EF_{grid,BM,y}$ is calculated as follows. Data used in these calculations are provided in Annex 3.

$EF_{grid,BM,y}$ = 0.7975×86.24% = 0.6878 tCO_2e/MWh

Step 7. Calculate the combined margin emission factor

The combined margin emission factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \qquad \textbf{(T-11)}$$

where:

$EF_{grid,BM,y}$	=	Build margin CO_2 emission factor in year *y* (tCO_2/MWh)
$EF_{grid,OM,y}$	=	Operating margin CO_2 emission factor in year *y* (tCO_2/MWh)
w_{OM}	=	Weighting of operating margin emission factor (%)

w_{BM} = Weighting of build margin emission factor (%)

Since the CPA is neither wind nor solar power generation project, both of the default values used for W_{OM} and W_{BM} for the first crediting period should be 0.5. Therefore, $EF_{grid,CM,y}$ is given by the following equation:

$$EF_{grid,CM,y} = 0.5 \times EF_{grid,OM,y} + 0.5 \times EF_{grid,BM,y}$$

The result of calculation for $EF_{grid,CM,y}$ is given in Table-12.

Table-12 NWPG $EF_{grid,CM,y}$

$EF_{grid,OM,y}$	0.9947	tCO_2/MWh
$EF_{grid,BM,}$	0.6878	tCO_2/MWh
$EF_{grid,CM,y}$	0.8413	tCO_2/MWh

All data and the result of calculation for project emissions (PE_y) of each year are presented in Table-13.

Table-13 GHG emissions estimation in the Project Activity

	PE_y	PE_{ME}	PE_{MD}				PE_{UM}
				MD_{OX}	MM_{OX}	PE_{OX}	
Year	tCO_2e	tCO_2e	tCO_2e	tCH_4	tCH_4	tCH_4	tCO_2e
2012	61,411	4,905	45,710	16,622	17,136	514	10,796
2013	81,515	8,058	59,423	21,608	22,277	668	14,034
2014	81,515	8,058	59,423	21,608	22,277	668	14,034
2015	81,515	8,058	59,423	21,608	22,277	668	14,034
2016	81,515	8,058	59,423	21,608	22,277	668	14,034
2017	81,515	8,058	59,423	21,608	22,277	668	14,034
2018	81,515	8,058	59,423	21,608	22,277	668	14,034
2019	81,515	8,058	59,423	21,608	22,277	668	14,034
2020	81,515	8,058	59,423	21,608	22,277	668	14,034
2021	81,515	8,058	59,423	21,608	22,277	668	14,034
Total	795,046	77,427	580,517	211,098	217,627	6,529	137,102

2) Baseline Emissions

Baseline emissions are given by the following equation:

$BE_y = BE_{MD,y} + BE_{MR,y} + BE_{Use,y}$ **(E-6)**

where:

BE_y	Baseline emissions in year y (tCO_2e)
$BE_{MD,y}$	Baseline emissions from destruction of methane in the baseline scenario in year *y* (tCO_2e)
$BE_{MR,y}$	Baseline emissions from release of methane into the atmosphere in year *y* that is avoided by the project activity (tCO_2e)
$BE_{Use,y}$	Baseline emissions from the production of power replaced by the project activity in year *y* (tCO_2e)

$BE_{MDy} = 0$

$BE_{MRy} = GWP_{CH4} \times (CMM_{PJ,i,y} + PMM_{PJ,i,y} + VAM_{PJ,i,y})$ **(E-8)**

$BE_{Use,y} = GEN_y \times EF_{ELEC}$ **(E-13)**

The total amount of $CMM_{PJ,i,y}$, $PMM_{PJ,i,y}$ and $VAM_{PJ,i,y}$ is the amount sent VAM oxidizer and used in the project activity to generate power (Note that the total amount of $CMM_{PJi,y}$, $PMM_{PJi,y}$ and $VAM_{PJi,y}$ is the same as MM_{OX} which is presented in the Table 13). GEN_y is as much as the electric power generated presented in Table-10.

For electricity emissions factor, EF_{ELEC}, is the same value as CEF_{ELEC} in the calculations of project emissions, which calculated by formulae from "Tool to calculate the emission factor for an electricity system (Version 02)" for calculating the combined margin emissions.

Therefore the all data and the result of calculation for baseline emissions (BE_y) of each year are presented in Table-14.

Table-14 Baseline GHG emissions estimation

	BE_y	$BE_{MD,y}$	$BE_{MR,y}$	$(CMM_{PJ,y} + PMM_{PJ,y} + VAM_{PJ,y}) = MM_{OX}$		$BE_{use,y}$	GENy
Year	tCO2	tCO2	tCO2	tCH_4	10^3Nm^3	tCO_2	MWh
2012	386,778	0	359,856	17,136	24,000	26,922	32,000
2013	494,735	0	467,813	22,277	31,200	26,922	32,000
2014	494,735	0	467,813	22,277	31,200	26,922	32,000
2015	494,735	0	467,813	22,277	31,200	26,922	32,000
2016	494,735	0	467,813	22,277	31,200	26,922	32,000

2017	494,735	0	467,813	22,277	31,200	26,922	32,000
2018	494,735	0	467,813	22,277	31,200	26,922	32,000
2019	494,735	0	467,813	22,277	31,200	26,922	32,000
2020	494,735	0	467,813	22,277	31,200	26,922	32,000
2021	494,735	0	467,813	22,277	31,200	26,922	32,000
Total	4,839,393	0	4,570,171	217,627	304,800	269,220	320,000

3) Leakage

As no methane is employed for other baseline thermal energy uses:
$Le_{d,y} = 0$.

CBM is not utilized in the project and CDM project activity has no influence upon coal production and prises, and market dynamics:
$LE_{o,y} = 0$

Therefore:
$LE_y = Le_{d,y} + LE_{o,y} = 0$

B.5.3. Summary of the ex-ante estimation of emission reductions:

>>

As the leakage emission (LE_y) is 0, the emissions reduction ER_y from the project activity during a given year y is the difference between the baseline emissions (BE_y) and project emissions (PE_y), as follows:

$$ER_y = BE_y - PE_y - LE_y \quad \textbf{(E-15)}$$

The emission reduction ER_y from the project activity as well as base line emissions (BE_y) and project emissions (PE_y) during project years are given in Table-15.

Table-15 Summary table of emissions reductions

Year	Estimation of project activity emissions (tonnes of CO_2 e)	Estimation of baseline emissions (tonnes of CO_2 e)	Estimation of leakage (tonnes of CO_2 e)	Estimation of overall emission reductions (tonnes of CO_2 e)
2012	61,411	386,778	0	325,367
2013	81,515	494,735	0	413,220
2014	81,515	494,735	0	413,220
2015	81,515	494,735	0	413,220
2016	81,515	494,735	0	413,220
2017	81,515	494,735	0	413,220
2018	81,515	494,735	0	413,220
2019	81,515	494,735	0	413,220

2020	81,515	494,735	0	413,220
2021	81,515	494,735	0	413,220
Total (tonnes of CO_2 e)	795,046	4,839,393	0	4,044,347

B.6. Application of the monitoring methodology and description of the monitoring plan:

B.6.1. Description of the monitoring plan:

>>

Data to be monitored

Data and parameters that are to be monitored in the CPA are as follows;

Data / Parameter:	$CONS_{ELEC,PJ}$
Data unit:	MWh
Description:	Additional electricity consumption for capture and use or destruction of methane, if any
Source of data to be used:	Monitoring data provided by the operator of the CPA.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See additional power consumption in Table-10.
Description of measurement methods and procedures to be applied:	Continuously monitored by Electricity meter. Monitoring points are presented in Annex 4.
QA/QC procedures to be applied:	Electricity meter will be periodically checked and maintained. Backup data will be continuously monitored and archived.
Any comment:	

Data / Parameter:	$time_y$
Data unit:	s
Description:	Time during which VAM unit is operational during period y
Source of data to be used:	Monitoring data provided by the operator of the CPA.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	8,000hr x 3,600s (from FSR)
Description of measurement methods and procedures to be applied:	Continuously monitored at control center for VAM oxidizer operation by PC.
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	PC_{CH4}
Data unit:	%

Description:	Concentration (in mass) of methane in extracted gas (VAM & CMM added to VAM) supplied to VAM power plant, measured on wet basis.
Source of data to be used:	Monitoring data provided by the operator of the CPA.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CH_4 in VAM: 0.3% CH_4 in CMM added to VAM: below 8% CH_4 in VAM supplied to VAM oxidation Plant: 1.0 % (power generation) and 0.3% (heating) (from FSR)
Description of measurement methods and procedures to be applied:	Methane concentration will be monitored by concentration meters continuously at the VAM oxidation plant. Monitoring points are presented in Annex 4. The confidence level of the measuring system, based on the supplier's quote, is over 95 %.
QA/QC procedures to be applied:	Concentration meters will be periodically checked and maintained.
Any comment:	To be measured on wet basis.

Data / Parameter:	PC_{NMHC}
Data unit:	%
Description:	NMHC concentration (in mass) in VAM supplied to VAM oxidizer.
Source of data to be used:	Monitoring data of each CPA.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	<0.01 (Annex 3)
Description of measurement methods and procedures to be applied:	Sample will be taken annually at inlet of VAM oxidizers and analyzed by gas chromatography.
QA/QC procedures to be applied:	Analysis of gas samples will be executed by using gas chromatography subjected to a regular maintenance regime before analysing gas components to ensure accuracy.
Any comment:	-

Data / Parameter:	$VAM_{flowrate,y}$
Data unit:	Nm^3/s
Description:	Average flow rate of VAM entering the flameless oxidation unit during period y.
Source of data to be used:	Monitoring data provided by the operator of the CPA.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	$167Nm^3/s$ (600,000 Nm^3/h) (from FSR)
Description of measurement methods and procedures to be applied:	$VAM_{flowrate,y}$ are monitored by gas flow meter at the VAM oxidation station and corrected into the mass at standard temperature and pressure, which is 0 degrees centigrade and 1 atm. The confidential level of the measuring system, based on the supplier's quote, is over 95 %.

QA/QC procedures to be applied:	Gas flow meter, pressure and temperature transducer will be periodically checked and maintained
Any comment:	

Data / Parameter:	$PC_{CH4,VAM}$
Data unit:	%
Description:	Concentration of methane in the VAM (including added CMM) entering the flameless oxidation unit
Source of data to be used:	Monitoring data provided by the operator of the CPA.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CH_4 in VAM: 0.3% CH_4 in CMM added to VAM: below 8% CH_4 in VAM supplied to VAM oxidation Plant: 1.0 % (power generation) and 0.3% (heating) (from FSR)
Description of measurement methods and procedures to be applied:	Methane concentration will be monitored by concentration meters continuously at the VAM oxidation plant. Monitoring points are presented in Annex 4. The confidence level of the measuring system, based on the supplier's quote, is over 95 %.
QA/QC procedures to be applied:	Concentration meters will be periodically checked and maintained.
Any comment:	To be measured on wet basis.

Data / Parameter:	$PC_{CH4,exhaust}$
Data unit:	%
Description:	Concentration of methane in exhaust gas from flameless oxidation unit.
Source of data to be used:	Monitoring data provided by the operator of the CPA.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	$PC_{CH4,VAM}$ x 0.03 (from manufacture's specification)
Description of measurement methods and procedures to be applied:	Methane concentration will be monitored by concentration analyzers continuously at the VAM power plant. Monitoring points are presented in Annex 4. The confidence level of the measuring system, based on the supplier's quote, is over 95 %.
QA/QC procedures to be applied:	Concentration analyzers will be periodically checked and maintained.
Any comment:	To be measured on wet basis.

Data / Parameter:	GEN_y
Data unit:	MWh
Description:	Electricity generated by project activity in year *y* (MWh).
Source of data to be used:	Monitoring data provided by the operator of the CPA.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See Electric generation in Table-14.

Description of measurement methods and procedures to be applied:	The power generated by the steam turbine generator which is transferred to the transformer is continuously monitored. Monitoring points are presented in Annex 4.
QA/QC procedures to be applied:	Electricity meter will be periodically checked and maintained. Backup data will be continuously monitored and archived at the transformer and generators, respectively.
Any comment:	

Data / Parameter:	$CMM_{PJ,y} + PMM_{PJ,y}$
Data unit:	tCH_4
Description:	Pre mining CMM captured sent to and destroyed by oxidation units in the project activity in year y and post mining CMM captured sent to and destroyed by oxidation units in the project activity in year y.
Source of data to be used:	Monitoring data provided by the operator of the CPA.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See Table-14
Description of measurement methods and procedures to be applied:	Total volume of ($CMM_{PJ,y} + PMM_{PJ,y}$) are monitored by gas flow meter at the VAM oxidation station and corrected into the mass at standard temperature and pressure, which is 0 degrees centigrade and 1 atm by the monitoring data such as pressure, temperature and methane concentration. The confidential level of the measuring system, based on the supplier's quote, is over 95 %.
QA/QC procedures to be applied:	Gas flow meter, pressure and temperature transducer will be periodically checked and maintained
Any comment:	$CMM_{PJ,y}$ is monitored together with $PMM_{PJ,y}$, because the common extraction system is located in the underground mine. Under the condition of 1 atm and 0 degrees centigrade, the mass of 1 Nm^3 of CH_4 is 0.714kg.

Data / Parameter:	$VAM_{PJ,y}$
Data unit:	tCH_4
Description:	VAM captured, sent to and destroyed by oxidation units in the project activity in year y.
Source of data to be used :	Monitoring data provided by the operator of the CPA.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See Table-14
Description of measurement methods and procedures to be applied:	The volume of $VAM_{PJ,y}$ are monitored by gas flow meter at the VAM oxidation station and corrected into the mass at standard temperature and pressure, which is 0 degrees centigrade and 1 atm by the monitoring data such as pressure, temperature and methane

	concentration. The confidential level of the measuring system, based on the supplier's quote, is over 95 %.
QA/QC procedures to be applied:	Gas flow meter, pressure and temperature transducer will be periodically checked and maintained .
Any comment:	Under the condition of 1 atm and 0 degrees centigrade, the mass of 1 Nm^3 of CH_4 is 0.714kg.

Data / Parameter:	MM_{OX}
Data unit:	tCH_4
Description:	Amount of methane supplied to and consumed by VAM oxidation plant.
Source of data to be used:	Monitoring data provided by the operator of the CPA.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See Table-13
Description of measurement methods and procedures to be applied:	The total volume of MM_{OX} is monitored by gas flow meter at the VAM oxidation station and corrected into the mass at standard temperature and pressure, which is 0 degrees centigrade and 1 atm by the monitoring data such as pressure, temperature and methane concentration. The confidential level of the measuring system, based on the supplier's quote, is over 95 %.
QA/QC procedures to be applied:	Gas flow meter, pressure and temperature transducer will be periodically checked and maintained.
Any comment:	Under the condition of 1 atm and 0 degrees centigrade, the mass of 1 Nm^3 of CH_4 is 0.714kg.

Organization and Monitoring Manual

The CPA will involve the development of a monitoring manual, based on which accurate monitoring shall be conducted. The monitoring manual will clearly state the monitoring method employed at each monitoring point and will make sure that the monitoring is accurately conducted. The contents of the monitoring manual are presented in Annex 4.

The manual will clarify the management structure of the CPA, such as indicated Figure-4[9]. A monitoring team will be formed under the CDM Director, who oversees the entire project, for the management of the monitoring of the project. Monitoring will be mainly conducted at the VAM oxidizing plant. Other monitoring will be carried out at the transformer under the control of the structure. Other functions such as

[9] Dafosi already has CDM monitoring structure. As the structure has been established for the other CDM project (CMM power generation), the new section is established under the original organization for this project.

maintenance and periodical check-up and emergency management are also carried out at each section (See Figure-5).

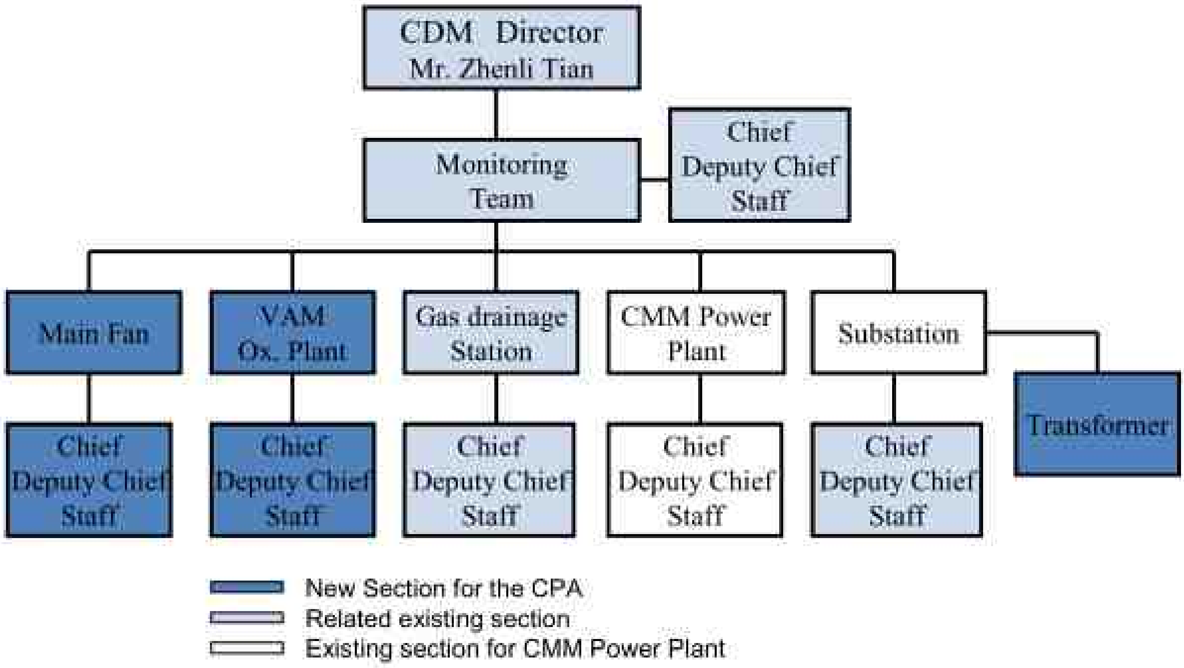

Figure-4 Management structure of the CPA

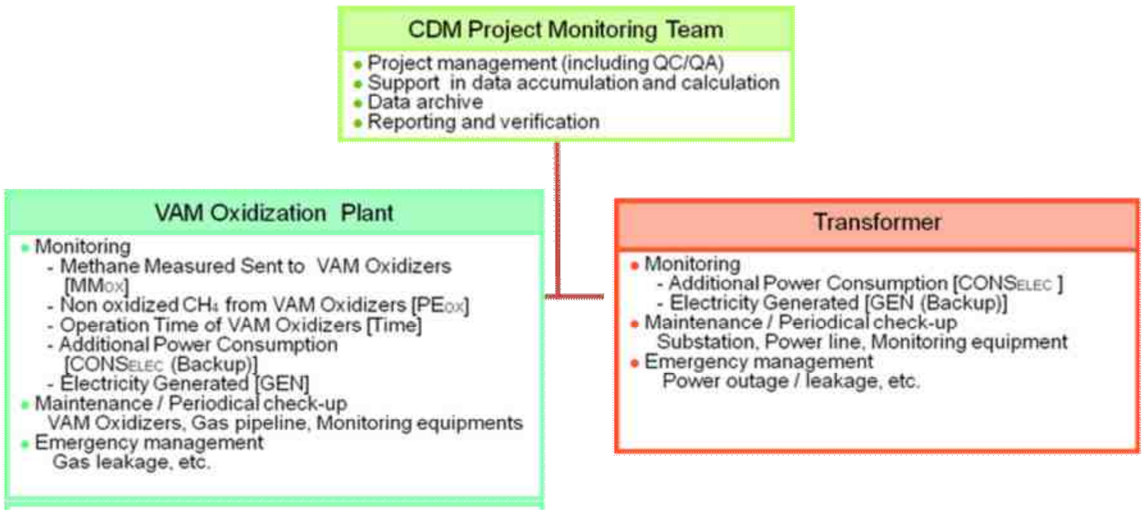

Figure-5 Monitoring & other function of each section

Monitoring points and data to be monitored

The data that will be monitored are shown in the table of Section B6.1. Figure A-1 of Annex-4 indicates the detailed instruments installation for monitoring. All equipments installed will correspond to Chinese national standards.

The Gas flow measured will be corrected by pressure and temperature into the STP. STP is defined as $0^{o}C$ at one atmospheric pressure.

The power generated by the steam turbine generator which is transferred to the transformer is continuously monitored at the out put of the generator. The backup data will be monitored for receiving electricity at the transformer.

The electricity generated is cross-checked with the invoices and /or sales receipts as a control mechanism, in addition to be monitored at a transformer.

Monitoring, recording and management of data

All data continuously measured will be transmitted to the monitoring computer via transmitters. The records of the time and date will be added to each measurement data stored in the computer. The electronic records and paper copies will be kept for two years after the end of the crediting period as required by approved methodology ACM0008.

The data will be measured continuously and electronically archived as descried already. The chief of each section will check the data in the measurement tables, sign the datasheets, and report the data of the previous day to the Monitoring Team everyday. Furthermore, on the first day of every month, the chief will send the measurement table of the previous month to the monitoring team for storage and management.

The monitoring team will compile the collected data to calculate emission reductions. The team will also be responsible for data storage and for preparing the data for verification.

Quality control and training

The following procedures will be followed to install, maintain and calibrate the equipment used in this project:

1) CDM monitoring team and their staff will have training on every day maintenance check during the test operation by the instrument supplier.
2) The measuring instruments such as for flow volume, methane concentration, pressure and temperature will be calibrated in accordance with relevant national/sectoral or manufacturers' requirements;
3) The electricity meters will be calibrated by authorized entities.

SECTION C. Environmental analysis

>>

C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

☐ Please tick if this information is provided at the PoA level. In this case sections C.2. and C.3. need not be completed in this form.

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

>>

The construction of the VAM oxidizing plant will be initiated in Feb 2011. Before construction, in July 2008, the Academy of General Electronics Research of the Ministry of Information Industry prepared an Environmental Impact Assessment report, which was approved by the Environmental Protection Bureau of Xianyang City on December 11, 2008.

The Environmental Impact Assessment indicates the following:

- This project complies with the requirements of national industrial policy and the cleaner production policy and the pollutant emission levels satisfy national standards; thus, the project pursues social, economic and environmental public interests.
- This project complies with national environmental regulations and will operate under national standards.

The Environmental Protection Bureau of Xianyang City provided the following instructions for the operation of the VAM oxidization plant in its approval letter:

1. During the construction activity, the noise level should be lower to satisfy “Standard for Noise Level in Construction area” (GB12523-90). The construction work should be prohibited during night time, from 22:00 to 06:00 of next day.
2. Wastewater, sewage water and household wastewater should be utilized completely after adequate treatment for sprinkling plant trees and road so that it would not be exported, according to the first class standard limit of "Comprehensive Emission Standard for Sewage" (GB8978-1996) and "Comprehensive Emission Standard for Sewage into Weihe River System" (GB61/224-2006).
3. Low noise equipment should be chosen preferentially in order to keep the noise level in a factory below at the second standard limit of “Noise Standard for Industrial Area” (GB12348-90).
4. Solid garbage should be collected by the given segregation so that it would not be export.
5. It should be strived not to destroy the ecosystem upon construction.
6. Prepare emergency plans for accidents and enhance the capacity to cope with unexpected happenings so that accidents do not result in environmental damages.

In response, this Project will implement the under mentioned measures:

1. Environmental protection measures carried out during the construction and operation of the VAM power plant will be based on the following national standard for each subject.
   - The second class standard limit of “Environment Standard for Air Quantity” (GB3095-1996);
   - The third class standard limit of “Environment Quantity Standard for Ground Water” (GB3838-88);
   - The second class standard limit of “Noise Standard for Industrial Area” (GB12348-90) and “Noise Standard for Construction area” (GB12523-90).
   - The first class standard limit of "Comprehensive Emission Standard for Sewage" (GB8978-1996) and "Comprehensive Emission Standard for Sewage into Weihe River System" (GB61/224-2006).
   - The third class standard limit of "Comprehensive Emission Standard for Air Pollutant" (GB16297-96).
2. Power generators will be installed in a soundproof building to satisfy noise standards.
3. Waste water, sewage water and household wastewater will be treated to be used for the greening of power plant premises.
4. Solid garbage will be appropriately treated by the Environmental Sanitary Bureau of Dafosi.
5. Construction activities shall not impose environmental damage, including deforestation.
6. An emergency response manual will be developed so that environmental damage shall not occur as a result of accidents.

C.3. Please state whether in accordance with the host Party laws/regulations, an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA),:

>>

In line with the national law/regulations, an Environmental Impact Assessment (EIA) should be carried out and approved by the environmental agency in charge of environmental protection of City or County before a CPA would start. The EIA should be carried out for the following Environmental impact:

- Expected Environmental impacts during construction, on such as atmosphere, noise, waste water and solid waste;
- Expected Environmental impacts during operation, on such as atmosphere, noise, waste water and solid waste.

SECTION D. Stakeholders’ comments

>>

D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

☐ Please tick if this information is provided at the PoA level. In this case sections D.2. to D.4. need not be completed in this form.

D.2. Brief description how comments by local stakeholders have been invited and compiled:

>>

On Oct. 16th, 2008, the Stakeholders Consultation Meeting of Dafosi Coal Mine Ventilation Air Methane Power Generation Project (CPA-CVAM-1) was held at Dafosi Coal Mine in Bin County, Shaanxi Province of China. This meeting was held with the intention to reveal all stakeholders’ comments and suggestions on the CPA. The Stakeholders Consultation Meeting was announced through visits made to local farmers, telephone communication with local governments and a posting on bulletin board at Binchang Co.

The Stakeholders Consultation Meeting was held for the purposes of having the project's aims and details fully understood by its participants, namely, farmers' representatives from Tugou Village, the construction site of the CPA, farmers' representatives from Caizi Village located along the road connecting the mine and the VAM oxidizing plant, representatives from local authorities and workers of the coal mine and VAM oxidizing plant. The meeting was also held to hear their opinions on the construction and operation of the VAM oxidizing plant. The meeting engaged three representatives of local farmers, four representatives of the local government and five people from Binchang Co.

D.3. Summary of the comments received:

>>

The outline of the meeting and summary are as follows:

1. Opening oration from Li, Jichang, the vice president of Binchang group
2. Introductions of VAM power generation project - from Tian, Zhenlin, manager of resources office of Binchang Co. & chief manager of Shaanxi Binchang New Energy Co. Ltd.
3. Introductions of VAM power generation project CDM application – from KOE
4. Comments declaration on ventilation air methane power generation project of Binchang Co., the environmental assessment, and CDM application, etc. (in a random order)
   (1) Bin County Planning Bureau (States the requirement and importance of the project, the contributions to the sustainability of Bin County, and governmental attitude to this project)
   (2) Bin County Environmental Protection Bureau (The environmental impacts of the project construction, national policy and environmental requirements)
   (3) Representatives of Caiziyuan Village (the director and villagers)
   (4) Workers' representatives from the power plant and coal mine
   (5) KOE
5. Declaration from the director of Caiziyuan Village in Bin County
6. Speech of Dafosi VAM power generation project from Bin County governmental leader - Liu, Xu, the vice county magistrate
7. Speech from the leader of Binchang Co. - Li, Jihcang, the vice president (declaration to the comments and suggestions)
8. Get to a final comment and sign
9. Meeting conclusion— the session chair
10. Closing

The decisions were formed as follows:

Through the understanding of significance and necessity of CDM project (VAM power generation) of Shaanxi Binchang New Energy Co., Ltd, the attitude of government department and villager delegates to the project, and the realization of contribution from the project to local sustainable development and environment protection, it is considered that the construction of the project is necessary and feasible. The VAM resource can be utilized maximally by the project. Using VAM for power generation, one hand, it promotes the development of environment protection, on the other hand, it also brings the tremendous environmental benefits and creates more job opportunities.

As a result, the construction of the project can make a contribution towards local sustainable development, bring preferable environmental benefit to Shaanxi Binchang New Energy Co., Ltd. Economy benefit, social benefit and environmental benefit are notable.

All the attendants of this conference agree and support the construction of this project.

D.4. Report on how due account was taken of any comments received:

>>

One negative comment was taken out from the director of Caiziyuan Village related with the possibility of noise pollution. As described in Environmental impact, this project complies with national environmental regulations and will operate under national standards. All necessary noise protection measures will be taken to maintain noise below legally required level. Such measures include attachment of mufflers on engine exhaust outlet and insertion of acoustic insulation.

Annex 1

CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE CPA

Organization:	Shaanxi Binchang New Energy Co., Ltd.
Street/P.O.Box:	
Building:	
City:	Xianyang City
State/Region:	Shaanxi Province
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URL:	
Represented by:	Zhenlin Tian
Title:	Manager
Salutation:	Mr.
Last name:	Tian
Middle name:	-
First name:	Zhenlin
Department:	
Mobile:	13809100525
Direct FAX:	86-29-33277668
Direct tel:	86-29-33277668
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City:	Kawasaki-Shi
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Postfix/ZIP:	213-0013
Country:	Japan
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E-Mail:	inoue@cncdm.jp
URL:	
Represented by:	Inoue Kaoru
Title:	
Salutation:	Mr.
Last Name:	Inoue
Middle Name:	
First Name:	Kaoru
Department:	

Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding from Parties included in Annex I countries is involved.

Annex 3

BASELINE INFORMATION

Table A-1 VAM & CMM Recovery Plan

	Coal Production	Relative gas emission rate	Absolute gas emission rate	Gas Emissions	CMM			VAM
						CMM power plant	Emitted in the Atmosphere	
	10^3 t	m^3/ t	m^3/min	10^3m^3	10^3m^3	10^3m^3	10^3m^3	10^3m^3
2008	3,000	26.3	150.0	78,840	47,304	12,096	35,208	31,536
2009	6,000	19.3	220.0	115,632	78,840	24,192	54,648	36,792
2010	6,000	19.3	220.0	115,632	78,840	24,192	54,648	36,792
2011	6,000	20.1	230.0	120,888	86,724	24,192	62,532	34,164
2012	6,000	20.1	230.0	120,888	86,724	24,192	62,532	34,164
2013	6,000	20.1	230.0	120,888	86,724	24,192	62,532	34,164
2014	6,000	20.1	230.0	120,888	86,724	24,192	62,532	34,164
2015	8,000	20.1	306.7	161,184	124,392	24,192	100,200	36,792
2016	8,000	20.1	306.7	161,184	127,020	24,192	102,828	34,164

Table A-2 Composition of Recovered Gas

Sampling Points	Date of Sampling	Time	Composition of Gas (%)						
			N_2	O_2	CH_4	$C_{2\sim5}$	CO	CO_2	Total
Main Shaft (VAM)	21/10/2008	10:20	78.65	20.38	0.60	0	0	0.37	100
Gas Drainage station (CMM)	24/02/2008		70.42	17.63	11.08	<0.01	<0.01	0.87	100

Source: Analyzed by The Detection of Chemical Component of CSIC

The baseline information for calculation of OM, BM and CM emission factor of North West China Power Grid is shown in the Report on Determination of Baseline Grid Emission Factor by China DNA NDRC at http://cdm.ccchina.gov.cn. The concrete process is shown in the following tables.

TableA-3 Fuel consumption and emission of North West China Power Grid in 2006

Fuels	Units	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Total	Emission factor ($kgCO_2/TJ$)	OXID (%)	NCV (MJ/t, or MJ/km^3)	Emission (tCO_2e)
		A	B	C	D	E	F=A+B+C +D+E	G	H	I	J=G*H*I*F/10000000 (quality unit) or J=G*H*I*F/1000000 (volume unit)
Raw coal	10^4 ton	2834.44	1660.92	421.86	1833.72	1547.69	**8298.63**	87,300	100	20908	151,472,271
Washed coal	10^4 ton						**0**	87,300	100	26344	0
Other washed coal	10^4 ton				112.7	8.45	**121.15**	87,300	100	8363	884,504
Coke	10^4 ton				0.01		**0.01**	95,700	100	28435	272
Coke oven gas	10^8 m^3	0.2				0.08	**0.28**	37,300	100	16726	17,469
Other gas	10^8 m^3	0.1					**0.1**	37,300	100	5227	1,950
Crude oil	10^4 ton					0.02	**0.02**	71,100	100	41816	595
Gasoline	10^4 ton	0.01					**0.01**	67,500	100	43070	291
Diesel	10^4 ton	1.14	0.24	0.61		1.25	**3.24**	72,600	100	42652	100,328
Fuel oil	10^4 ton		0.6			0.11	**0.71**	75,500	100	41816	22,415
LPG	10^4 ton						**0**	61,600	100	50179	0
Refinery gas	10^4 ton						**0**	48,200	100	46055	0
Natural gas	10^8 m^3	1.59	0.56	1.06		7.49	**10.7**	54,300	100	38931	2,261,930
Other petroleum products	10^4 ton						**0**	72,200	100	38369	0
Other coking products	10^4 ton	1.86					**1.86**	95,700	100	28435	50,615
Other energy	10^4 ton	33.57	8.81			2.2	**44.58**	0	100	0	0
Total											**154,812,639**

Data source: *China Energy Statistical Yearbook 2007*

Table A-4 The fuel fired electricity generation and calculation of simple OM emission factor of North West China Power Grid in 2006

Province	The fuel fired electricity generation（MWh）	The rate of electricity self-consumption（%）	The fuel fired electricity connected to the grid（MWh）
Shaanxi	54,482,000	6.97	50,684,605
Gansu	35,738,000	4.29	34,204,840
Qinghai	7,204,000	2.57	7,018,857
Ningxia	36,731,000		36,731,000
Xinjiang	29,901,000	8.02	27,502,940
Total			156,142,241
Total Emission (tCO_2)			154,812,639
$EF_{OM,y}$ for 2006			**0.99148**

Data source: China Electric Power Yearbook 2007 and China Energy Statistical Yearbook 2007

TableA-5 Fuel consumption and emission of North West China Power Grid in 2007

Fuels	Units	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Total	Emission factor ($kgCO_2$/TJ)	OXID (%)	NCV (MJ/t, or MJ/km^3)	Emission (tCO_2e)
		A	B	C	D	E	F=A+B+C+D+E	G	H	I	J=G*H*I*F*44/12/10000000 (quality unit) or J=G*H*I*F*44/12/1000000 (volume unit)
Raw coal	10^4 ton	3303.44	1969.03	470.85	2165.8	1762.11	**9671.23**	87,300	100	20908	176,525,905
Washed coal	10^4 ton						**0**	87,300	100	26344	0
Other washed coal	10^4 ton	3.73			124.31	7.73	**135.77**	87,300	100	8363	991,243
Mould Coal	10^4 ton	3.53					**3.53**	87,300	100	20908	64,432
Coke	10^4 ton						**0**	95,700	100	28435	0
Coke oven gas	10^8 m^3	0.52	0.65			0.26	**1.43**	37,300	100	16726	89,215
Other gas	10^8 m^3	14.14	0.71				**14.85**	37,300	100	5227	289,526
Crude oil	10^4 ton					0.09	**0.09**	71,100	100	41816	2,676
Gasoline	10^4 ton	0.02					**0.02**	67,500	100	43070	581
Diesel	10^4 ton	1.12	0.26	0.42		1.77	**3.57**	72,600	100	42652	110,546
Fuel oil	10^4 ton	0.01	1.05	0.04		0.05	**1.15**	75,500	100	41816	36,307
LPG	10^4 ton						**0**	61,600	100	50179	0
Refinery gas	10^4 ton					5.99	**5.99**	48,200	100	46055	132,969
Natural gas	10^8 m^3	1.68	0.49	1.93		8.66	**12.76**	54,300	100	38931	2,697,404
Other petroleum products	10^4 ton						**0**	72,200	100	38369	0
Other coking products	10^4 ton						**0**	95,700	100	28435	0
Other energy	10^4 ton	94.36	9.73				**104.09**	0	100	0	0
Total											**180,940,805**

Data source: *China Energy Statistical Yearbook 2008*

Table A-6 The fuel fired electricity generation and calculation of simple OM emission factor of North West China Power Grid in 2007

Province	The fuel fired electricity generation（MWh）	The rate of electricity self-consumption（%）	The fuel fired electricity connected to the grid（MWh）
Shaanxi	59,100,000	6.77	55,098,930
Gansu	42,400,000	5.89	39,902,640
Qinghai	9,700,000	7.19	9,002,570
Ningxia	43,500,000		43,500,000
Xinjiang	34,600,000	9.2	31,416,800
Total			178,920,904
Total Emission (tCO_2)			180,940,805
$EF_{OM,y}$ for 2007			**1.01129**

Data source: China Electric Power Yearbook 2008 and China Energy Statistical Yearbook 2008

Table A-7 Fuel consumption and emission of North West China Power Grid in 2008

Fuels	Units	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Total	Emission factor (kgCO_2/TJ)	OXID (%)	NCV (MJ/t, or MJ/km^3)	Emission (tCO_2e)
		A	B	C	D	E	F=A+B+ C+D+E	G	H	I	J=G*H*I*F/10000000 (quality unit) or J=G*H*I*F/1000000 (volume unit)
Raw coal	10^4 ton	3620	2216.9	507.44	2330.72	1924.9	**10599.96**	87,300	100	20908	193,477,720
Washed coal	10^4 ton						**0**	87,300	100	26344	0
Other washed coal	10^4 ton	9.22			53.85	8.2	**71.27**	87,300	100	8363	0
Coke	10^4 ton						**0**	95,700	100	28435	76,113
Coke oven gas	10^8 m^3						**0**	37,300	100	16726	362,249
Other gas	10^8 m^3	0.35	0.74			0.13	**1.22**	37,300	100	5227	0
Crude oil	10^4 ton	18.38	0.2				**18.58**	71,100	100	41816	1,744
Gasoline	10^4 ton						**0**	67,500	100	43070	105,902
Diesel	10^4 ton	0.05				0.01	**0.06**	72,600	100	42652	29,045
Fuel oil	10^4 ton	1.03	0.44	0.26	0.05	1.64	**3.42**	75,500	100	41816	0
LPG	10^4 ton		0.86	0.04		0.02	**0.92**	61,600	100	50179	160,939
Refinery gas	10^4 ton						**0**	48,200	100	46055	2,403,565
Natural gas	10^8 m^3					7.25	**7.25**	54,300	100	38931	302
Other petroleum products	10^4 ton	0.94	0.24	2.99		7.2	**11.37**	72,200	100	38369	0
Other coking products	10^4 ton					0.01	**0.01**	95,700	100	28435	0
Other energy	10^4 ton						**0**	0	100	0	0
Total											**197,137,915**

Data source: *China Energy Statistical Yearbook 2009*

Table A-8 The fuel fired electricity generation and calculation of simple OM emission factor of North West China Power Grid in 2008

Province	The fuel fired electricity generation（MWh）	The rate of electricity self-consumption（%）	The fuel fired electricity connected to the grid（MWh）
Shaanxi	71,500,000	6.95	66,530,750
Gansu	46,800,000	6.4	43,804,800
Qinghai	10,700,000	7.14	9,936,020
Ningxia	44,000,000	7.57	40,669,200
Xinjiang	39,700,000		39,700,000
Total			200,640,770
Total Emission (tCO_2)			197,137,915
$EF_{OM,y}$ for 2008			**0.98254**

Data source: *China Electric Power Yearbook 2009*

TableA-9 The three years average emission factor of North West China Power Grid

Years	2006	2007	2008	Three years average emission factor（tCO_2e/MWh）
Total CO_2 emission(tCO_2e)	**154,812,639**	**180,940,805**	**197,137,915**	**0.9947**
The total fuel fired electricity connected to the grid(MWh)	**156,142,241**	**178,920,940**	**200,640,770**	

Data Source: from the above table A3～A8

Table A-10 Calculation the weight of CO_2 emissions from solid fuels, liquid fuels and gas fuels among the total emissions in North West China Power Grid

Fuels	Units	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Total	NCV (MJ/t, or MJ/km^3)	Emission factor ($kgCO_2$/TJ)	OXID	CO_2 emissions
		A	B	C	D	E	F=A+B+C+D+E	G	H	I	J=G*H*I*F/100000 (quality unit) or J=G*H*I*F/10000 (volume unit)
Raw coal	10^4t	3,620.00	2,216.90	507.44	2,330.72	1,924.90	10,599.96	20,908	87,300	1	193,477,720
Washed coal	10^4t	0	0	0	0	0	0	26,344	87,300	1	0
Other washed coal	10^4t	9.22	0	0	53.85	8.2	71.27	8,363	87,300	1	520,335
Mould coal	10^4t	0	0	0	0	0	0	20,908	87,300	1	0
Coke	10^4t	0	0	0	0	0	0	28,435	95,700	1	0
Other coke products	10^4t	0	0	0	0	0	0	28,435	95,700	1	0
Total of solid fuels											**193,998,055**
Crude oil	10^4t	0	0	0	0	0	0	41,816	71,100	1	0
Gasoline	10^4t	0.05	0	0	0	0.01	0.06	43,070	67,500	1	1,744
Diesel	10^4t	0	0.86	0.04	0	0.02	0.92	41,816	75,500	1	29,045
Fuel oil	10^4t	0	0	0	0	0.01	0.01	41,816	72,200	1	302
Other petroleum products	10^4t	0	0	0	0	0	0	41,816	71,100	1	0
Total of liquid fuels											**136,993**
Natural gas	10^8m^3	0.94	0.24	2.99	0	7.2	11.37	38,931	54,300	1	2,403,565
Coke oven gas	10^8m^3	0.35	0.74	0	0	0.13	1.22	16,726	37,300	1	76,113
Other gas	10^8m^3	18.38	0.2	0	0	0	18.58	5,227	37,300	1	362,249
LPG	10^4t	0	0	0	0	0	0	50,179	61,600	1	0
Refinery gas	10^4t	0	0	0	0	7.25	7.25	46,055	48,200	1	160,939
Total of gas fuels											**3,002,866**

Total of all fuels	**197,137,915**

Data source: *China Energy Statistical Yearbook 2009*

Table A-11 The emission factor of the most efficient commercial coal-fuelled, oil-fuelled and gas-fuelled power plant

	Variable	Efficiency of electricity supply (%)	Emission factor of the fuels($kgCO_2/TJ$)	OXID	Emission factor(tCO_2e/MWh)
		A	B	C	D=3.6/A/10000*B*C
Coal-fuelled power plant	$EF_{Coal,Adv,y}$	39.08	87,300	1	0.8042
Gas-fuelled power plant	$EF_{Gas,Adv,y}$	51.46	75,500	1	0.5282
Oil-fuelled power plant	$EF_{Oil,Adv,y}$	51.46	54,300	1	0.3799

TableA-12 The weight of CO_2 emission from solid, liquid and gas fuels among the total emissions and the thermal emission factor of NWPG

$\lambda_{Coal,y}$	$\lambda_{Oil,y}$	$\lambda_{Gas,y}$	$EF_{BL,fossil,adv,y}$ (tCO_2e/MWh) = ($\lambda_{Coal,y}$* $EF_{Coal,Adv,y}$+$\lambda_{Oil,y}$* $EF_{Oil,Adv,y}$+$\lambda_{Gas,y}$* $EF_{Gas,Adv,y}$)
98.41%	0.07%	1.52%	**0.7975**

Table A-13 Calculation of BM emission factor of North West China Power Grid

	2006 installed capacity	2007 installed capacity	2008 installed capacity	Newly added installed capacity between 2006 and 2008	Weight in newly added installed capacity
	A	B	C		
Fossil fuelled(MW)	29,627	35,620	44,570	16,216	86.24%
Hydro power(MW)	14,074	14,590	15,780	1,707	9.08%
Nuclear power(MW)	0	0	0	0	0.00%
Wind power(MW)	399	798.5	1,280	881	4.69%
Total(MW)	**44,100**	**51,008.5**	**61,630**	**18,804**	**100.00%**
Share in 2006 installed capacity				30.51%	
BM=0.7975×86.24%=0.6878 tCO_2/MWh					

Note: The new added installed capacity here is calculated considering the capacity, capacity shut down and the pumped storage capacity.
Data source: *China Electric Power Yearbook 2006-2008*

Table A-14 Calculation of CM emission factor of North West China Power Grid

OM (tCO_2e/MWh)	BM (tCO_2e/MWh)	CM (tCO_2e/MWh)
A	B	C=0.5×A+0.5×B
0.9947	0.6878	0.8413

Annex 4

MONITORING INFORMATION

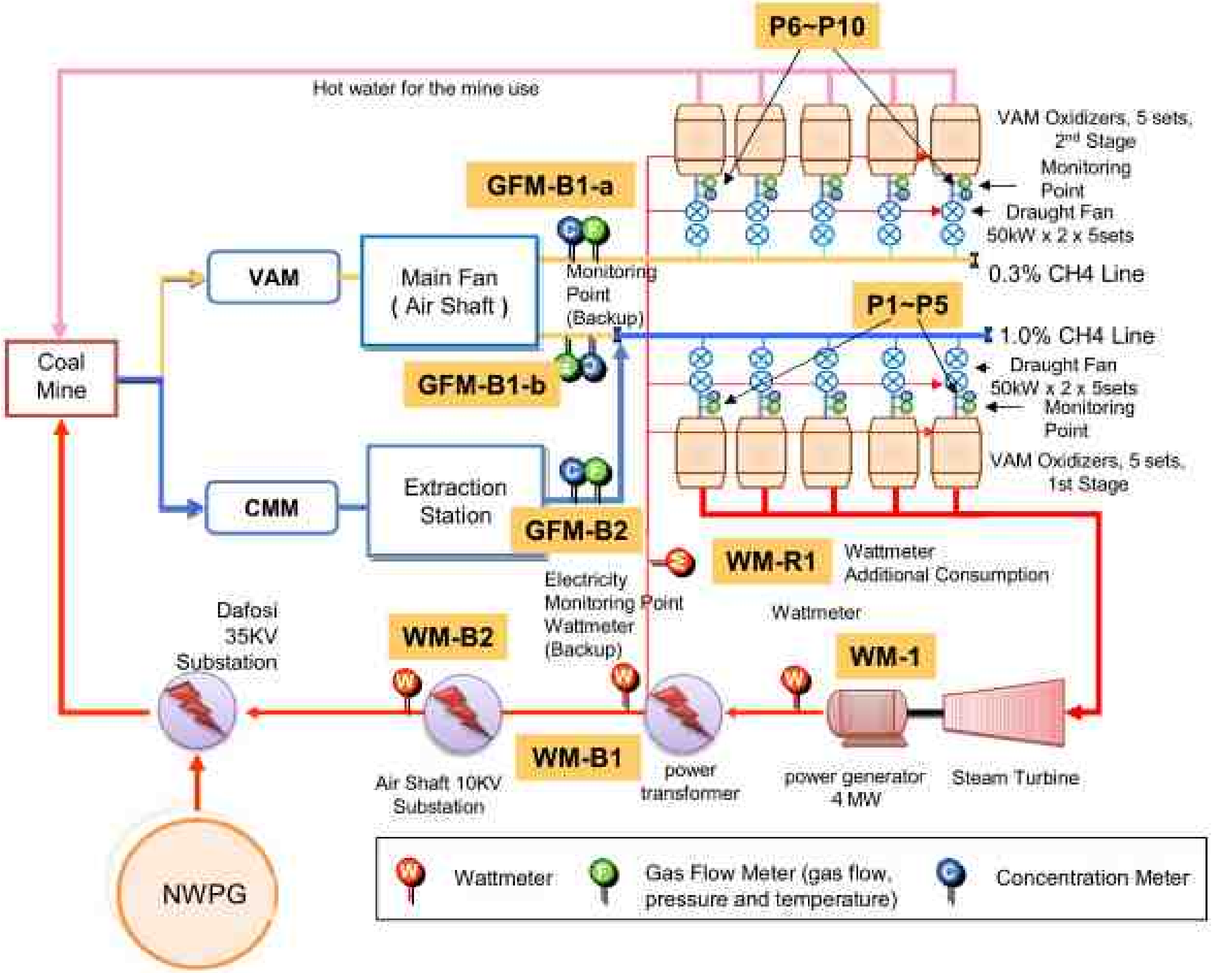

Figure A-1 Monitoring point of the CPA