CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

SECTION A. General description of project activity

A.1 Title of the project activity:

Power Generation by Waste Heat Recovery Project of Xinjiang Tianshan Cement Co. Ltd. in Urumqi City, Xinjiang Autonomous Region, P. R. China.
Version 04
Date (dd/mm/yyyy): 14/07/2008

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A.2. Description of the project activity:

Power Generation by Waste Heat Recovery Project of Xinjiang Tianshan Cement Co. Ltd. in Urumqi City, Xinjiang Autonomous Region, P. R. China (hereinafter "XT-WHRPG") is a new project attached to 2 NSP[1] cement production lines which is respectively locate in Xinjiang Tianshan Cement Co. Ltd. and its Turpan Clinker Subsidiary (2000 tons of cement per day each). So far, all waste heat is vented directly into the atmosphere without any utilization. After the installation of waste heat recovery unit, including 2 back kiln SP[2] residual heat boilers and 2 forehead kiln AQC[3] boilers, waste heat from the kilns will generate electricity with the technology of steam/hot water flash distillation. The project will only take advantage of waste heat and consume no fuel at all. The total installed capacity of XT-WHRPG is 6MWand the annual net generation of the project will be 36,641MWh. The Project will generate 31,138 ton CO_2 equivalent of emission reductions per year.

According to the latest China Electric Yearbook, Northwest China Grid is dominated by thermal power. The purpose of the project is to utilize the waste heat of the two clinker production lines to generate electricity that will be used in the manufacture of the cement and displace the relevant electricity of Northwest China grid. Thus the relevant Green House Gas (GHG) emissions will be consequently reduced as well.

Project's contribution to sustainable development

The specific sustainable development benefits of the project include:
1. Supplying of zero-emitting energy to the cement plant, reducing reliance on exhaustible fossil fuel based power sources and emissions of CO_2.
2. Providing job opportunities (lots of jobs during the construction period and 18 permanent staff positions during operation) and related training program that will promote the education level of local people and increase income of local people and government.
3. Improving the energy efficiency of cement production process and contributing to construct an environment-friendly society.

[1] New Suspension Preheater
[2] Suspension Preheater
[3] Air Quenching Cooler

The project proponents believe that the project activity would greatly contribute to the sustainable development of the local area by generating benefits to local economy, society and environment.

A.3. Project participants:

Name Of Party Involved (*) ((Host) Indicates A Host Party)	Private And/Or Public Entity(ies) Project Participants (*) (As Applicable)	Kindly Indicate If The Party Involved Wishes To Be Considered As Project Participant (Yes/No)
People's Republic of China (host)	Xinjiang Tianshan Cement Co. Ltd.	No
United Kingdom	Arreon Carbon UK Ltd.	No

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

P. R. China

A.4.1.2. Region/State/Province etc.:

Xinjiang Autonomous Region

A.4.1.3. City/Town/Community etc:

Urumqi City and Turpan Area in Uigur Autonomous Region

A.4.1.4. Detail of physical location, including information allowing the unique identification of this project activity (maximum one page):

The Project Activity will be implemented at: 1) Tianshan Cement Plant, located at Cangfang Area, Urumqi City, bordered to the east by the National Highway 312 and the Lanxin Railway. 2) Turpan Clinker Subsidiary, located in the Uygur Autonomous Region at Daheyan, Turpan Area in the Uygur Autonomous Region, which is 3km away from the Daheyan railway and 14km away from the highway. The longitude of the project area is between 87^{o} 36' and 89^{o} 11' east and the latitude is between 42^{o} 54' and 43^{o} 45' north.

XT-WHRPG is located at Urumqi and Turpan City, Xinjiang Autonomous Region, as detailed in the map below.

Location of XT-WHRPG in Xinjiang Autonomous Region, China

Fig A.1 Geographical location of XT-WHRPG in Xinjiang Autonomous Region, China

A.4.2. Category(ies) of project activity:

According to the project activity scope stipulations in 'Sectoral scopes related approved methodologies and DOEs (version 30 Oct 06), the project activity can be primarily categorized in Sectoral Scope 1 – Energy Industries (Renewable/ non-renewable sources) and 4 - Manufacturing Industries.

A.4.3. Technology to be employed by the project activity:

The power generation by waste heat recovery system of each line consists of one back kiln with SP residual heat boilers, one forehead kiln AQC boilers, a set of condensing turbine generators, a bumping-recycling water system for cooling, a chemical water system to supply water and a computer control system for operation and monitoring. All equipment has been made in China, thus there is no technology transfer in this project. The details are as shown below.

Table A.1 Equipments & Technology Employed by the Project Activity of the Urumqi line

Number	Equipment	Amount	Specifications & parameters
1	Condensing turbine	1	Type: N3 - 1.0 Capacity: 3MW Rotate speed: 5600/3000r/min Inlet pressure: 1.0MPa Inlet temperature: 300℃
2	3MW generator	1	Capacity: 3MW Rotate speed: 3000r/min
3	2000t/d back kiln SP boiler	1	Inlet gas: 136000m^3/h (standard) Gas temperature: 325℃ Vapour parameters: 10t/h-1.1MPa-310℃
4	2000t/d forehead kiln AQC boiler	1	Inlet gas: 80000m^3/h (standard) Gas temperature: 340℃ Vapour parameters: 6.2t/h-1.1MPa-310℃ Water parameters: 17t/h - 165℃ Inlet water: 40℃
5	Vacuum oxygen removal system	1	Removal speed: 20t/h Pressure: 0.008MPa Temperature: 40℃ Tank: 10m^3
6	Boiler feedwater pump	2	Rate of current: 25t/h Total head: 270m

Table A.2 Equipments & Technology Employed by the Project Activity of the Turpan line

Number	Equipment	Amount	Specifications & parameters
1	Condensing turbine	1	Type: N3 - 1.25 Capacity: 3MW Rotate speed: 5600/3000r/min Inlet pressure: 1.25MPa Inlet temperature: 310□
2	3MW generator	1	Capacity: 3MW Rotate speed: 3000r/min
3	2000t/d back kiln SP boiler	2	Inlet gas: 158900m^3/h (standard) Gas temperature: 340□ Vapour parameters: 8.79t/h-1.35MPa-310□
4	2000t/d forehead kiln AQC boiler	2	Inlet gas: 75000m^3/h (standard) Gas temperature: 350□ Vapour parameters: 5.68t/h-1.35MPa-330□ Water parameters: 15.1t/h - 170□ Inlet water: 40□
5	Vacuum oxygen removal system	1	Removal speed: 20t/h Pressure: 0.008MPa Temperature: 40□ Tank: 10m^3
6	Boiler feedwater pump	2	Rate of current: 25t/h Total head: 270m

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

The chosen crediting period for the Project is seven years. The Project will generate 31,138 tonnes of CO_2 equivalent per year, accumulating to a total reduction of 217,966 tons over the seven year crediting period. The emission reductions plan is as shown below.

Table A.2 Emission Reductions from the Project Activity

Years	**Annual estimation of emission reductions in tonnes of CO_2e**
June 1,2008- December 31,2008	18,164
2009	31,138
2010	31,138
2011	31,138
2012	31,138
2013	31,138
2014	31,138
January 1,2015- May 31,2015	12,974
Total estimated reductions (tonnes of CO_2e)	217,966
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	31,138

A.4.5. Public funding of the project activity:

No public funding from parties included in Annex I is provided to the project activity.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity:

The project activity applies the following approved methodology for PDD preparation: ACM0004 (version 02)

Baseline methodology:
"Consolidated baseline methodology for waste gas and/or heat and/or pressure for power generation" ACM0004 (version 02)
"Consolidated baseline methodology for grid-connected electricity generation from renewable sources" ACM0002 (version 06)

Monitoring methodology:
"Consolidated monitoring methodology for waste gas and/or heat and/or pressure for power generation" ACM0004 (version 02)

The additionality of the project activity is demonstrated and assessed using the **"Tool for the demonstration and assessment of additionality"** (version 03) agreed by the CDM Executive Board

All the documents are available on the UNFCCC CDM web site:

http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

B.2 Justification of the choice of the methodology and why it is applicable to the project activity:

The baseline methodology ACM0004 lists two applicability criteria：

1. project activities which displace electricity generation with fossil fuels in the electricity grid or displace captive electricity generation from fossil fuels, electricity;
2. project activities where no fuel switch is done in the process where the waste heat or the waste gas is produced after the implementation of the project activity

The project activity is based on the use of waste heat for the generation of electricity, displacing imported electricity from grid to the cement manufacturing facility where the project is implemented. In the project activity, no fuel switch is being done in the process where the waste heat is produced. Therefore, all of these applicability criteria clearly apply to the project activity.

B.3. Description of the sources and gases included in the project boundary

The spatial extent of the project boundary comprises the clinker production lines, the waste heat power plant, and the power plants connected physically to Northwest China Grid. The grid comprises Shaanxi Province, Gansu Province, Qinghai Province, Ningxia Autonomous Region, and Xinjiang Autonomous Region.

	Source	**Gas**	**Included?**	**Justification / Explanation**
Baseline	Grid electricity generation/ identified specific generation source	CO_2	Yes	Main source of emissions
		CH_4	No	Excluded for simplification
		N_2O	No	Excluded for simplification
	Captive electricity generation	CO_2	No	No captive electricity generation
		CH_4	No	No captive electricity generation
		N_2O	No	No captive electricity generation
Project Activity	On-site fossil fuel consumption due to the project activity	CO_2	No	The project consumes no fuel
		CH_4	No	The project consumes no fuel
		N_2O	No	The project consumes no fuel
	Combustion of waste gas for electricity generation	CO_2	No	The project utilizes no waste gas
		CH_4	No	The project utilizes no waste gas
		N_2O	No	The project utilizes no waste gas

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

1. Define alternatives to the project activity

This Project Design Document identified plausible project options, which include all possible courses of actions that could be adopted in order to produce electricity for the cement plant.

There are four alternative scenarios available to meet the power requirement equivalent to 6MW.

Alternative Scenario 1 –The proposed project activity XT-WHRPG not undertaken as a CDM project activity;

Alternative Scenario 2 –Electricity is imported from the Northwest China grid.

Alternative Scenario 3 –A new coal-fired captive power plant is constructed, supplying power to the grid.

Alternative Scenario 4 –A new renewable energy power plant with equal capacity is constructed, supplying power to the grid.

Other waste heat utilization methods include:

Alternative Scenario 5 – Collecting the waste heat and utilizing it in other ways.

2. Determine alternatives to the project activity

In determining the baseline scenario, alternatives which are technically unavailable should be excluded first. The project activity area does not have enough renewable resources to generate electricity. Alternative Scenario 4 should thus be excluded from the baseline scenario.

Alternatives do not comply with laws and regulations should then be excluded. The capacity of the waste heat power plant is 6 MW; 7200 operation hours per year. According to the 2005 Chinese Electrical Yearbook, if a coal-fired power plant with the same annual generation as the waste heat plant is built, operation hours should be 4588 and the corresponding capacity should be 9.4MW. At present, it is forbidden to a operate 9.4MW coal based power generation plant in China (Source: http://www.gov.cn/gongbao/content/2002/content_61480.htm). Alternative Scenario 3 should thus be excluded from the baseline scenario.

The project activity is far away from any residential area and can not supply residential heat. At present, other factories have no intention of purchasing the waste heat and the waste heat can not be easily transported. Thus, Alternative Scenario 5 should also be excluded from baseline.

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As show in the B.5 Section of this PDD, the IRR of alternative scenario 1 –The proposed project activity XT-WHRPG not undertaken as a CDM project activity is lower than the benchmark rate 8% of the power industry.

Thus the left alternative scenarios are alternative scenario 1 –The proposed project activity XT-WHRPG not undertaken as a CDM project activity and alternative scenario 2 –Import of electricity from the Northwest China grid.

According to ACM 0004, the scenario that does not face any prohibitive barrier and is the most economically attractive should be considered as baseline scenario.

As show in the table attached for the NPV comparison of scenarios 1 and 2, the results are listed in the following table:

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	Alternative scenario 1(the project without CDM)	Alternative scenarios 2(import of electricity from the NWCG)
NPV	-94.69 Million Yuan	-88.26 Million Yuan

The result of the comparative NPV calculation indicates that alternative scenario 2 is more economically attractive than alternative scenario 1. Therefore, Alternative scenario 1 should be excluded from baseline scenario.

Considering all options mentioned above, Alternative Scenario 2 has been determined as the baseline scenario. Alternative Scenario 2 is the continuation of the current situation: purchasing electricity from Northwest China Grid and venting waste heat into the atmosphere.

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B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality)

As is demonstrated below, the proposed project activity is not the most financially attractive. In the feasibility report of XT-WHRPG, it has been advised that CDM can be helpful in increasing project income. The project owner has fully considered this advice before the construction of the proposed project.

The additionality of the project activity is demonstrated as below in accordance with the "**Tool for the demonstration and assessment of additionality"** (version 3)

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a. Define alternatives to the project activity:

Alternatives to the project activity have been defined in section B.4 as follows.

Project Option 1 –The proposed project activity XT-WHRPG is not undertaken as a CDM project activity;

Project Option 2 – Electricity is imported from the Northwest China grid.

Project Option 3 – A new coal-fired captive power plant is constructed, supplying power to the grid.

Project Option 4 – A new renewable energy power plant with equal capacity is constructed, supplying power to the grid.

Other waste heat utilization methods include:

Project Option 5 – Collecting the waste heat and utilizing it in other ways.

There are no wind power and hydropower resources that can be used to generate electricity in the area, nor is there enough biomass for power generation. Therefore, the construction of a renewable energy power plant is technically unfeasible. Project Option 4 should be excluded from the baseline scenario.

The project activity is far away from any residential area and can not supply residential heat. At present, other factories have no intention of purchasing the waste heat and the waste heat can not be easily transported. Thus, Option 5 should also be excluded from baseline.

Sub-step 1b. Consistency with mandatory laws and regulations:

With the exception of Option 3, all the options are all in compliance with current laws and regulations.

Step 2: Investment analysis

Sub-Step 2a Determine appropriate analysis method

Three options are listed in the *Tool for the demonstration and assessment of additionality*: simple cost analysis (Option I), investment comparison analysis (Option II) and benchmark analysis (Option III). The project generates financial and economic benefits other than CDM income, therefore simple cost analysis (Option I) is not applicable. Investment comparison analysis (Option II) compares returns of the project investment with the investment required for an alternative to the project. The alternative baseline scenario of the proposed project is not a new investment project, but the Northwest China Power Grid. Investment comparison analysis (Option II), therefore, is not suitable for this project. Since the data is available, benchmark analysis (Option III) has been selected.

Sub-step 2 Benchmark Analysis Method (Option III)

With reference to "Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects," the financial benchmark rate of return (after tax) of the Chinese power industry is 8%[4] of the total investment. This number has been widely used in the feasibility studies of power project investments.

[4] Interim Rules on Economic Assessment of Electric Engineering Retrofit Projects, State power company generation and transmission operating department, page 2

Based on the above-mentioned benchmark, the calculation and comparative analysis of financial indicators for the proposed project are carried out in sub-step 2c.

Sub-step 2c Calculation and comparison of financial indicators

Assuming a CER price of €8.4/tCO2e, a 20-year crediting period and an exchange rate of 10.0 CNY/EUR, the IRR analysis results are as follows:

According to the feasibility reports of the proposed project, parameters needed for calculation of key financial indicators are listed in Table B1.

Table B1. Parameters for calculation of key financial indicators

Key Parameters	Unit	Turpan	Urumqi	Total
Installed Capacity	MW	3	3	6
Static Investment	Million RMB	26.68	27.21	53.89
Including:				
construction expenses	Million RMB	4.70	4.79	9.49
equipment purchase	Million RMB	14.66	14.96	29.62
installation expenses	Million RMB	4.32	4.41	8.73
other expenses	Million RMB	3.00	3.05	6.05
power purchase reduced	GWh	17.79	18.85	36.64
wire loss reduced	GWh	0.456	0.58	1.036
Electricity Sales Price(Excluding VAT)	RMB/MWh	360	359	
Annual Revenue of Electricity Sales	Million RMB	6.57	6.98	13.55
Operating Costs	Million RMB	3.64	4.05	7.69
Including:				
material costs	Million RMB	0.83	1.28	2.11
repair expenses	Million RMB	0.56	0.57	1.13
wage and welfare	Million RMB	1.23	1.23	2.46
other expenses	Million RMB	1.02	0.97	1.99
Build Period	Year	1	1	1
Life of Plants	Year	20	20	20
Value Added Tax(VAT)		17%	17%	17%
Income Tax		33%	33%	33%

Data source: Feasibility Reports of the proposed project

Comparison of financial indicator

Table B2. Financial indicators of this project

	Project IRR of total investment before tax		
	The whole project	Turpan	Urumqi
Without CDM	6.08%	6. 18%	5.97%
With CDM revenue	11.55%	11.54%	11.56%

In accordance with benchmark analysis (Option III), if the financial indicators of the proposed project, such as the project IRR, are lower than the benchmark values, the proposed project is not considered as financially attractive. The project IRR for the whole project without CDM revenue is 6.08%, the project IRR for the production line of Turpan is 6.18%, and the project IRR for the production line of Urumqi is 5.97%, all of that are lower than the benchmark rate of 8%. With the CDM revenue, all of the project

IRR is significantly improved and exceeds the benchmark. Therefore, with CDM revenue, the proposed project becomes financially viable to the investors.

Sub-step 2d. Sensitivity analysis

The objective of sensitivity analysis is to show whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions. The investment analysis provides a valid argument in favour of additionality only if it consistently supports (for a realistic range of assumptions) the conclusion that the project activity is unlikely to be the most financially attractive or is unlikely to be financially attractive.

For the project, the following financial parameters were taken as uncertain factors for sensitive analysis of financial attractiveness.

-Total Investment
-Operating Hour
-Operating Costs

As the electricity sales price is regulated by the government and it is quite stable, it is not included in the parameters.

Sensitivity analysis for the whole project, the production line of Turpan and the production line of Urumqi are listed below:

Table B3. Sensitivity test for the whole project (without CDM)

Range Parameter	-10%	-7.5%	-5%	-2.5%	0%	+2.5%	+5%	+7.5%	+10.0%
Total Investment	7.13%	6.85%	6.58%	6.33%	6.08%	5.84%	5.61%	5.39%	5.17%
Operating Hour	3.67%	4.30%	4.90%	5.50%	6.08%	6.64%	7.20%	7.74%	8.28%
Operating Costs	7.38%	7.06%	6.73%	6.41%	6.08%	5.74%	5.40%	5.06%	4.71%

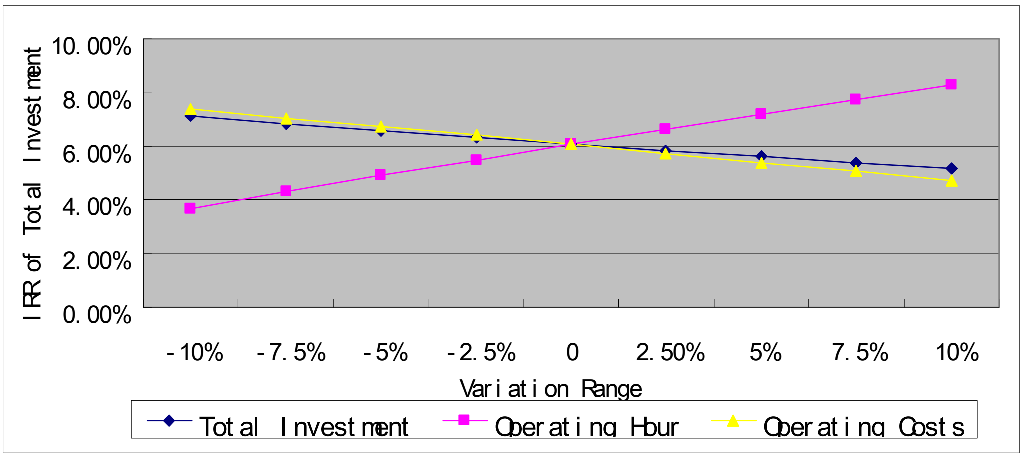


Figure B1. IRR of total investment sensitivity to different financial parameters for the whole project (Without CER sales revenues)

Table B4. Sensitivity test for the production line of Turpan (without CDM)

Range Parameter	-10%	-7.5%	-5%	-2.5%	0%	+2.5%	+5%	+7.5%	+10.0%
Total Investment	7.24%	6.96%	6.69%	6.43%	6.18%	5.95%	5.72%	5.49%	5.28%
Operating Hour	3.83%	4.45%	5.04%	5.62%	6.18%	6.74%	7.28%	7.81%	8.33%
Operating Costs	7.42%	7.12%	6.81%	6.50%	6.18%	5.86%	5.54%	5.21%	4.88%

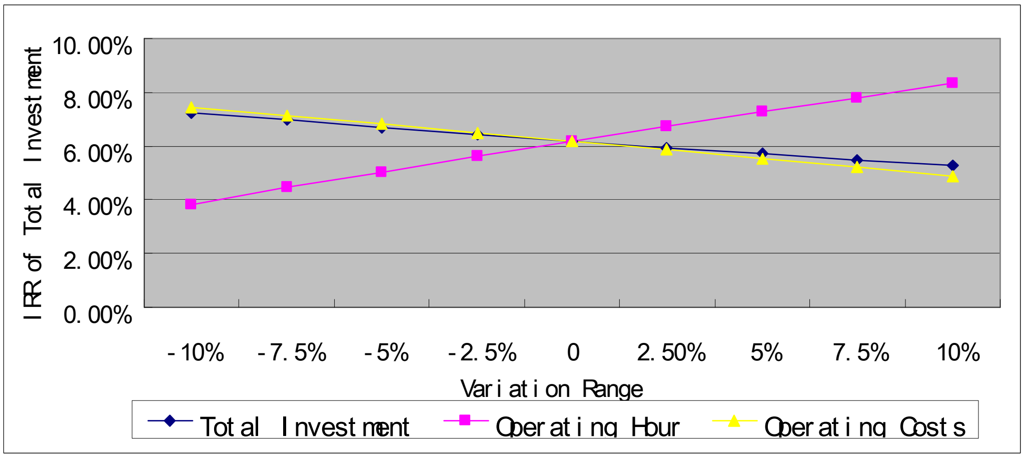


Figure B2. IRR of total investment sensitivity to different financial parameters for the production line of Turpan (Without CER sales revenues)

Table B5. Sensitivity test for the production line of Urumqi (without CDM)

Range Parameter	-10%	-7.5%	-5%	-2.5%	0%	+2.5%	+5%	+7.5%	+10.0%
Total Investment	7.01%	6.74%	6.47%	6.22%	5.97%	5.74%	5.51%	5.30%	5.09%
Operating Hour	3.50%	4.15%	4.77%	5.38%	5.97%	6.55%	7.12%	7.68%	8.22%
Operating Costs	7.33%	7.00%	6.66%	6.32%	5.97%	5.62%	5.27%	4.91%	4.54%

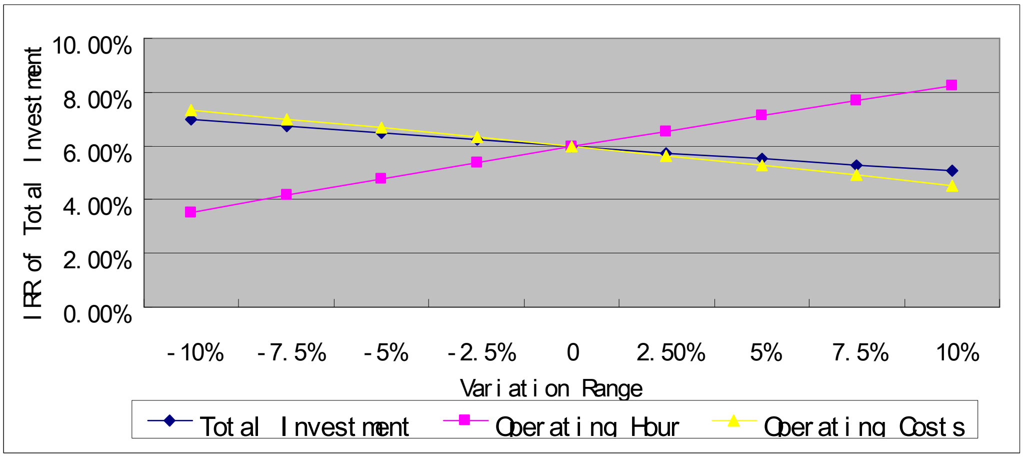


Figure B3. IRR of total investment sensitivity to different financial parameters for the production line of Urumqi (Without CER sales revenues)

As shown in Figure B1,B2,B3, the IRR of total investment is lower than the benchmark rate when the parameters of total investment and operating costs variables vary between -10%~10%. Among the three financial indicators, the impact of operating hour on IRR is more significant. When operating hour increases by 10%, the IRR of total investment is slight higher than the benchmark. According to the document provided by the Xinjiang Jiancai Design Institute, it stated that the highest project operating hours using this kind of technics are no more than 7700 hours per year according to the historical operating records, less than 7% variation of operating hours. The sensitivity analysis is thus satisfied.

The above sensitivity analysis shows that there is clear evidence that the implementation of this type of project without CER sales is not above the typical rate of the economically attractive course of action in China. If the project is not as a registered CDM project, it is not financially viable, even when the possible variations of the main parameters are considered.

Step 4 Common practice analysis

Sub-step 4a. Analyze other activities similar to the proposed project activity:

Projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, and access to technology, access to financing, etc.

At present there is no other Waste Heat Recovery Project except XT-WHRPG in Xinjiang Autonomous Region.

Sub-step 4b. Discuss any similar options that are occurring:

There are no similar projects that are occurring.

Therefore, the XT-WHRPG project activity is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

As per methodology ACM0004, the baseline in this project is supplying electricity by the existing grid.

Baseline emissions

Baseline emissions are given as:

$$BE_{electricity,y} = EG_y \cdot EF_{electricity,y} \quad (1)$$

Where:

EG_y Net quantity of electricity supplied to the manufacturing facility by the project during the year y in MWh, and

EF_y CO_2 baseline emission factor for the electricity displaced due to the project activity during the year y (tCO_2/MWh) , due to in the baseline scenario electricity is supplied from the grid, then $EF_{Elec,\,y}$ is the emission factor of the grid - $EF_{Grid,y}$

According to methodology ACM0002, the baseline emission factor $EF_{Captive,\,y}$ is estimated ex-ante as follows:

$$EF_y = w_{OM} \cdot EF_{OM,y} + w_{BM} \cdot EF_{BM,y} \quad (2)$$

Where the weights w_{OM} and w_{BM}, by default, are 50% (i.e., $w_{OM} = w_{BM} = 0.5$), and $EF_{OM,\,y}$ and $EF_{BM,\,y}$ are calculated as following formula (3) and (4) and are expressed in tCO_2/MWh.

$$EF_{OM,simple,y} = \frac{\sum_{i,j} F_{i,j,y} \cdot COEF_{i,j}}{\sum_j GEN_{j,y}} \quad (3)$$

Where:

$F_{i,j,y}$ is the amount of fuel i (in a mass or volume unit) consumed by relevant power sources j in year(s) y,

j refers to the power sources delivering electricity to the grid, not including low-operating cost and must run power plants, and including imports[6] to the grid,
$COEF_{i,j\,y}$ is the CO_2 emission coefficient of fuel *i* (tCO_2 / mass or volume unit of the fuel), taking into account the carbon content of the fuels used by relevant power sources *j* and the percent oxidation of the fuel in year(s) *y*, and
$GEN_{j,y}$ is the electricity (MWh) delivered to the grid by source *j*.

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \cdot COEF_{i,m}}{\sum_{m} GEN_{m,y}} \qquad (4)$$

Where $F_{i,m,y}$, $COEF_{i,m}$ and $GEN_{m,y}$ are analogous to the variables described for the simple OM method above for plants *m*.

The CO_2 emission coefficient $COEF_i$ is obtained as

$$COEF_i = NCV_i \cdot EF_{CO2,i} \cdot OXID_i \qquad (5)$$

Where:
NCV_i is the net calorific value (energy content) per mass or volume unit of a fuel *i*,
$OXID_i$ is the oxidation factor of the fuel (see page 1.29 in the 1996 Revised IPCC Guidelines for default values),
$EF_{CO2,i}$ is the CO_2 emission factor per unit of energy of the fuel *i*.

The EF_{IGS} should be calculated at the start of the crediting period and be fixed for the whole crediting period.

Project emissions

As per the methodology ACM0004, project emissions are applicable only if auxiliary fuels are fired for generation startup, in emergencies, or to provide additional heat gain before entering the Waste Heat Recovery Boiler. In the project activity there is no provision of auxiliary fuel firing, thus there would not be any emissions in this project activity.

Leakage
As per ACM0004 (Version 02), LEy = 0.

Emission reductions
The emission reduction ER_y by the project activity during a given year *y* is the difference between the baseline emissions though substitution of electricity generation with fossil fuels (BE_y) and project emissions (PE_y), as follows:

$$ER_y = BE_y - PE_y \qquad (6)$$

Where:
ER_y are the emissions reductions of the project activity during the year *y* in tons of CO_2,
$BE_{,y}$ are the baseline emissions due to displacement of electricity during the year *y* in tons of CO_2,

PE_y are the project emissions during the year *y* in tons of CO_2
PE_y is zero Then $ER_y = BE_y$.

B.6.2. Data and parameters that are available at validation:

(Copy this table for each data and parameter)

Data / Parameter:	NCV_i
Data unit:	GJ/ton
Description:	Net Calorific Value (energy content) per ton (or litre or cubic meter) of fuel i
Source of data used:	China Energy Statistical Yearbook
Value applied:	Listed in Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	The NCV_i data are reported on China Energy Statistical Yearbook
Any comment:	

Data / Parameter:	$EF_{CO2,\ i}$
Data unit:	tonne CO_2/GJ
Description:	the CO_2 emission factor per unit of energy of fuel i
Source of data used:	IPCC
Value applied:	Listed in annex III
Justification of the choice of data or description of measurement methods and procedures actually applied :	The $EF_{CO2,\ i}$ data are reported on IPCC website, www.ipcc.ch.
Any comment:	

Data / Parameter:	$Gen_{j,y}$
Data unit:	GWh
Description:	The generation of province j in year y
Source of data used:	China Electric Power Yearbook
Value applied:	Listed in annex III
Justification of the choice of data or description of measurement methods and procedures actually applied :	The $Gen_{j,\ y}$ data are quoted from China Electric Power Yearbook.
Any comment:	

Data / Parameter:	$GEN_{j,y}$
Data unit:	MWh
Description:	Electricity (MWh) delivered from each province in Northwest China to the grid excluding low operating cost/must run power plants in year *y*
Source of data used:	China Electric Power Yearbooks
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Since the detailed generation data by power plants are not publicly available, therefore the aggregated data by fuel types are used instead.
Any comment:	

Data / Parameter:	$F_{i,j,y}$
Data unit:	Ton or m^3
Description:	Amount of fuel *i* consumed in year(s) *y* for generation
Source of data used:	China Electric Power Yearbooks
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Since the detailed fuel consumption data by power plants are not publicly available, therefore the aggregated data by fuel types are used instead.
Any comment:	

Data / Parameter:	$Capacity_{j,y}$
Data unit:	MW
Description:	Installed capacity data of province j in Northwest China in year y
Source of data used:	China Electric Power Yearbooks
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the latest CDM EB deviation clarification, since no data available at power plant level, the above samples are composed by the installed capacity increment by fuel type. For the proposed project, the samples include the installed capacity increment of thermal power, hydro power and others.
Any comment:	

Data / Parameter:	ASCC
Data unit:	gce/kWh
Description:	Assumed Standard Coal Consumption, based on the most advanced commercially available domestic technology.
Source of data used:	Official data from Chinese DNA
Value applied:	343.33 gce/kWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1374.pdf
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

Calculation of electricity baseline emission factor

Northwest China Grid covers the area of Shaanxi Province, Gansu Province, Qinghai Province, Ningxia Autonomous Region, and Xinjiang Autonomous Region.

Firstly, the emission factors of Operating Margin ($EF_{OM,y}$)and Build Margin ($EF_{BM,y}$) were calculated, then, the baseline emission factor (EF_y) was calculated as the weighted average of the previous two factors. All the calculation is in compliance with requirement of baseline methodology ACM0002 (Ver. 6).

STEP 1. Calculate the Operating Margin emission factor ($EF_{OM, y}$)

As indicated before, 'Simple OM' (1) method is applicable to this project activity.

As is defined, Simple OM emission factor ($EF_{OM\ Simple,\ y}$) is the generation-weighted average emissions per electricity unit (tCO_2/MWh) of all generating sources serving the system, not including low-operating cost and must-run power plants. Therefore it should be calculated from total emission divided by the generation of all thermal power plants.

$$EF_{OM,y} = \frac{\sum_{i,j} F_{i,j,y} \times COEF_{i,j}}{\sum_{j} GEN_{j,y}}$$

Where:

$F_{i,j,y}$ is the amount of fuel *i* (in a mass or volume unit) consumed by relevant power sources *j* in year(s) *y;*

$COEF_{i,j,y}$ is the CO2 emission coefficient of fuel *i* (tCO2 / mass or volume unit of the fuel), taking into account the carbon content of the fuels used by relevant power sources *j* and the percent oxidation of the fuel in year(s) *y*,

$GEN_{j,y}$ is the electricity (MWh) delivered to the grid by source *j*.

Either of the following data vintages for year(s) can be used in the calculation of the Simple OM emission factor according to the provision of the methodology.

(i) (ex-ante) the full generation-weighted average for the most recent 3 years for which data are available at the time of the PDD submission, if or

(ii) The year in which project generation occurs, if $EF_{OM, y}$ is updated based on ex post monitoring.

Based on the most recent statistics available of the project activity at the time of PDD submission, the first data vintages (ex-ante) for the calculation of the OM emission factor was chosen for this project, ex-post calculation would not be needed. The generation data for various power generating sources for the most recent three years are presented in the Annex III attached.

The CO_2 emission coefficients of each fuel are calculated as

$COEF_{i,j\ y} = NCV_i * EF_{CO2,i} * OXID_i$

Where:

$COEF_{i,j\ y}$ - is the CO_2 emission coefficient of fuel i (t CO_2 / mass or volume unit of the fuel) in year y
NCV_i - is Net Calorific Value (energy content) per mass or volume unit of a fuel I
$EF_{CO2,i}$ - is the CO_2 emission factor per TJ of fuel i (tC/TJ)
$OXID_i$ - is oxidation factor of the fuel i

All key information and data used to acquire the Simple OM emission factor have been listed in Annex III.

Based on the data of the most recent three years (attached in Annex III), Simple OM $EF_{OM,\ y}$ can be calculated as the table below shows. $GEN_{Thermal,\ y}$ is the net thermal generation delivered to the Northwest China Grid in year y.

Table B6. Calculation of Simple OM in Northwest China

		2003	2004	2005
A	CO_2 emission(tCO_2)e	112066654.1	138716096.2	147447078.8
B	$GEN_{Thermal,\ y}$ (MWh)	105651775	122605242.6	125,496,682
C=A/B	Operation Margin (tCO_2/MWh)	1.060	1.131	1.175

As per methodology ACM0002, the EF_{OM} Average is the generation-weighted average for the most recent three years for which data are available at the time of PDD submission, thus the EF_{OM} Average for the Northwest China Grid is **1.1257** (ton of CO_2/MWh)

STEP 2. Calculate the Build Margin emission factor (EF *BM, y*)

As per Step 2 the Build Margin emission factor ($EF_{BM,\ y}$) is calculated as the generation-weighted average emission factor (tCO_2/MWh) of a sample of power plants.

This project adopted the Option 1, which requires the project proponent to calculate the Build Margin emission factor $EF_{BM,\ y}$ ex ante based on the most recent information available on plants already built for sample group m at the time of PDD submission. The sample group m consists of either:

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

Project participants should use one from these two sample groups that comprises the larger annual generation.

For the project activity under discussion the sample group ‘m’ consists of (b) the capacity additions that comprise 20% of the system generation (in MWh) and that have been built most recently, because it comprises the larger annual generation than option (a). None of the power plant capacity additions in the sample group have been registered as CDM project activities.

According to the latest CDM EB deviation clarification and detailed explanations by Chinese DNA[5], the BM of Northwest China Grid is calculated as follows:

i. Since no data available at power plant level, the above samples are composed by the installed capacity increment by fuel type. For the proposed project, the samples include the installed capacity increment of thermal power, hydro power and others.

ii. Find the start year t_0 which meets the following equation:

$$\sum_i CAP_{i,t-t0} \geq 20\% \times \sum_i CAP_{i,t}$$

Where:
t is the most recent year in which data are available;
$CAP_{i,t-t_0}$ is the installed capacity increment of type i during the starting year t_0 to the current year t;
$CAP_{i,t}$ is the installed capacity of type i in the current year t.

According to official statistics obtained recently, comparing with system capacity in year 2004, the increased capacity comprised less than 20% (12.17%) of the whole system capacity in 2005. Comparing with system capacity in year 2003, the newly added capacity comprised 21.02% of the whole system capacity in 2004. Therefore, system capacity in 2003 was chosen to compare with that in 2005 to determine the newly added amount as the sample group m.

From the table "The CO_2 Emission of Northwest China Grid in Year 2005" in Annex III, it can be seen that, in the base year the CO_2 emissions generated by coal consumption in power generation are 144645225.6 tCO_2e, consisting 98.1% of total emissions in year 2005. The CO_2 emissions generated by the oil and gas are 2801853.2 tCO_2e, only consisting 1.9% of total emissions in year 2005. Since the percentage of newly added capacity from individual oil or gas type is unknown, only 98.1% of the newly added thermal (coal) capacity out of all thermal power plants is considered for BM calculation. The emissions from other oil and gas sources will be ignored. This approach is conservative.

Table B7. Composition of new capacity addition by fuel types

	System Capacity 2003 (MW)	System Capacity 2005 (MW)	Newly added System Capacity 2005 (MW)
Thermal power plants	20492.7	25362.6	4869.9
Hydropower plants	9382	12219.8	2847.8
Other plants	122.9	399.5	276.6
Total	29997.6	37981.9	7984.3

[5].http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_QEJWJEF3CFBP1OZAK6V5YXPQKK7WYJ

http://cdm.ccchina.gov.cn/UpFile/File678.DOC

The CO_2 emission coefficient of fuel is calculated as

$COEF_{i,j\ y} = NCV_i * EF_{CO2,i} * OXID_i$

Where:

$COEF_{i,j\ y}$ - is the CO_2 emission coefficient of fuel i (t CO_2 / mass or volume unit of the fuel) in year y

NCV_i - is Net Calorific Value (energy content) per mass or volume unit of a fuel I

$EF_{CO2,i}$ - is the CO_2 emission factor per TJ of fuel i (tC/TJ)

$OXID_i$ - is oxidation factor of the fuel i

Table B8. Basic Data used for BM emission factor calculation

Parameters	**2003**	**2004**	**2005**
Fuel type	**Coal**	**Coal**	**Coal**
NCV_i (GJ/ton)	29.27	29.27	29.27
$EF_{CO2,i}$ (tC/TJ)	25.8	25.8	25.8
$OXID_i$	1	1	1
***$COEF_{i,j\ y}$*(tCO_2/ton of fuel)**	2.769	2.769	2.769

Data sources:

NCV: China Energy Statistics Yearbook 2006

EF_{CO2}: IPCC Good Practice Guidance,

OXID: IPCC Good Practice Guidance,

It is conservatively assumed by Chinese DNA that ASCC (Assumed Standard Coal Consumption) of the most advanced commercially available coal-fired power technology is 343.33 g/kWh[*], and this value is commonly accepted in Chinese power sector. The BM EF_{Bmy} (tCO_2/MWh) is calculated based on the following table.

The BM $EF_{BM,y}$ (tCO_2/MWh) is calculated based on the following table

Table B9. Calculation of the weighted average BM $EF_{BM,y}$ (tCO_2/MWh)

A	B	C	D=C*98.1%	E	F=D/E	F=A*B*F/1000
Assumed Standard Coal Consumption (kg/MWh)	COEF	Newly Added Thermal Capacity	Newly Added Coal-Fired Capacity	Newly Added System Capacity	Fraction of New Coal-Fired Capacity Addition (%)	EF_{BMy} (tCO_2/MWh)
343.33	2.769	4869.9	4777.4	7984.3	59.83	0.569

$EF_{BM,y}$ (ton of CO_2/MWh) is 0.5739

STEP 3: Calculate the baseline emission factor EF_y

[*] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1374.pdf.

As per Step 3 the baseline emission factor EF $_y$ is calculated as the weighted average of the Operating Margin emission factor (EF $_{OM,y}$) and the Build Margin emission factor (EF $_{BM,y}$), where the weights w $_{OM}$ and w $_{BM}$, by default, are 50% (i.e., w $_{OM}$ = w$_{BM}$ = 0.5), and EF $_{OM,y}$ and EF $_{BM,y}$ are calculated as described in Steps 1 and 2 above and are expressed in tCO_2/MWh.

The most recent 3-years weighted average of the Simple OM and the BM of the base year i.e. 2005 are considered. The Baseline Emission Factor was calculated as a combined margin (CM), consisting of the simple average of both the resulting OM and BM.

CM=0.5*OM + 0.5*BM = 0.5*(1.1257+0.5739) =0.8498 tCO_2e/MWh
The Baseline Emission Factor, $EF_{electricity,y}$ is **0.8498** tCO_2e/MWh
According to formula (1) in Section B.6.1：

$$BE_{electricity,y} = EG_y \times EF_{electricity,y}$$

EG_y = 36,641MWh
$EF_{electricity,\,y}$ = 0.8498(tCO_{2e}/MWh)
Therefore，$BE_{electricity,y}$ = 31,138 t

Calculation of project emissions

According to B.6.1, the ex-ante estimate of project emissions is zero.

Calculation of emission reductions

Because the project emissions are expected to be zero, the total net emission reductions due to the project activity are equal to baseline emissions and are presented in Section B.6.4.

B.6.4 Summary of the ex-ante estimation of emission reductions:

Year	**Estimation of project activity emissions (tonnes of CO_2e)**	**Estimation of baseline emissions (tonnes of CO_2e)**	**Estimation of leakage (tonnes of CO_2e)**	**Estimation of overall emission reductions (tonnes of CO_2e)**
June 1,2008- December 31,2008	0	18,164	0	18,164
2009	0	31,138	0	31,138
2010	0	31,138	0	31,138
2011	0	31,138	0	31,138
2012	0	31,138	0	31,138
2013	0	31,138	0	31,138
2014	0	31,138	0	31,138
January 1,2015- May 31,2015	0	12,974	0	12,974
Total	0	217,966	0	217,966

(tonnes of CO_2e)				

B.7 Application of the monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

(Copy this table for each data and parameter)

Data / Parameter:	Total Electricity Generated
Data unit:	MWh/yr
Description:	Electricity supplied to the cement plant by the project
Source of data to be used:	Feasibility report
Value of data applied for the purpose of calculating expected emission reductions in section B.5	36,641MWh
Description of measurement methods and procedures to be applied:	Monitoring location: meters at plant and DCS will measure the data. Manager Incharge would be responsible for regular calibration of the meter.
QA/QC procedures to be applied:	Electricity meters would be properly maintained with regular testing and calibration schedules developed as per the technical specification requirements to ensure accuracy.
Any comment:	

Data / Parameter:	Auxiliary Electricity
Data unit:	MWh/yr
Description:	electrical energy utilized by the power generating equipment in the project boundary
Source of data to be used:	Online measurement
Value of data applied for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Monitoring location: meters at plant and DCS will measure the data. Manager Incharge would be responsible for regular calibration.
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	Net Electricity supplied to facility
Data unit:	MWh/yr
Description:	
Source of data to be used:	Calculated (EG_{GEN} - EG_{AUX})
Value of data applied for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	
Any comment:	

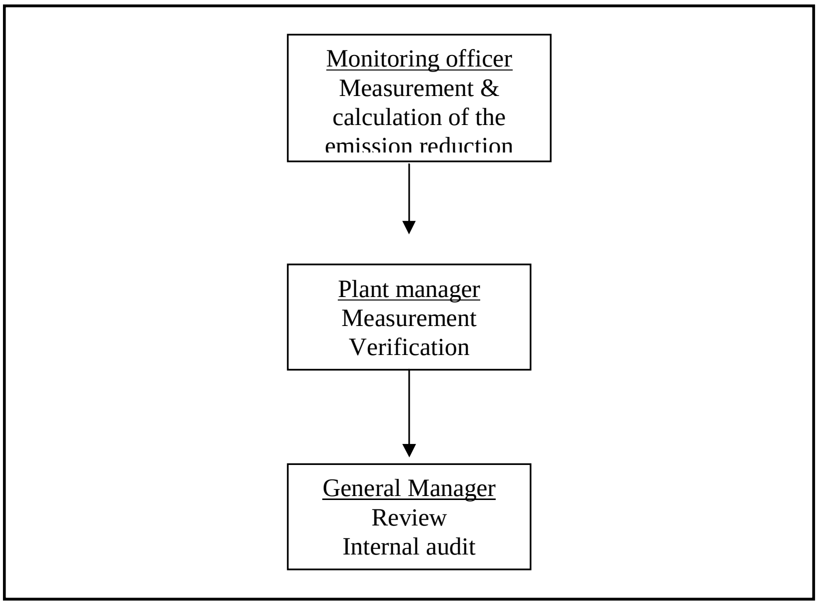
B.7.2 Description of the monitoring plan:

According to the methodology, the data that needs to be monitored is the total generation of the project and electrical energy utilized by the power generating equipment in the project boundary. These two data points will be directly measured with measuring instruments.

1. Outline of the monitoring plan of the project activity

The general manager is responsible for the overall monitoring process. In the first step of the process, the total generation of the project and electrical energy utilized by the power generating equipment in the project boundary should be measured and reported daily. This will be organized and checked by the plant manager. He or she should appoint a monitoring officer whose is responsible for measuring the two data points. This measurement should then be checked weekly by the plant manager. The monitoring officer should calculate the net electricity supplied to the facility and the subsequent emission reductions. The monitoring officer will prepare operational reports of the project activity and record the daily operation of the plant; including operation periods, power generation, equipment defects, etc. Finally, the monitoring reports will be reviewed by the general manager. The operational and management structure of monitoring the project's emission reductions has been outlined below. All the monitoring personnel are trained before they go to post.

Figure B4. Management structure for monitoring the emission reduction



2. The installation and operation of monitoring instruments

In order to precisely measure the two data points, meters at the plant and at DCS will measure the data. The shift manager is responsible for regular calibration. The metering instruments at both locations will be calibrated according to regulations and their margin of error should be guaranteed at no more than 0.5 s. If there are any substantial discrepancies between the readings of the metering instruments, the grid company's data will be adopted. The calibration procedures will be carried out according to "Verification Regulations of Electrical Energy Meters with Electrodes", as implemented by the Nationa1 Monitoring Bureau of Technology (NMBT) since February 7, 1990.

3. Data record

The plant manager and monitoring officer should be trained on implementing the monitoring process before the plants are put into operation to assure that they have fully understood their responsibilities and the requirements of the monitoring plan. During the monitoring process, the monitoring officer should record the meter once an hour, and record the data on to the electricity statistic sheet on site. Records cannot be altered and all original data must be conserved. If the monitoring officer cannot reach the site to record, the plant manager should assign other employee to take over this duty. The record should be handed over to the monitoring officer without any delay when he or she arrives on site and both people should sign it. The plant manager should check and verify the electricity statistic sheet every week and report results to the general manager after doing so.

4. QA & QC and procedures in case of emergency

Two electricity meters should be installed to the output side of the transformer, one daily measurement meter one alternate. They should have the same margin of error. If the daily measurement meter needs to be repaired or calibrated, the alternate meter should be put into operation. If the backup meter fails under these cirumstances, the value from the grid company should be used alone.

Data record will be archived for a period of 2 years after the first crediting period to which the records pertain.

B.8 Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)

Date of completion of baseline and monitoring study: 07/03/2007

Name of the responsible person(s)/entity(ies)

Ms. Dan SONG, Mr. Yixing CHEN, Dr. Jun GUO, Ms. Fang ZHANG
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Xinjiang Autonomous Region
830011, P.R., China

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

The starting date of the Project Activity will be 01/08/2007.

C.1.2. Expected operational lifetime of the project activity:

The expected operational life of the project is 20 years.

C.2 Choice of the crediting period and related information:

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

01/06/2008

C.2.1.2. Length of the first crediting period:

7 years

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

Not applicable

C.2.2.2. Length:

Not applicable

SECTION D. Environmental impacts

D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

An Environmental Impact Assessment (EIA) was performed on the proposed project activity to ensure that the project complied with national, regional and local environmental regulations. The EIA for this project was carried out by the Xinjiang Research Institute of Environmental Protection Science (XRIEPS). XRIEPS, an official Environmental Impact Assessment institute, is certified by the State Environmental Protection Agency (SEPA) and is independent from the project owner, XT-WHRPG, both financially and administratively. The following is a brief summery of the EIA report.

1. Air quality

Air pollution during the construction period includes suspended particles from the transportation and agitation of construction materials and from the tail gas emitted from the exhaust pipe of the construction vehicles and machines. The area affected by the air pollution is contained mainly within the project's construction, and thus the impact extent is quite small. There will be no air pollution caused by the project during its operation period.

2. Water

During the construction period, water will be polluted mainly by human waste and will thus have no influence on the surrounding environment. During the project's operation period, waste water will result from project processes. It will be cleaned to meet GB18483-2001's Standard 1 and will not be dispersed directly in bodies of water. Therefore, there will be no waste water drainage.

3. Solid waste
Solid waste produced during the construction period will be collected and regularly clean by the local Environmental Sanitation Bureau. Project construction will thus not cause solid waste pollution in the project area. During the operation period, the main solid waste will be boiler ash, which will be collected and used in the clinker product line. Therefore, there will be no negative impacts resulting from project activity.

4. Ecological Environment
There is no vegetation or wildlife at the project location. Therefore, the project does not influence to the the ecological environment.

5. Noise
The project is located far from any residential area; therefore it will not cause noise pollution to local people.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

Host party regulations require that the project owner to obtain environmental clearance in the form of a "No Objection Certificate" from the local Pollution Control Board and carry out an EIA study to research any significant environmental impacts. XT-WHRPG has carried out the EIA study and has obtained the necessary clearances. The study indicated that the environmental impacts are not negative.

The Environmental Protection Administration of Xinjiang Uygur Municipality (SUMEPA) approved the the EIA reports of the two project lines on 22 December 2006 and 12 January 2007. The respective file numbers are [2006] (17) and [2007] (02).

SECTION E. Stakeholders' comments

E.1. Brief description how comments by local stakeholders have been invited and compiled:

The project proponent conducted a public survey of local residents and the cement plants' workers in December 2006. A total of 50 questionnaires were randomly distributed in order to fairly reflect public opinion and concern. 50 valid questionnaires were returned. Because the project activity is implemented within the boundary of the cement plant and is quite far away from the local villages, the questionnaires were mainly distributed to the local villagers and employees of the cement plant. The questions are:

1. How much do you know about the XT-WHRPG project?
2. In which aspects do you know about the project?
3. What is your attitude towards the project?
4. What do you think of the impact of the XT-WHRPG project?
5. Do you think the XT-WHRPG project has any negative impact?

6. Do you support the construction of the XT-WHRPG project?
7. What do you think are the local area's main environmental problems?
8. Do you think the XT-WHRPG project will improve the local environment?

The project was supported by all 50 people surveyed. A brief summary of the survey results was circulated to all stakeholders and is available in the corresponding project report. The opinions expressed by the stakeholders were recorded and are available on request.

E.2. Summary of the comments received:

Almost all people had known about the project and 98% of them were willing to support project activity. In addition, 30% believed that the project activity will improve the local environment while the remaining 70% believed that the project activity will have no influence on the local environment.

The questionnaires show that all people who took part in the survey agree that the project should be implemented. 94% of them support immediate project implementation. Only three people thought that the project should be implemented in one year. They were most concerned about negative impacts of the project on the plants cash flow, on its environmental impact.

E.3. Report on how due account was taken of any comments received:

None of the survey participants opposed the project. Those suggesting that the project start in one year suggested as such because they believed that later start and CDM funds would improve the project's financial situation.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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<u>Annex 2</u>

INFORMATION REGARDING PUBLIC FUNDING

No public funding from parties included in Annex I is available to the project activity.

Annex 3

BASELINE INFORMATION

Electricity generation in each province in Northwest China in most recent five years

Province	Generation of 2001(GWh)		Generation of 2002(GWh)		Generation of 2003(GWh)			Generation of 2004(GWh)			Generation of 2005(GWh)		
	Thermal	Hydro	Thermal	Hydro	Thermal	Hydro	Other	Thermal	Hydro	Other	Thermal	Hydro	Other
Shaanxi	28182	2703	31941	2841	38144	4560		44439	7043		43117	5454	241
Gansu	18485	11030	23504	10759	29494	9812	33	33242	12047	438	33924	16591	326
Qinghai	4651	9520	4980	9184	6446	7136		6208	11071		5531	16058	
Ningxia	13500	844	15505	861	19175	822	1	25298	984	46	29057	1668	148
Xinjiang	16330	3350	17498	3782	19834	3569	208	22752	3668	221	17052	3006	229
Total	81148	27446	93428	27427	113093	25899	242	131939	34813	705	128681	42777	944

Data Source:
China Electric Yearbook 2001 P617,
China Electric Yearbook 2003 P585,
China Electric Yearbook 2004 P709,
China Electric Yearbook 2005 P474
China Electric Yearbook 2006 P572,

Electricity capacity in each province in Northwest China in most recent three years

Province	Capacity of 2003(MW)			Capacity of 2004(MW)			Capacity of 2005(MW)		
	Thermal	Hydro	Other	Thermal	Hydro	Other	Thermal	Hydro	Other
Shaanxi	7326.4	1462.3	0	7640.4	1876.5		9132.1	1578	46
Gansu	4745	3280.6	21.6	4975.6	3566.1	138.2	5715	4036.2	109.1
Qinghai	905.8	3341.1	0	889.8	4053.4		886.8	4825	
Ningxia	3102	308.2	1	3782	366.2	42.5	4577	428.5	112.2
Xinjiang	4413.5	989.8	91.3	4959.7	973	95.3	3203.6	854.2	105.4
Total	20492.7	9382	113.9	22247.5	10835.2	276	23514.5	11721.9	372.7

Data Source:
China Electric Power Yearbook 2004 P709,
China Electric Power Yearbook 2005 P473
China Electric Power Yearbook 2006 P616,

The CO_2 Emission Calculation Table for Northwest China Grid in Year 2003

Fuel	Unit	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Sub total
		A	**B**	**C**	**D**	**E**	**F=A+B+C+D+E**
Raw Coal	Kilo tons	20022.6	14796.2	3306.7	6820	10657.5	55603
Cleaned Coal	Kilo tons						0
Other Washed Coal	Kilo tons				270	36.4	306.4
Coke	Kilo tons						0
Coke Oven Gas	Million m^3		154				154
Other Coal Gas	Million m^3		12				12
Crude Oil	Kilo tons						0
Diesel	Kilo tons	31.2			0.4	4	35.6
Fuel Oil	Kilo tons		11.9			10.2	22.1
liquefied petroleum gas	Kilo tons						0
Refinary Gas	Kilo tons					34.8	34.8
Natural Gas	Million m^3	10	54			595	659
Other Energy	Kilo tce		58.6			23	81.6

	EF_{CO2}	OXID	NCV	CO_2 Emission（tCO_2e）
	（tc/TJ）	（%）	（MJ/t,km^3）	J=G*H*I*F*44/12/100000（Mass Unit）
	G	H	I	J=G*H*I*F*44/12/100000 (Volume Unit)
Raw Coal	25.8	100	20908	109976995.8
Cleaned Coal	25.8	100	26344	0
Other Washed Coal	25.8	100	8363	242405.2347
Coke	25.8	100	28435	0
Coke Oven Gas	12.1	100	16726	114279.8375
Other Coal Gas	12.1	100	5227	2782.8548
Crude Oil	20	100	41816	0
Diesel	20.2	100	42652	112463.6562
Fuel Oil	21.1	100	41816	71497.13619
liquefied petroleum gas	17.2	100	50179	0
Refinary Gas	18.2	100	46055	106954.4476
Natural Gas	15.3	100	38931	1439275.177
Other Energy	0	100	0	0
			Sub Total	112066654.1

Data Source: China Energy Statistical Yearbook 2004

Thermal Power Generation of Northwest China Grid in Year 2003

Province	Generation（MWh)	Aux power ratio（%）	Electricity Delivered to the Grid (MWh)
Shaanxi	38144000	6.94	35496806
Gansu	29494000	6.35	27621131
Qinghai	6446000	4.5	6155930
Ningxia	19175000	5.25	18168313
Xinjiang	19834000	8.19	18209595
Total			105651775

Data Source: China Electric Power Yearbook 2004

The CO_2 Emission Calculation Table for Northwest China Grid in Year 2004

Fuel	Unit	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Sub total
		A	B	C	D	E	F=A+B+C+D+E
Raw Coal	Kilo tons	24287	15959	3228	12701	12409	68584
Cleaned Coal	Kilo tons						0
Other Washed Coal	Kilo tons				1026.4	105	1131.4
Coke	Kilo tons	7.8					7.8
Coke Oven Gas	Million m^3		30				30
Other Coal Gas	Million m^3	74	126				200
Crude Oil	Kilo tons	0.1				0.6	0.7
Gasoline	Kilo tons	0.2					0.2
Diesel	Kilo tons	21.6	3.6		0.5	4.1	29.8
Fuel Oil	Kilo tons	0.1	6.9			3	10
liquefied petroleum gas	Kilo tons						0
Refinary Gas	Kilo tons					3.26	3.26
Natural Gas	Million m^3	161	59			627	847
Other Energy	Kilo tce		61.7			34.6	96.3

	EF_{CO2}	OXID	NCV	CO_2 Emission（tCO_2e）
	（tc/TJ）	（%）	（$MJ/t,km^3$）	J=G*H*I*F*44/12/100000（Mass Unit）
	G	H	I	J=G*H*I*F*44/12/100000 (Volume Unit)
Raw Coal	25.8	100	20908	135652074.1
Cleaned Coal	25.8	100	26344	0
Other Washed Coal	25.8	100	8363	895095.5697
Coke	25.8	100	28435	20981.6178
Coke Oven Gas	12.1	100	16726	22262.306
Other Coal Gas	12.1	100	5227	46380.91333
Crude Oil	20	100	41816	2146.554667
Gasoline	18.9	100	43070	596.9502
Diesel	20.2	99	42652	94140.92571
Fuel Oil	21.1	99	41816	32351.64533
liquefied petroleum gas	17.2	99.5	50179	0
Refinary Gas	18.2	99.5	46055	100192.9595
Natural Gas	15.3	99.5	38931	1849872.648
Other Energy	0	0	0	0
			Sub Total	138716096.2

Data Source: China Energy Statistical Yearbook 2005

Thermal Power Generation of Northwest China Grid in Year 2004

Province	Generation（MWh)	Aux power ratio（%）	Electricity Delivered to the Grid (MWh)
Shaanxi	44439000	7.5	41106075
Gansu	33242000	6.21	31177672
Qinghai	6208000	7.96	5713843.2
Ningxia	25298000	5.45	23919259
Xinjiang	22752000	9.07	20688394
Total			122605243

Data Source: China Electric Power Yearbook 2005

The CO_2 Emission Calculation Table for Northwest China Grid in Year 2005

Fuel	Unit	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Sub total
		A	B	C	D	E	F=A+B+C+D+E
Raw Coal	Kilo tons	24612.8	15970	3451	14677	13580.9	72291.7
Cleaned Coal	Kilo tons	162.2					162.2
Other Washed Coal	Kilo tons	355.6			1019.5	102	1477.1
Coke	Kilo tons	32.3					32.3
Coke Oven Gas	Million m^3						0
Other Coal Gas	Million m^3						0
Crude Oil	Kilo tons					1.8	1.8
Gasoline	Kilo tons	0.2				0.1	0.3
Diesel	Kilo tons	22.4	4.6	0.6		5	32.6
Fuel Oil	Kilo tons	0.1	5.7			2.5	8.3
liquefied petroleum gas	Kilo tons						0
Refinary Gas	Kilo tons					77.1	77.1
Natural Gas	Million m^3	146	52	133		781	1112
Other Energy	Kilo tce	82.4	13				95.4

	EF_{CO2}	OXID	NCV	CO_2 Emission（tCO_2e）
	（tc/TJ）	（%）	（$MJ/t,km^3$）	J=G*H*I*F*44/12/100000（Mass Unit）
	G	H	I	J=G*H*I*F*44/12/100000 (Volume Unit)
Raw Coal	25.8	100	20908	142985522.1
Cleaned Coal	25.8	100	26344	404225.4973
Other Washed Coal	25.8	100	8363	1168592.599
Coke	25.8	100	28435	86885.4173
Coke Oven Gas	12.1	100	16726	0
Other Coal Gas	12.1	100	5227	0
Crude Oil	20	100	41816	5519.712
Gasoline	18.9	100	43070	895.4253
Diesel	20.2	99	42652	102986.3818
Fuel Oil	21.1	99	41816	26851.86563
liquefied petroleum gas	17.2	99.5	50179	0
Refinary Gas	18.2	99.5	46055	236959.4227
Natural Gas	15.3	99.5	38931	2428640.359
Other Energy	0	0	0	0
			Sub Total	147447078.8

Data Source: China Energy Statistical Yearbook 2006

Thermal Power Generation of Northwest China Grid in Year 2005

Province	Generation（MWh)	Aux power ratio（%）	Electricity Delivered to the Grid (MWh)
Shaanxi	41100000	7.16	38,157,240
Gansu	33106000	4.23	31,705,616
Qinghai	5500000	2.69	5,352,050
Ningxia	27643000	5.73	26,059,056
Xinjiang	26560000	8.8	24,222,720
Total			125,496,682

Data Source: China Electric Power Yearbook 2006

Annex 4

MONITORING INFORMATION

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