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

CONTENTS

Annexes

SECTION A. General description of project activity

A.1. Title of the project activity:

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Sichuan Carbide Calcium Residues Based Cement Plant Project in Leshan City

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A.2. Description of the project activity:

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The project activity is to build a cement plant that employ new dry precalcination clinker production line with a capacity of 2,000 tonnes of clinker per day, which switches carbonated calcium source by CCR as non-carbonated calcium source in raw material. The project location is in Leshan City, Sichuan Province and the project owner is Sichuan Yongxiang Co,.Ltd (hereafter referred to as Yongxiang).

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The objective of the proposed project is to make lower-emission cement through substituting conventional carbonated calcium source of limestone and clay with non-carbonated calcium source of CCR for clinker production in the newly built cement plant.

In the proposed project, about 550 thousand tonnes of CCR will be utilized as the raw mix for clinker production per year, which is generated in the Adjacent PVC production process and will be kept open dumped until the proposed project begin operation. The CCR is mainly made up of $Ca(OH)_2$ and in theory no CO_2 generated during its thermally decomposing process, therefore compared with conventional raw material of limestone and clay for clinker production which is mainly comprised of $CaCO_3$, displacing the conventional carbonated calcium source in the raw mix by using CCR will significantly avoid CO_2 emission in clinker-making process.

When the proposed project is put into operation, it is expected to realize clinker production of 600,000 tonnes and lower-emission cement production of 759,400 tonnes (including blend cement 42.5 P.O and 32.5 P.C that are 531,600 tonnes and 227,800 tonnes respectively) per year as well as annual GHG emission reduction of 224,543 tCO_2.

Comparing with business-as-usual scenario, in addition to Reducing GHG emissions, the contributions of the proposed project to sustainable development are summarized as follows:

- **Avoid the potential environmental pollution that result from current CCR disposal of open dump;**
- **Avoid the potential negative environmental impact on local region due to limestone mining;**
- **Reduces GHG emissions compared to a business-as-usual scenario;**
- **Promote the development and popularization of advanced cement production technology in cement Industry of China;**

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A.3. Project participants:

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Participants to the project activity are the following:

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)
P.R.China (host)	Sichuan Yongxiang Co., Ltd. (Private)	No
Japan	PEAR Carbon Offset Initiative, Ltd. (Private)	No

More detailed contact information on the Participants is provided in Annex 1.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

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The Host Country is the People’s Republic of China.

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

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Sichuan Province

A.4.1.3. City/Town/Community etc:

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Leshan City

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

The proposed project is located in Zhugen Town, Wutongqiao District， Leshan City, Sichuan Province, and it is 2 km far from the center of the Wutongqiao District, 1km far from the Min River and 0.5km far from the Yongsi River.

Figure 1 is a map showing the location of the Project in Leshan City, Sichuan Province, China. The geographical coordinates of the project activity are E 103°49'30" and N 29°24'40".

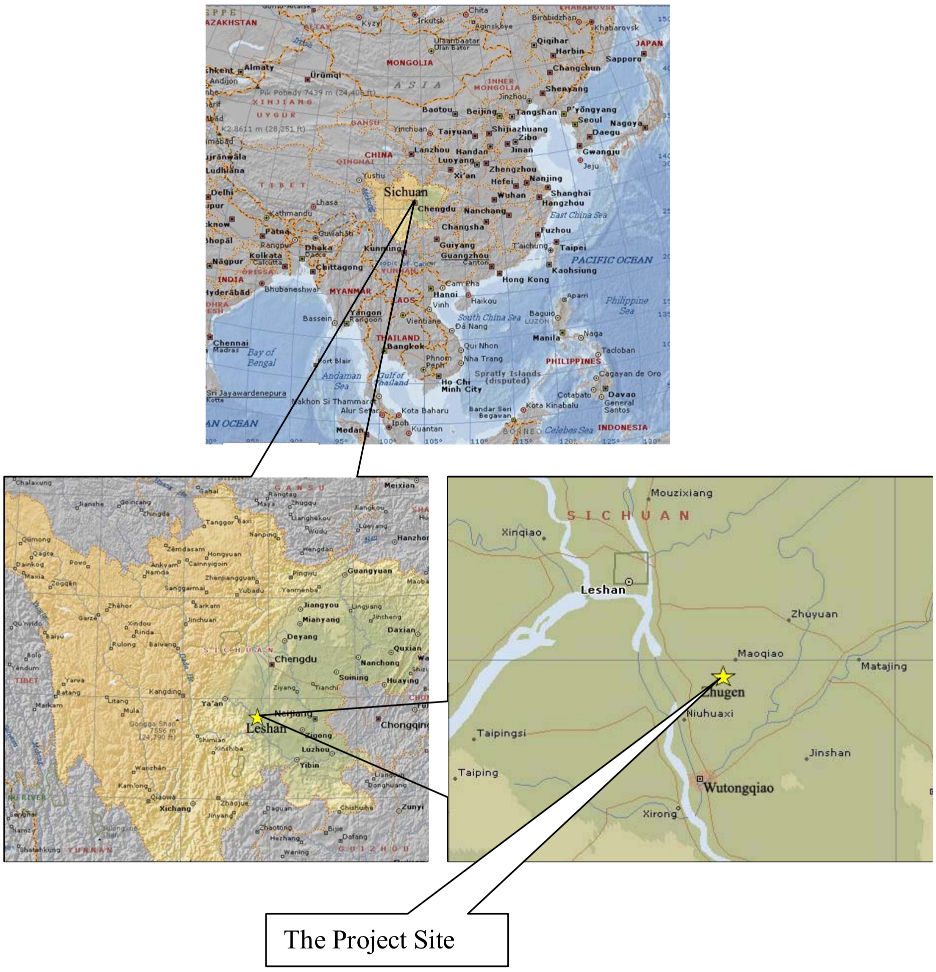

Figure 1. Map showing the location of the Project

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

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This category would fall within sectoral scope 4: Manufacturing industries

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

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The project activity is to build a calcium carbide residue (CCR) based cement plant that switches carbonated calcium source by CCR as non-carbonated calcium source in raw material. In the project activity, the technology of new dry precalcination clinker production (hereafter referred to as New

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Dry Process) is employed. New dry process cement technology is characterized by application of technologies including Suspension preheater and precalcination outside kiln, and normally equipped new type of grinding and homogenization facilities. New dry process has virtues such as higher efficiency and quality, lower energy consumption compared with conventional dry or semi-dry process, however, also is more complicated and more emphasizes association among processes. As a kind of new technology, New dry process is now undergoing the spread period in cement industry in China, moreover, the utilizing level of New dry process is only about 16.8 % in Sichuan Province till 2005.

The utilization of New dry process in CCR based clinker production is an innovation initially investigated and developed by Hefei Cement research and design institute (hereafter referred to as HC R&D) since Nov 2001. The design scheme of clinker production line in the proposed project is their first case with capacity up to 2,000 t/d in China. To avoid potential damage for the kiln system, may caused by in case of excessive chloride ion remaining in CCR, a series of innovative design and new materials are adopted in the pre-calcinations, combustion stove etc, with reference to the FSR. Furthermore, in the CCR supply side, the upstream recycle water to react with calcium carbide would be control and treatment to prevent diverting chloride into CCR. The upstream control includes recycle water treatment equipment and fresh water source as back up.

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The main characters are showing in table 1,

Table 1**. The main characters of the entire cement production line**

No.	Key indicators	Unit	Value	Source
1	Clinker production capacity	tonnes/yr	600,000	FSR
2	CCR consumption annually	tonnes/yr	550,000	FSR
3	Blend cement production capacity	tonnes/yr	759,400	FSR
4	Coal consumption of unit clinker making	t/t clinker	0.1650	FSR
5	Power consumption of unit clinker making	MWh/t clinker	0.0740	FSR
6	Coal consumption of CCR pretreatment	t/t clinker	0.0555	PCR
7	Power consumption of CCR pretreatment	MWh/t clinker	0.0013	PCR

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Note:FSR stands for Feasibility study report of the proposed project.
PCR stands for Price certification report of CCR

The entire production system is mainly composed of the following parts:

1) **CCR filtration and transportation;**
2) **Raw mix grinding and storage;**
3) **raw material homogenization;**
4) **clinker burning system;**
5) **dedust system**

the process is illuminate by flow chart showing as figure 2

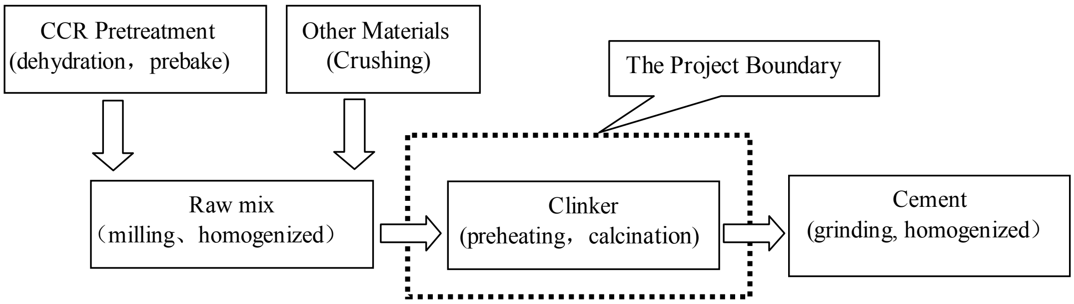

figure 2. the flow chart of entire clinker production process

As to the process of proposed project activity, the highlight characters of the technology employed in the system including is listed in Table 2.

Table 2. The main processes and employed technology

Main processes	Description	Employed Technology
1) CCR dehydration and transportation	The wet CCR is firstly dehydrated by pressure filtration and spin dryer to decrease the water content from 90% to 12~14% and transported to grinding system by belt conveyor.	Pressure filtration system and a 2 km belt conveyor are adopted, by which could deliver 2047.8 tonnes CCR material to the clinker process.
2) Grinding and storage	drying and grinding process for raw mix is complete simultaneously to make sure the requirement on water content and particle size of raw material.	HRM2200/2800 vertical mill is adopted, which has virtues such as represents the advanced technology level
3) Raw material homogenization	Homogenization is a crucial process before calcination in kiln, which is to re-mix the grinded material particles and then feed them into kiln.	A Φ15m IBAU storeroom is adopted and equipped with TDGS raw mix quantity meter.
4) kiln system	This process including five-stage precalcining facility, rotary kiln and cooler facility.	HXPG-2000/5 precalcining process is researched and developed by HC R&D recently, which is latest and integrated the RSP technology of Europe and Japan.
5) dedust system	de-dust instruments are installed respectively for precalcination system and cooler system	Sack deduster and electric deduster are adopted.

Source: Feasibility study report of the proposed project.

In general the technology is latest technology of cement industry of ANNEX I country and represent the most advanced level in China recently.

There is no direct technology transferring involved.

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

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The 10 years fixed crediting period is adopted and it is expected that the project activities will

generate emission reductions about 224,543 tCO_2e per year over the crediting period from 01/03/2009 to 28/02/2019

Years	Annual estimation of emission reductions in tonnes of CO_2e
01/03/2009-28/02/2010	118,548
01/03/2010-28/02/2011	236,320
01/03/2011-28/02/2012	236,320
01/03/2012-28/02/2013	236,320
01/03/2013-28/02/2014	236,320
01/03/2014-28/02/2015	236,320
01/03/2015-28/02/2016	236,320
01/03/2016-28/02/2017	236,320
01/03/2017-28/02/2018	236,320
01/03/2018-28/02/2019	236,320
Total estimated reductions (tonnes of CO_2e)	2,245,429
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	224,543

A.4.5. Public funding of the project activity:

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There is no public funding from Annex I Parties for this Project.

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:

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AM0033 (version 02) – "Use of non-carbonated calcium sources in the raw mix for cement processing".
(http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_THFPVAJDL9K5RK7P10GSEZDMSJYZ99)

The *Tool for the Demonstration and Assessment of Additionality* (ver 3).
(http://cdm.unfccc.int/methodologies/PAmethodologies/AdditionalityTools/Additionality_tool.pdf)

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

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According to the applicability requirement, approved methodology AM0033 is applicable to project activities in the cement industry, to switch a part or all of the raw material used for clinker production to a non-carbonated calcium sources from limestone and clay that would otherwise continue to be used during the crediting period. The methodology is applicable to exiting plants as well as new facilities projects.

In accordance with the items of applicability condition of methodology AM0033, the description of relevant situation of the proposed project and corresponding conclusions are showing as follow:

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According to approved methodology AM0033, it is applicable under the following conditions:	The relevant situation of the proposed project activity	Conclusion
CO_2 emissions reductions relate to CO_2 generated from decarbonisation of raw materials (typically $CaCO_3$ and $MgCO_3$) and are unrelated to the CO_2 emissions generated from fossil fuel burning;	The proposed project is to built a cement plant that use the non-carbonated calcium sources for clinker production, which may avoid CO_2 emissions from decarbonisation of the traditional raw materials otherwise in absence of the project activity.	Applicable
Raw materials (limestone and clay) used for clinker production are partially or completely replaced by non-carbonated calcium sources	The traditional raw material (limestone and clay) is partly displaced by non-carbonated calcium sources, CCR, in the proposed project.	Applicable
type and quality of produced clinker remain the same in both baseline and project case;	The quality of clinker produced in project activity is compulsive to meet the same standard (GB/T 21372-2008) with the traditional ones, and only one type of clinker is defined in the standard.	Applicable
Non-carbonated raw materials are available in the region (defined as the area including at least the ten cement plants nearest to the plant of the project activity) or country is such that leakages due to displacement of other uses of these non-carbonated raw materials will not occur;	The calcium carbide residue (CCR) is superfluous and rarely used in the Leshan City, where the proposed project located. Thus there will not result in leakages from displacement of other uses of these non-carbonated raw materials.	Applicable
Conclusion: the proposed project is applicable to approved methodology AM0033		

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According to the baseline methodology AM0033, the baseline methodology AM0033 is applied in compliance with the monitoring methodology AM0033

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

Based on baseline methodology AM0033, the project boundary is defined as the clinker process where the raw material is substituted for production of clinker. Fuel and electricity used are considered outside the project boundary and are estimated in the leakage section.

The table below shows gases and sources included in the project boundary.

	Source	Gas	Included?	Justification/Explanation
Baseline	Transportation of raw materials from reserves to the plant	CO_2	Excluded	Not significant
		CH_4	Excluded	Not related
		N_2O	Excluded	Not related

	Decarbonation reaction	CO_2	Included	Main emission source
Project Activity	Transportation of raw materials from related reserves to the plant	CO_2	Excluded	Not significant
		CH_4	Excluded	Excluded for simplification.
		N_2O	Excluded	Excluded for simplification.
	Decarbonation reaction	CO_2	Included	Main emission source
		CH_4	Excluded	Excluded for simplification.
		N_2O	Excluded	Excluded for simplification.

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

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According to the methodology AM0033, to provide the same type and quality clinker, two alternative scenarios are identified and the baseline scenario shall be determined via either financial analysis or barrier analysis. This step is implemented as the description in table below:

Step 1: Define the baseline scenario alternatives from following baseline options.

According to approved methodology AM0033, two alternative scenarios are identified:

- ***A continuation of current practice, i.e., a scenario in which the company continues cement production using the existing technology, fuel mix and raw materials. In case of greenfield projects, a scenario where the company uses raw materials from carbonated sources with New dry proces.***

- ***Define a scenario in which traditional raw materials, limestone and clay, are partially substituted by noncarbonated calcium source. If relevant, develop different scenarios varying the degrees of raw material switch from traditional ones. These scenarios should reflect all relevant policies and regulations.***

The plausible alternatives for the proposed project are identified as:

- ***Alternative 1:*** *The* ***Company*** *constructs a cement plant using raw materials from conventional carbonated calcium sources with* ***New dry process technology.***

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The alternative is realistic and credible for below reasons:

Considering the proposed project is a greenfield project, therefore in this scenario the company uses raw materials from carbonated sources (limestone and clay). Besides, limestone and clay are the most common material for clinker production and is with a firm abundance. Without any exception, in the region of Leshan City where the project activity situated is of sufficient limestone storage. There are more than 31 cement plants and all of them use traditional carbonated calcium as raw material in Leshan City currently[1], therefore to generate the same output with the

[1] *Feasibility Study Report* of the proposed project.

proposed project, the owner is very likely to construct a clinker production line with same capacity and technology but utilizing carbonated sources.

- ***Alternative 2: This alternative is the proposed CDM project activity, which is substituting carbonated calcium source by CCR as non-carbonated calcium source in raw material undertaken without being registered as a CDM project activity i.e. the company constructs a cement plant partly substituting carbonated raw materials by CCR;***

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The alternative is realistic and credible for below reasons:

Due to the industry structure of Leshan City, there is no other comparable amount of non-carbonated source than CCR for the owner of the proposed project, other non-carbonated material option is not taken into account any further. On the other hand, as to the abundance of CCR to produce expected quantity and quality product is could be ensured based on the current dumped CCR storage and future production from the PVC that is about 550,000 tonnes per year. The quality of the clinker produced in project activity will meet the national standard for clinker (GB/T 21372-2008), which is the same as those in baseline scenario.

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Step 2: Selection of the baseline scenario through financial or barrier analysis.

The methodology requires determining the baseline scenario through financial analysis or barrier analysis.

So this step will carried out though following sub-steps:

Sub-step 1: financial analysis of the baseline alternatives

According to the required steps by methodology, the following steps should be followed:

- ***Calculate the financial costs (e.g. capital and variable costs) and account cost savings due to net energy gains, if any, from project activity.***
- ***A sensitivity analysis should be performed to assess the robustness of the selection of the most likely future scenario to reasonable variations in critical assumptions and to establish that the project is not the baseline. The financial indicator is calculated conservatively if assumptions tend to make the CDM project's indicators more attractive and the alternatives' indicators less attractive.***
- ***The baseline scenario should take into account relevant national/local and sectoral policies and circumstances, and the proponent should demonstrate that the key factors, assumptions and parameters of the baseline scenario are conservative***

Sub-step 1a. Determine appropriate analysis method

Since the project activity (*Alternative 2, substituting carbonated calcium source by CCR as non-carbonated calcium source in raw material)* is regarded as an incremental investment to the *Alternative 1* that *constructs a cement plant using raw materials from conventional carbonated calcium sources with New dry process technology.* The financial analysis is performed as following steps to justify the incremental investment of project activity being unprofitable.

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Firstly, to assess the financial costs and cost saving due to net energy gains form project activity, it is to identify and calculate the basic parameters of financial analysis, of which the key factors considered include incremental initial investment, additional O&M cost and cost saving or other gains from

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Secondly, a NPV analysis is conducted to test whether the project activity is a financially unattractive scenario, which is substituting carbonated calcium source by CCR as non-carbonated calcium source in raw material. During this step, local/sectoral encouraging policy for project activity e.g. tax free, has been considered to ensure the conservativeness of the analysis result.

Finally, a sensitivity analysis is performed to testify the robustness of the result of NPV analysis that the project activity is not profitable even though the critical assumptions vary in reasonable ranges.

Sub-step 2b. NPV Analysis Method

By virtue of the NPV financial analysis, it ought to demonstrate that the substitution of non-carbonated calcium sources in the region or country is non-profitable. If the NPV of the project activity is negative, the project activity is not financially attractive and not likely the baseline scenario,

According to *Methods and Parameters for Economic Assessment of Construction Project (version3)*, a proposed project in the cement sector is considered financially feasible only if the indicator surpass the sectoral benchmark value. Therefore the proposed project will be financially acceptable when the NPV is positive at the discount rate which adopts the benchmark project IRR of cement industry 12 %.

Sub-step 2c. Calculation of financial indicators

The key parameters to perform the NPV analysis are explicitly state the following:

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No.	Basic financial parameters	Unit	Alternative 1	Alternative (project)	Incremental Cost or Gains	Remarks	Source
1	fixed asset investment	million RMB	206.74	218.95	*12.21*	***Incremental fixed asset investment of raw material switching***	Certificate from the design institute
2	Material & Power cost	million RMB	105.30	109.78	*4.48*	***Total additional M&P cost of raw material switching***	FSR
2.1	*Material cost*	million RMB	31.25	39,09	*7.84*	***Additional material cost of raw material switching***	FSR
2.2	*Fuel and Power cost*	million RMB	74,05	70,69	*3.36*	***Gain of energy saving of raw material switching***	FSR
3	Estimated annual sales income	million RMB	166.80	166.80	*0*	***No additional revenue occurred***	FSR
4	A discount rate	--	12%	12%	*N/A*	--	Sector benchmark
5	Lifetime of project	years	21	21	*N/A*	--	FSR
6	VAT	--	17%	17%	*N/A*		FSR
7	urban maintenance and construction tax	--	7%	7%	*N/A*	--	FSR
8	surtax for education	--	4%	4%	*N/A*	--	FSR
9	Income Tax	--	33%	33% (5 years free)	*N/A*	*5 years Tax free income has been considered in NPV calculation* --	FSR

The project would benefits from cyclic economic policy as it would take full utilization of wastes slides like CCR. Thus, the income tax in first 5 years would be exempted. However, obviously the NPV of the project activity is negative, given that no additional revenue is brought by the incremental investment and the additional cost.

According to calculation based on the above data, without CERs sales revenues, the NPV is -29.7 million RMB, thus the Project is not profitable.

NPV of total investment without CERs	-2,969 $*10^4$ RMB

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Sub-step 2d. Sensitivity analysis

In accordance with the key parameters listed above and the constitution of additional O&M cost, following financial parameters were identified and taken as uncertain factors for sensitive analysis of financial attractiveness:

- **Additional fixed asset investment**
- **CCR price**
- limestone price
- coal price
- power price
- gain of energy saving

The impacts of above factors were analyzed. The results of sensitive analysis of the indicators are shown in Table 3 and Figure 3.

Table 3. Sensitivity analysis of financial indicators of the Project
(NPV without CER sales revenues)

Unit: 10^4 RMB

range / parameter	-20%	0	20%
Additional fixed assets investment	￥-2,429	￥-2,969	￥-3,472
CCR price	￥-382	￥-2,969	￥-5,556
limestone price	￥-4,370	￥-2,969	￥-1,552
coal price	￥-2,751	￥-2,969	￥-3,106
power price	￥-2,320	￥-2,969	￥-3,559
gain of energy saving	￥-4,053	￥-2,969	￥-1,895

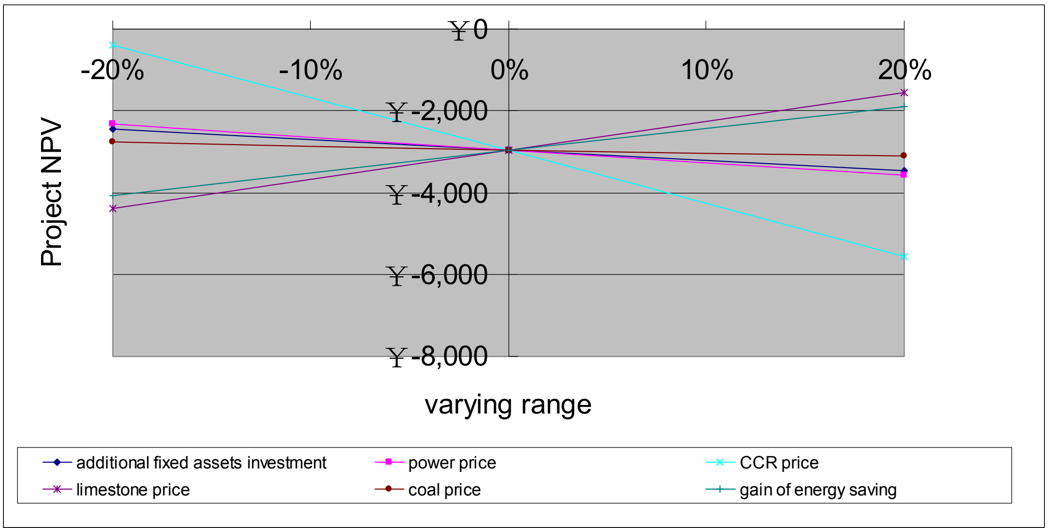

Figure 3. Sensitivity analysis of financial indicators of the Project

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As shown in the sensitivity analysis, while the key variables varying form -20% to 20%, the NPV of the Project is negative. In a conclusion, under fluctuations of given factors within a sensible range, it is unlikely to change the situation that the project is not financially attractive.

Drawing on the above results, it is evident that *Alternative 2* is not financial profitable, thereby being excluded as a baseline scenario. Therefore, as a more financial feasible alternative, the *Alternative 1* is identified as the baseline scenario, also considering that it is consistent with current mandatory laws and regulations in cement sector of China.

Then as a conclusion, ***Alternative 1*** is selected as the baseline scenario.

Sub-step 2: barrier analysis of the baseline alternatives

Based on the result of *Sub-step 1,* the baseline scenario is selected, therefore this step is bypassed.

In conclusion the *Alternative 1* is more financially attractive through the comparison of financial indicators and is consistent with current mandatory laws and regulations. Thereby the baseline scenario is selected that construct a cement plant using traditional carbonated calcium source as raw mix.

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):

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As a necessary illumination of the background and consideration of CDM of the proposed project, the milestones during the implement process are showing in Table 4.

Table 4 The Timeline of the proposed project.

Time	Events	References
2006	Initial consideration of the feasibility of the proposed project inherently with the revenue of CDM.	FSR
2006-9-25	Receive the approval of EIA	approval of EIA
2006-11-16	Startup of application of CDM and enquiry with China's DNA.	Enquiry letter to DNA
2006-12-12	Sign the contract with CDM consultant entity representing the formally beginning of CDM application process.	Relevant Consulting agreement
2007-1-12	The owner made the decision on carrying out investment and the financing strategy of the proposed based on the consideration of CDM.	Relevant Conference Summary
2007-1-23	Receive the approval letter of the project	Governmental approval letter
2007-4-8	Initial rejection of loan for the project without consideration of CDM income	Initial Rejection letter of loan
2007-4-16	Sign a agreement of equipment purchasing *(deemed as starting date of project activity)*	Purchasing agreement

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That method is sensible for following reasons:¶
<#>According to the FSR and a specific breakdown clarification[2], the fixed asset investment of project activity includes series additional technologies especially for CCR as main raw mix e.g. the CCR transportation system, elect mill for CCR raw mix and the precalcination system etc. Therefore the fixed asset investment of project activity is definitely higher than that in baseline scenario, and in term of the principle of conservativeness it is acceptable to assume that in both baseline scenario and project activity is equal. ¶
<#>According to the FSR, the annual material and power cost has account for more than 80% of total operation and maintaince cost.¶
¶
Based on the above analysis, it is acceptable and reasonable to select the *annual material and power cost* as the key indicator to compare the financial ... [43]

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2007-6-11	Sign a contract project construction	Contract of construction
2007-6-18	Sign a order to start the construction by supervisor company	Order to start the project
2007-5-20	Succeeding approval of loan for the project with consideration of CDM income	Approval letter of loan
2007-7-12	Beginning of construction	Project Supervision Record
2008-1-18	Sign ERPA with the CER buyer	ERPA

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From the timeline, it is aware that CDM was not only considered before the investment decision, but also have played an important role across the whole preparation process for the project.

The additionality of the Project is demonstrated by using the *Tool for the Demonstration and Assessment of Additionality (version 3)* approved by CDM EB.

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

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

According to the methodology AM0033, The possible alternative scenarios in the absence of the CDM project activity would include:

***Alternative 1*: A scenario in which the company construct the cement plant using the traditional carbonated calcium source as raw materials with New dry process technology.**
***Alternative 2*: The proposed project activity, which is substituting carbonated calcium source by CCR as non-carbonated calcium source in raw material, undertaken without being registered as a CDM project activity i.e. the company constructs a cement plant partly substituting carbonated raw materials by CCR;**

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

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Alternative 1*: *A continuation of current prevailing practice, i.e., a scenario in which the company construct the cement plant using the traditional carbonated calcium source as raw materials with New dry process technology.
To product cement with traditional carbonated calcium source in raw material is a common practice in China, which is in consistency with mandatory laws and regulations. New dry process technology is one of the advanced clinkers producing technology, which is in consistency with mandatory laws and regulations.

Alternative 2*: *The proposed project activity undertaken without being registered as a CDM project activity;
The proposed project activity, which is substituting carbonated calcium source by CCR as non-carbonated calcium source in raw material, is a resource integrated utilization project and is in line with all the current laws and regulations.

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Hence the next steps will be implemented on the above two alternatives to demonstrate and assess the additionality of proposed project activity.

Step 2. Investment Analysis

Sub-step 2a. Determine appropriate analysis method

In accordance to the requirement on additionality statement methodology AM0033, when the financial analysis is chosen project participants shall demonstrate that the use of non-carbonated calcium sources in the region or country is non-profitable using the net present value (NPV) analysis. The project is additional if the NPV of the project activity is negative.

Sub-step 2b. NPV Analysis Method

Based on the requirements of AM0033, the NPV analysis is conducted in virtue of the gain of energy saving realized by the additional investment and cost, due to the substitution of traditional raw material by CCR in the Greenfield clinker production line.

According to *Methods and Parameters for Economic Assessment of Construction Project (version3)*, a proposed project in the cement sector is considered financially feasible only if the indicator surpass the sectoral benchmark value. Therefore the proposed project will be financially acceptable when the NPV is positive at the discount rate which adopts the benchmark project IRR of cement industry 12 %.

Sub-step 2c. Calculation of financial indicators

According to the requirements of AM0033, if the financial analysis is chosen project participants shall demonstrate that the use of non-carbonated calcium sources in the region or country is non-profitable using the net present value (NPV) analysis and explicitly state the following parameters:

No.	Basic financial parameters	Value /unit	Source
1	Investment requirements for raw material switching *(additional investment to the baseline scenario)*	12.21 million RMB	Certificate from the design institute
2	Cost due to the substitution of limestone and clay by non-carbonated calcium source *(additional cost to the baseline scenario)*	7.84 million RMB	Calculated based on FSR
3	A discount rate appropriate to the country and sector	12%	Sector benchmark
4	Current price (variable costs) of non-carbonated calcium source;	36.6 RMB/t	FSR
5	Lifetime of the project, equal to the remaining lifetime of the existing equipment(s)	21 years	FSR
6	Cost savings accounting fuel consumption reduction due to energy gains of a non-occurrence of some chemical reactions that were expected in the regular way of clinker processing	3.36 million RMB	FSR
7	VAT	17%	FSR
8	urban maintenance and construction tax	7%	FSR
9	surtax for education	4%	FSR
10	Income Tax	33%	FSR
11	Expected CERs Price	12 USD/ tCO_2	--
12	Credit period	10 years	--

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The project would benefits from cyclic economic policy as it would take full utilization of wastes slides like CCR. Thus, the income tax in first 5years would be exempted. However, obviously the NPV of the project activity is negative, given that no additional revenue is brought by the incremental investment and the additional cost.

According to calculation based on the above data, without CERs sales revenues, the NPV is **-35.2** million RMB, thus the Project is not financially attractive. While the project is undertaken as a CDM project, considering of the CER sales revenues, the NPV of the proposed project is significantly improved to **64** million RMB, which is positive and make the proposed project being financial attractive. The comparison of NPV with and without CERs is showing below:

NPV of total investment without CERs	**-2,969 *10^4 RMB**
NPV of total investment with CERs	**6,961 *10^4 RMB**

Sub-step 2d. Sensitivity analysis

For the details of this part, please refer to counterpart in paragraph B.4.

Conclusively, as shown in the sensitivity analysis, **while the key variables varying form -20% to 20%,** the NPV of the Project is negative.In a conclusion, under fluctuations of given factors within a sensible range, it is unlikely to change the situation that the project is not financially attractive.

Step 3. Barrier analysis

This step is **bypassed in the PDD.**

Step 4 Common practice analysis

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

There are more than 300 cement enterprises in Sichuan Province, however there is no similar operational New dry process cement production line substitutes traditional limestone and clay by CCR as calcium source. After completion of construction, the Project will be the first New dry process cement production line utilizing CCR as main raw material in Sichuan Province.

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

That no similar project exists supports the conclusion of step 2 and step 3 and further demonstrates the additionality of the Project.

Conclusively, the project activity is additional.

B.6. Emission reductions:	

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B.6.1. Explanation of methodological choices:	

The consolidated methodology AM0033 is applied in the context of the Project in the following steps:

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In accordance with the Feasibility Study report, following financial parameters were taken as uncertain factors for sensitive analysis of financial attractiveness:¶
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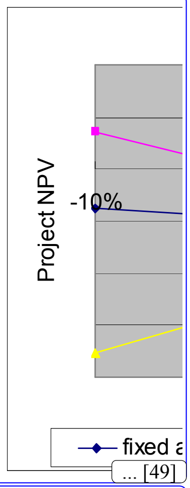

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·calculate the baseline GHG emissions;

·calculate the project GHG emissions;

·calculate the project leakage;

·calculate the emission reductions.

Calculate the baseline GHG emissions

According to AM0033, the baseline emissions mainly involve:

Reaction-based CO_2 Generation – the thermo chemical decomposition reaction involving decarbonation of the limestone of the raw mix (comprised of limestone and clay), producing CO_2 as an industrial process emission source ($CaCO_3 \rightarrow CaO + CO_2$; i.e., the decarbonation reaction of one $CaCO_3$ molecule) generates one CaO molecule and one CO_2 molecule)

The calculation takes into account the percentage of the limestone and clay decarbonated. It takes into account that a certain amount of the limestone and clay will become part of the clinker (CaO) and the rest will turn into CO_2.

The first step for determining the CO_2 emissions from the decarbonation reaction is to perform a lab analysis to identify the 'Loss of Ignition' (LOI) of the raw mix, which quantifies the amount of CO_2 generated from one kilogram of the raw mix, based on a principle of difference in mass before and after the ignition process, corrected for moisture content. The size and frequency of sampling for this lab analysis should be statistically significant with an maximum uncertainty range of 20% at a 95% confidence level, and possible impurities in the raw mix should be monitored and reported so as to guarantee that the difference in mass can be attributed to CO_2 emissions only, or corrected otherwise.

The baseline emissions for the year *y* shall be determined as follows:

Firstly, calculating CO_2 emissions due to decarbonation reaction during baseline scenario through following formula:

$$Q_{CO2} = LOI * C_{rm/kk} \quad (1)$$

Where:

Q_{CO2}	CO_2 emissions due to decarbonation reaction during baseline scenario, $kgCO_2$/kg clinker
LOI	loss of ignition, i.e. the amount of CO_2 per unit of raw mix in baseline scenario $kgCO_2$/kg raw mix
$CM_{rm/kk}$	relation between raw mix and linker, kg raw mix/kg clinker

Where

$$LOI = ((M_1 - M_2)/M_1 \quad (1a)$$

Where:

M_1	initial weight of dry sample in baseline scenario, kg
M_2	residual weight of sample after heating in baseline scenario, kg

$$C_{rm/kk} = \frac{1}{(1 - LOI)} \quad \textbf{(1b)}$$

Where:

$C_{rm/kk}$ **relation between raw mix and clinker, kg raw mix/kg clinker**

For greenfield project, where samples can not be taken for establishing the baseline on the plant site as described above, following approach to determine the LOI may be chosen:

Option 1: Lab analysis based on the sample obtained in the region in the baseline scenario

Under this Option, samples, to obtain the values for M_1 and M_2, are taken from the clinker production line (which may be owned by the same owner) with the highest performance in the region. The clinker production line sampled should use the same raw materials (limestone and clay) that is commonly used in the region and as in the identified baseline scenario and produces the same type and quality of clinker as done by the project activity. "Region" is defined as the area including at least the ten cement plants nearest to the plant of the project activity.

The historical information during the year previous to project implementation (previous to the proposed project implementation, at least twelve monthly measurements) shall be used if available. Alternatively, if not available, the ex post monitoring is carried out. The size and frequency of sampling for this lab analysis should be statistically significant with a maximum uncertainty range of 20% at a 95% confidence level. Possible impurities in the raw mix should be monitored and reported so as to guarantee that the difference in mass can be attributed to CO_2 emissions only, or corrected otherwise.

Option 1 is adopted in this PDD and the historical information during the year previous to project implementation is used. To obtain the value of LOI, the "Region" is defined as Leshan City where there are about 31 cement plants now.

According to the *Cement Industry Development Policy in China*, New dry process technology is highly recommend and representing higher energy efficiency and more environmental friendliness. Therefore, to select the sample with highest performance in Leshan City, local cement industry association ranked cement plants which is adopted New dry proces-tech according to main characters of key facilities, initial investment, reputation, energy efficiency and environmental friendliness.

As the result of the ranking, the cement production line with capacity of 2000 t/d in Jinding Cement Co,.Ltd is the one with highest performance in the region, therefore the historic information of it shall be adopted in this PDD.

Finally, calculate baseline emission by the product of Q_{CO2} multiplying the clinker output during year y $Q_{Clinker,y}$.

Calculate the project GHG emissions

The Project emissions for the year *y* shall be determined as follows:

Firstly, calculating CO2 emissions due to decarbonation reaction during project activity through following formula:

$$Q^*_{co2} = LOI^* * C^*_{rm/kk} \quad (2)$$

Where:

Q^*_{co2}	**CO2 emissions due to decarbonation reaction during project activity, kgCO2/kg clinker**
LOI^*	**loss of ignition i.e. the amount of CO_2 per unit of raw mix for project activity, kgCO2/kg raw mix**
$CM^*_{rm/kk}$	**relation between raw mix and linker, kg raw mix/kg clinker**

Where:

$$LOI^* = ((M^*_1 - M^*_2)/M^*_1 \quad (2a)$$

Where:

M^*_1	**initial dry weight of sample for project activity, kg**
M^*_2	**residual weight of sample for project activity, kg**

$$C^*_{rm.kk} = \frac{1}{(1 - LOI^*)} \quad (2b)$$

Where:

$C^*_{rm/kk}$	**amount of raw mix necessary to produce one unit of clinker, kg rawmix/kg clinker**

As the “Loss of Ignition” (LOI) in mass of the project is attributed to CO_2 and water, such as thermal decomposition of calcium carbide residue (CCR), project participants may choose the following approaches to determine the LOIs.

Option1: Measurement of mass of trapped CO_2

$$Q^*_{co2} = LOI^* * C^*_{rm/kk} = (M^*_1 - M^*_2)/M^*_2 \quad (3)$$

Where:

$$C^*_{rm/kk} = 1/(1 - LOI^*) = M^*_1 / M^*_2 \quad (3a)$$

$$LOI^* = M^*_{CO2} / M^*_1 \quad (3b)$$

$$C^*_{rm/kk} = M^*_1 / M^*_2 \quad (3c)$$

$$Q^*_{CO2} = M^*_{CO2} / M^*_2 \quad (3d)$$

Where:

M^*_{CO2}	**the mass of CO_2 measured in the captured gas (CO_2 mixed with H_2O) generated during the LOI analysis**

Calculate the project leakage

Leakage emissions considered are CO2 emissions from off-site transport of non-carbonated calcium source to the cement plant.
If GHG emissions intensity from energy use for clinker production increases with the implementation of the project activity, fuel consumption and electricity (from grid and self generation) consumption during the clinker process are considered as leakage emissions by the formula (6)below:

$$L_y = Q^t_{CO2} + Q_{fossil\_fuel,y} + Q_{ele\_grid\_CLINK,y} + Q_{ele\_sg\_CLINK,y} \quad (4)$$

Where:

$Q^t{}_{CO2}$	**leakage from transport of non carbonated calcium source (tCO2)**
$Q_{fossil-fuel,y}$	**leakage emission due to increase in energy use i in the year y (tCO2)**
$Q_{ele\_grid\_CLINK,y}$	**leakage emission due to increase in grid electricity in the year y (tCO2)**
$Q_{ele\_sg\_CLINK,y}$	**leakage emission due to increase in self generation electricity in the year y (tCO2)**

Where leakage due to energy use and electricity consumption is negative, i.e. ($Q_{fossil-fuel,y} + Q_{ele\_grid\_CLINK,y} + Q_{ele\_sg\_CLINK,y} < 0$), these leakages are considered as zero.

Since the CCR is generated at the chemical plant adjacent to the cement factory and transported by pipeline, the energy consumption is electricity power rather than fossil fuel and the transportation distance of the CCR is significant less than that of the traditional limestone. For conservative estimation, such positive emission reductions are not considered and the increased emissions from transportation equal zero, the leakage due to transportation, if any, is already considered in the electricity consumption part. In addition, there is no captive power plant involved in either project activity or baseline scenario and all the electricity power is input from grid, therefore the relevant item of self-generation is not applicable in the PDD. In accordance to above consideration, leakage is calculated by following formula:

$$L_y = Q_{fossil\_fuel,y} + Q_{ele\_grid\_CLINK,y} \quad (5)$$

Where:

The leakage from the increase of fossil consumption is calculated as follows:

$$Q_{fossil\_fuel,y} = Q_{clinker,y} \times \sum_i (F_{p,i,y} - F_{b,i,y}) \times EF_{f,i,Y} \quad (6)$$

Where:

$Q_{clinker,y}$	**quantity of clinker production in the year y (tonnes of clinker)**
$F_{p,i,y}$	**fossil fuel of type i (coal or other fuel type "i") combusted in the project activity in the year y per unit clinker(tonnes of fuel/t clinker)**
$F_{b,i,y}$	**fossil fuel of type i (coal or other fuel type "i") combusted in the baseline scenario per unit of clinker (tonnes of fuel/t clinker)**
$EF_{f,i,y}$	**emission factor for emissions of coal or other fuel type "i" (tCO2/tonnes of fuel). It**

could be calculated by the net caloric value (NCV_i) multiplying corresponding emission factor (EF_i) as below equation:

$$EF_{f,i,y} = NCV_i * EF_i \qquad (6a)$$

The leakage from the increase of grid electricity is calculated as follows:

$$Q_{ele-grid\_CLINKER,y} = Q_{clinker,y} \times (E_{P,grid\_CLINK,y} - E_{b,grid\_CLINK,y}) \times EF_{grid\_CLINK,y} \qquad (7)$$

Where:

$Q_{clinker,y}$ **quantity of clinker production in the year y (tonnes of clinker)**

$E_{P,grid\_CLINK,y}$ **grid electricity consumption in the project activity in the year y per unit of clinker(MWh/t clinker)**

$E_{b,grid\_CLINK,y}$ **grid electricity consumption in the baseline scenario per unit of clinker(MWh/t clinker)**

$EF_{grid\_CLINK,y}$ **emission factor for emissions of grid electricity (tCO2/MWh), which shall be calculated according to the latest version of ACM0002. In absence of data a conservative value of 1.3 t CO2/mwh may be used.**

For Greenfield projects, baseline electricity or fuel consumption per ton of clinker for baseline is estimated using the following options:

Option A:
Specific electricity or fuel consumption of the clinker production line (which may be owned by the same owner) with the highest performance in the region and which uses the raw materials (limestone and clay) in the baseline scenario and produces the same type and quality of clinker. "Region" is defined as the area including at least the ten cement plants nearest to the plant of the project activity.

Option A is chose to calculate baseline electricity or fuel consumption per ton of clinker in this PDD and the "Region" is defined as Leshan City where there are about 31 cement plants now. The cement production line with capacity of 2000 t/d in Jinding Cement Co,.Ltd is the one with highest performance in the region, therefore the historic information of it shall be adopted in this PDD.

Calculate the emission reductions

$$ER_y = Q_{Clinker,y} * (Q_{CO2} - Q^*_{CO2}) - L_y = BE_y - PE_y - L_y \qquad (8)$$

Where:

Q_{CO2} **baseline emissions, tCO_2**

Q^*_{CO2} **project emissions, tCO_2**

Q^t_{CO2} **leakage emissions, tCO_2**

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

Data / Parameter:	LOI
Data unit:	**$kgCO_2$/kg raw mix**
Description:	**LOI of raw mix in baseline scenario**
Source of data used:	**Historical production records**
Value applied:	**36.12%**
Justification of the choice of data or description of measurement methods and procedures actually applied :	**The average value of latest twelve month historical information of the clinker production line in Leshan City with the highest performance is used, which is consistent with the requirement of methodology. The test method is in line of GB/T176-1996 and GB/T5762-2000, and the lab is certificated by relevant authority.**
Any comment:	**-**

Data / Parameter:	$F_{b,i,y}$
Data unit:	**t coal/t clinker**
Description:	**coal combusted in the baseline scenario per unit of clinker**
Source of data used:	**Historical production records**
Value applied:	**0.1673**
Justification of the choice of data or description of measurement methods and procedures actually applied :	**The average value of latest twelve month historical information of the clinker production line in Leshan City with the highest performance is used, which is consistent with the requirement of methodology.**
Any comment:	**-**

Data / Parameter:	$E_{b,grid\_CLINK,y}$
Data unit:	**MWh/t clinker**
Description:	**grid electricity consumption in the baseline scenario per unit of clinker**
Source of data used:	**Historical production records**
Value applied:	**0.079**
Justification of the choice of data or description of measurement methods and procedures actually applied :	**The average value of latest twelve month historical information of the clinker production line in Leshan City with the highest performance is used, which is consistent with the requirement of methodology.**
Any comment:	**-**

Data / Parameter:	$EF_{grid\_CLINK,y}$
Data unit:	**tCO_2/MWh**
Description:	**emission factor for emissions of grid electricity**
Source of data used:	**default value of methodology AM0033**

Value applied:	1.3
Justification of the choice of data or description of measurement methods and procedures actually applied :	the default value of AM0033 is transparent and conservative.
Any comment:	-

Data / Parameter:	EF_{coal}
Data unit:	tCO_2/TJ
Description:	emission factor for emissions of coal equivalent
Source of data used:	IPCC Guidelines for National Greenhouse Gas Inventories 2006
Value applied:	94.6
Justification of the choice of data or description of measurement methods and procedures actually applied :	The default value of IPCC 2006 (25.8 tC/TJ*44/12) is adopted, which is creditable and appropriate.
Any comment:	-

Data / Parameter:	NCV_{coal}
Data unit:	MJ/t
Description:	Average net calorific value of coal
Source of data used:	China Energy Statistical Yearbook
Value applied:	20908
Justification of the choice of data or description of measurement methods and procedures actually applied :	As the priority for the regional specific value, national specific value was selected.
Any comment:	-

B.6.3. Ex-ante calculation of emission reductions:

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I. Estimated anthropogenic emissions by sources of greenhouse gases of the baseline:

The baseline emissions for the year *y* shall be determined as follows:

$$Q_{CO2} = LOI * C_{rm/kk}$$

Where:

variables	Value	Unite	Source

Q_{CO2}	0.5654	tCO_2/t clinker	Calculated based on FSR
LOI	36.12%	$kgCO_2$/kg raw mix	FSR
$CM_{rm/kk}$	1.5654	kg raw mix /kg clinker	Calculated based on FSR
$Q_{clinker,y}$	600,000	Tonnes/yr	FSR

According to the above data, the annual clinker production is estimated to be 600,000 Tonnes. The CO_2 emissions intensity due to decarbonation reaction in baseline scenario is 0.5654 tCO_2/t clinker the annual baseline emission of the Project in normal years is 339,261 tCO_2e. In the 1st production year, the cement production is just 80% of those years after, thus the baseline emission of the Project is 271,409 tCO_2e.during Feb.2009~Jan. 2010.

II. Estimated project activity emissions:

The Project emissions for the year *y* shall be determined as follows:

$$Q^*_{co2} = LOI^* * C^*_{rm/kk}$$

Where:

variables	Value	Unite	Source
Q^*_{co2}	0.2174 (Feb.2009~Jan. 2010) 0.0705 (Feb.2010~Jan. 2011 and after)	tCO_2/t clinker	Calculated based on FSR
LOI^*	17.86% (Feb.2009~Jan. 2010) 6.95% (Feb.2010~Jan. 2011 and after)	$kgCO_2$/kg raw mix	Calculated based on FSR
$CM^*_{rm/kk}$	1.2174 (Feb.2009~Jan. 2010) 1.0705 (Feb.2010~Jan. 2011 and after)	kg raw mix /kg clinker	Calculated based on FSR

According to the above data, the annual clinker production is estimated to be 600,000 Tonnes. The CO_2 emissions intensity due to decarbonation reaction in the project activity is 0.2174 tCO_2/t clinker during Feb.2009~Jan. 2010, while in Feb.2010~Jan. 2011 and after is 0.0705 tCO_2/t clinker. Then the annual project activity emission in normal years is 42,299 tCO_2e. In the 1st production year, the cement production is just 80% of those years after, thus the baseline emission of the Project is 104,347 tCO2e during Feb.2009~Jan. 2010.

III. Estimated project leakage:

Leakage emissions

$$L_y = Q_{fossil\_fuel,y} + Q_{ele\_grid\_CLINK,y}$$

Where:

$Q_{fossil-fuel,y}$ leakage emission due to increase in energy use i in the year y (tCO2e)

$Q_{ele\_grid\_CLINK,y}$ leakage emission due to increase in grid electricity in the year y (tCO2e/t clinker)

Where leakage due to energy use and electricity consumption is negative, i.e.

($Q_{fossil-fuel,y} + Q_{ele\_grid\_CLINK,y} < 0$), these leakages are considered as zero.

The leakage from the increase of fossil consumption is calculated as follows:

$$Q_{fossil\_fuel,y} = Q_{clinker,y} \times \sum_i (F_{p,i,y} - F_{b,i,y}) \times EF_{f,i,Y}$$

Where:

variables	Unite	Value	Source
$F_{p,i,y}$	t coal/t clinker	0.2205	FSR & Price Certification Report
$F_{b,i,y}$	t coal/t clinker	0.1673	Annual average of historic records
$EF_{f,i,y}$	tCO_2/t coal	1.978	$= NCV_{coal} * EF_{coal}$
$Q_{fossil-fuel,y}$	tCO_2/y	63,186	-

In the 1st production year, the cement production is just 80% of those years after, thus the leakage due to the fossil combustion is 50,548 tCO2e.during Feb.2009~Jan. 2010.
The leakage from the increase of grid electricity is calculated as follows:

$$Q_{ele-grid\_CLINKER,y} = Q_{clinker,y} \times (E_{P,grid\_CLINK,y} - E_{b,grid\_CLINK,y}) \times EF_{grid\_CLINK,y}$$

Where:

variables	Unite	Value	Source
$E_{P,grid\_CLINK,y}$	MWh/t clinker	0.0753	FSR & Price Certification Report
$E_{b,grid\_CLINK,y}$	MWh/t clinker	0.079	Annual average of historic records
$EF_{grid\_CLINK,y}$	emission factor for emissions of grid electricity (tCO2/MWh)	1.3	The default value in AM0033
$Q_{ele\_grid\_CLINK,y}$	tCO_2/y	-2,544	-

In the 1st production year, the cement production is just 80% of those years after, thus the leakage due to the grid power consumption is -2,035 tCO_2e.during Feb.2009~Jan. 2010.

According to the above calculation result, the leakage due to energy use and electricity consumption is negative, these leakages are considered as zero accordingly.

IV. Estimated emission reductions

$$ER_y = Q_{Clinker,y} * (Q_{CO2} - Q^*_{CO2}) - L_y = BE_y - PE_y - L_y$$

Where:

BE_y **= 271,409 tCO_2/y during Feb.2009~Jan. 2010 and 339,261 tCO_2/y in Feb.2010~Jan. 2011 and after.**

PE_y **= 104,347 tCO_2/y during Feb.2009~Jan. 2010 and 42,299 tCO_2/y in Feb.2010~Jan. 2011 and after.**

ER_y **= 118,548 tCO_2/y during Feb.2009~Jan. 2010 and 236,320 tCO_2/y in Feb.2010~Jan. 2011 and after.**

L_y **= 48,514tCO_2/y during Feb.2009~Jan. 2010 and 60,642 tCO_2/y in Feb.2010~Jan. 2011 and after.**

As per formula provided in Section B.6.1, the average annual emission reductions of the Project are 224,543 tCO_2e.

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

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The 10 years fixed crediting period is adopted and it is expected that the project activities will generate average emission reductions about 224,543 tCO_2e per year over the crediting period from 01/03/2009 to 28/02/2019

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)
01/03/2009-28/02/2010	104,347	271,409	48,514	118,548
01/03/2010-28/02/2011	42,299	339,261	60,642	236,320
01/03/2011-28/02/2012	42,299	339,261	60,642	236,320
01/03/2012-28/02/2013	42,299	339,261	60,642	236,320
01/03/2009-28/02/2014	42,299	339,261	60,642	236,320
01/03/2009-28/02/2015	42,299	339,261	60,642	236,320
01/03/2009-28/02/2016	42,299	339,261	60,642	236,320
01/03/2009-28/02/2017	42,299	339,261	60,642	236,320
01/03/2009-28/02/2018	42,299	339,261	60,642	236,320
01/03/2009-28/02/2019	42,299	339,261	60,642	236,320
Total (tCO_2e))	485,038	3,324,759	594,292	2,245,429

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

B.7.1. Data and parameters monitored:

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Data / Parameter:	$Q_{clinker,y}$
Data unit:	tonnes/y
Description:	quantity of clinker production in the year y (tonnes of clinker)
Source of data to be used:	Records of Production
Value of data applied for the purpose of calculating expected emission reductions in section B.5	600,000 (the value for the first operational year is 80% of 600,000 according to FSR)
Description of measurement methods and procedures to be applied:	Metered by Clinker production weight system and the data shall be collected and recorded monthly. 100% of data should be monitored.
QA/QC procedures to be applied:	The daily operation and maintenance follow ISO 9000 procedures.
Any comment:	-

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Data / Parameter:	LOI^*
Data unit:	%
Description:	LOI of raw mix in project activity
Source of data to be used:	Quality Report
Value of data applied for the purpose of calculating expected emission reductions in section B.5	17.86 for the years before 2010 in crediting period and 6.59 for the after. 100% of data should be monitored.
Description of measurement methods and procedures to be applied:	Calculated based on the result of lab analysis, based on a principle of difference in mass before and after the ignition process. M_1, M_2 and M_W of the samples should be measured monthly.
QA/QC procedures to be applied:	The daily operation and maintenance follow ISO 9000 procedures.
Any comment:	

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Data / Parameter:	*Quality of clinker*
Data unit:	-
Description:	The quality of clinker
Source of data to be used:	Clinker quality report
Value of data applied for the purpose of calculating expected emission reductions in section B.5	The data is not adopted in this PDD.
Description of measurement methods and procedures to	The quality of clinker will be sampled and test according to *China construction material industry Portland cement clinker standard*

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be applied:	*(GB/T 21372-2008)* per month. 100% of data should be monitored.
QA/QC procedures to be applied:	The lab in charge of test the quality should be authorized in accordance to cement industry technical regulations. The daily operation and maintenance follow ISO 9000 procedures.
Any comment:	-

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Data / Parameter:	$P_{CCR,p}$
Data unit:	%
Description:	Percentage of noncarbonated calcium source used in raw mix in project activity
Source of data to be used:	72
Value of data applied for the purpose of calculating expected emission reductions in section B.5	The data is not applied in B.6
Description of measurement methods and procedures to be applied:	The quantity of CCR and total raw mix will be monitored daily respectively, then the rate of CCR amount to the total raw mix will be calculated and recorded in paper form. 100% of data should be monitored.
QA/QC procedures to be applied:	The daily operation and maintenance follow ISO 9000 procedures.
Any comment:	-

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Data / Parameter:	$F_{p,i,y}$
Data unit:	Tonnes coal /clinker
Description:	coal combusted in the project activity in the year y per unit clinker (tonnes coal/t clinker) sources *j* in year(s) *y*
Source of data to be used:	Records of Production
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.2205
Description of measurement methods and procedures to be applied:	Raw coal consumption shall be metered. The data shall be recorded and summarized monthly. 100% of data should be monitored.
QA/QC procedures to be applied:	The daily operation and maintenance follow ISO 9000 procedures.
Any comment:	-

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Data / Parameter:	$E_{p,grid\_CLINK,y}$
Data unit:	MWh/t clinker
Description:	Electricity consumption intensity for clinker production in the project activity, including the transport electricity consumption.
Source of data to be used:	Records of Production
Value of data applied for the purpose of calculating	0.0753

expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	This value refers to the electricity consumption from CCR pretreatment, transportation to clinker production, it shall be metered continually and recorded and summarized monthly. All the meters qualify the sector standard and are calibrated once per year at least. Different data source are prepared for cross check. 100% of data should be monitored.
QA/QC procedures to be applied:	The daily operation and maintenance follow ISO 9000 procedures.
Any comment:	-

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Data / Parameter:	$P_{CCR,b}$
Data unit:	%
Description:	Percentage of non-carbonated calcium source used in raw mix of baseline scenario
Source of data to be used:	-
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable as this is a green field project.
Description of measurement methods and procedures to be applied:	Will not be monitored
QA/QC procedures to be applied:	-
Any comment:	-

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Data / Parameter:	$W_{CCR,p}$
Data unit:	tonnes
Description:	Quantity of non-carbonated calcium transported
Source of data to be used:	550,000
Value of data applied for the purpose of calculating expected emission reductions in section B.5	No value of data applied in PDD
Description of measurement methods and procedures to be applied:	Weight each batch of CCR inlet to raw mix and data is accordingly collected by electronic system, aggregated data is recorded monthly. The weight is maintained and calibrated in term of the manufacture's requirement and relevant standard. 100% of data should be monitored.
QA/QC procedures to be applied:	The daily operation and maintenance follow ISO 9000 procedures.
Any comment:	-

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B.7.2. Description of the monitoring plan:

>>

The Clinker production information of the Project is determined ex post, which including information of raw mix quality, electricity and fuel consumptions. Therefore the clinker production recording system of the Project is the basis for monitoring, which the monitoring plan drafted is mainly rely on.

1. **Methods for monitoring of clinker production information, i.e. raw mix characters, electricity and coal consumption.**

The clinker production of the proposed project activity shall be metered by weight meters /strap meters.
All meters involved shall meet relevant national standards of the accuracy and reliability, and be installed, calibrated and operated according the relevant national standards.

The CO_2 emission of the raw mix of the Project shall be tested by lab analysis according to relevant national standard, and the instruments of laboratory should be authorized. During the LOI analysis, the size and frequency of sampling for this lab analysis should be statistically significant with a maximum uncertainty range of 20% at a 95% confidence level.

The coal consumption intensity of clinker production of the Project shall be metered by weight meters, relevant record and invoice shall be kept for cross check.

The electricity consumption intensity of clinker production of the Project shall be metered respectively by MWh meters of each unit, which include units from CCR transportation to the clinker production. The MWh meters shall be maintained and calibrated according to relevant national standards.

As to the data planed to be monitored, Backup data shall be made though installing associated meters, relevant records or invoice.

2. **Calibration of Meters & Metering**

Calibration of Meters & Metering should be implemented according to relevant national and local standards and rules. And all the records should be documented and maintained by the project owner for DOE's verification.

3. **Quality Assurance and Quality Control**

DCS system is equipped in proposed project activity to monitoring the data of clinker production, by which may improve the reliability and accuracy of monitoring and recording.

The project owner shall own the quality management system ISO9000. The quality assurance and quality control procedures for recording, maintaining and archiving data shall be improved as part of this CDM project activity according to EB rules and real practice. This is an on-going process which will be ensured through the CDM mechanism in terms of the need for verification of the emission reductions on an annual basis according to this PDD.

4. **Data Management System**

Specific staff will be appointed by the project owner to take the overall responsibility for monitoring of greenhouse gas emission reductions and keeping all the data and information for emission

reductions verification. Electronic data, files including the log data in DCS is supposed to be backup and copied to CD or other disk, which should be kept for the entire life span of the Project. For the data in paper shall be kept for at least 5 years.

5. Verification

It is expected that the verification of emission reductions generated from the Project will be done annually.

6. Management structure

Details regarding the management structure of the monitoring plan are illuminated in Figure 4.

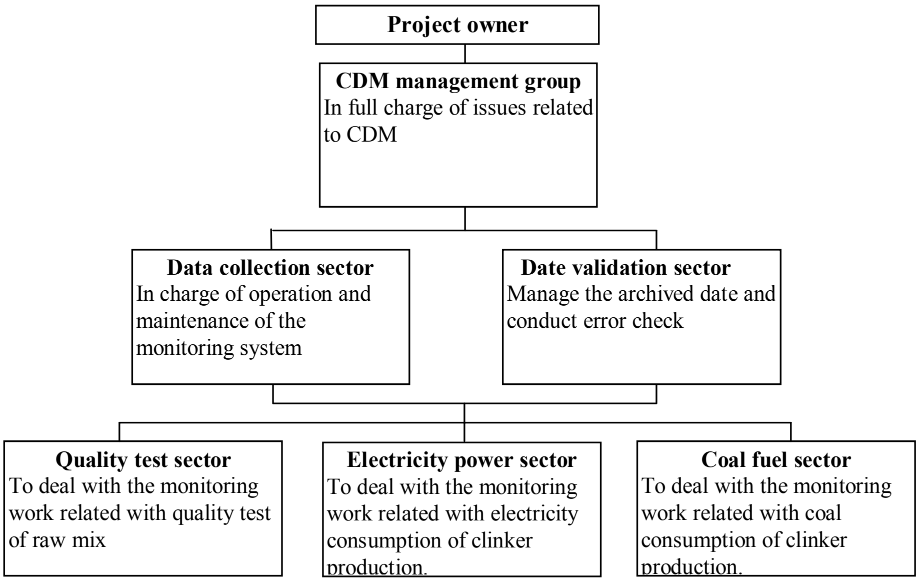

Figure 5. Management Structure of Monitoring Plan

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)

>>

The application of the baseline study and monitoring methodology of the Project was completed on 11/08/2008 by KOE Environmental Consulting, Inc. (Japan) (http://www.cncdm.cn).

The contact information of KOE who drafted the baseline and monitoring plan is indicated in the table blow.

KOE Environmental Consulting, Inc. (Japan)

Daniel Cao
cy@cncdm.cn
Tel: +86 010 62219066
Fax: +86 010 62219066
Website: http://www.cncdm.cn

The entity is not project participant listed in Annex 1

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:

>>

16/04/2007 (equipment purchasing)

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

>>

21 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:

Not applicable.

C.2.1.2. Length of the first crediting period:

Not applicable.

C.2.2. Fixed crediting period:

>>

C.2.2.1. Starting date:

>>

01/03/2009

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C.2.2.2. Length:

>>

10 years

SECTION D. Environmental impacts

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

The environmental impact assessment (EIA) report was approved by the Environmental Protection Administration of Leshan City in Sep. 25th, 2006. According to the EIA report, the environmental impacts arising from the Project are analyzed as following:
Environmental impact in construction phase:

The project owner would implement series effective measures to protect environmental. The impacts generated during the construction period would be kept within the standards. Besides, those impacts will disappear with the end of construction.

Environmental impact in operation phase:
The impacts generated during the operation phase, including atmosphere impact, waste water impact, noise impact, solid waste impacts etc, are analyzed as following:

1. Atmosphere Impact

The atmosphere impact could be controlled via the dust removing apparatus and corresponding management. The air quality of the district would be consistent with the 2nd class standard of GB3096-1995.

2. Waste Water Impact

During operation period, the project won't pollute Minjiang River, where the waste water of project is discharged into. The waste oil generated by the project will feed into the rotary kiln burning according to *Hazardous Waste Pollution Prevention technology requirements.*

3. Noise Impact

The noise measurements, such as vibration decreasing, vibration isolation, sound insulation and noise elimination etc, would be taken to limit the noise impact generated by the apparatus. The sound environment would reach the III standards of GB12348-90.

4. Solid Wastes impact

The solid wastes generated involve the dusts collected by dust removing apparatus and the daily garbage. Those dusts would feed back to the clinker produce process other than emitted into the air; while the garbage would be transported out of the plant for land filling.

5. Ecology impact

The impact of project on district ecology could be neglect.

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:

Environmental impacts arising from this project are considered insignificant; therefore, it is not necessary to make additional explanation here.

SECTION E. Stakeholders' comments

>>

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

>>

In Oct 2007, Leshan Yongxiang Group carried out a questionnaire survey on the workers and local residents to collect comments if any about the project activity. Comments received from the survey are summarized as follows.

E.2. Summary of the comments received:

>>

Totally 50 questionnaires returned out of 50 with 100% response rate. The basic structure of the respondents is illustrated in Table 6.

Table 6. Statistics on the basic conditions of people surveyed

Structure of gender		
gender	population	share
Male	28	56 %
Female	22	44 %

Structure of educational background		
Educational background	population	share
Junior college and above	15	30%
Senior high school and below	35	70%

Structure of age		
age	population	share
21～30	19	38%
30～40	19	38%
41~60	12	24%

As shown in Table 6, people surveyed are representative of the public in terms of gender, age and educational background. Therefore their attitudes towards the project can be a comprehensive reflection of the attitudes of the local residents possibly affected by the project. Among the 50 respondents:

All the respondents (accounting for 100%) hold a supportive attitude towards the project, which was considered to increase income (32%), provide employment opportunity (76%), alleviate environmental pollution (60%), and promote the development of local cycle economy (4%).

The respondents supposed it was necessary to control the dust appropriately during the operation process of the Project (12%).

The survey shows that most of the residents at the Project site consider that construction of the Project will benefit the local economic development, but they still have some concerns about the dust possibly caused by the Project. The project owner has given adequate consideration to noise control in the process of project design and construction and taken appropriate measures.

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

>>

The project owner has taken full consideration of relevant comments and suggestions from stakeholders in the process of project construction. Especially as to the issue of dust control, the project owner has adopted the design of production line furnished with appropriate dedust facilities and the it had receive the EIA, therefore the dust control is able to meet the relevant environmental regulation and standards according to current design.

In summary, people and local government are all very supportive of the Project therefore it is not necessary to modify the Project due to the comments received.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Sichuan Yongxiang Co., Ltd.
Street/P.O.Box:	Zhugen Town, Wutongqiao District, Xinhua County,
Building:	--
City:	Leshan City
State/Region:	Sichuan Province
Postcode:	614800
Country:	P.R.China
Telephone:	--
FAX:	--
E-Mail:	--
URL:	www.lesyxsz.com
Represented by:	Liu Jianhua
Title:	Project Manager
Salutation:	Mr.
Last Name:	Liu
Middle Name:	--
First Name:	Jianhua
Department:	Project Department
Mobile:	--
Direct FAX:	0833-3340717
Direct tel:	0833-3341978
Personal E-Mail:	liujh@lsyxsz.com

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Organization:	Pear Carbon Offset Initiative, Ltd.
Street/P.O.Box:	Tukiji 1-10-11, Chuo-ku
Building:	RATIO 1002
City:	Tokyo
State/Region:	----
Postcode:	104-0045
Country:	Japan
Telephone:	----
FAX:	+81-3-3248-0557
E-Mail:	----
URL:	----
Represented by:	Mr. Kazuo Sasaki
Title:	----
Salutation:	Mr.
Last Name:	Sasaki
Middle Name:	---
First Name:	Kazuo
Department:	----
Mobile:	----

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Direct FAX:	**----**
Direct tel:	**+81-3-3248-3396**
Personal E-Mail:	**k_sasaki@pear-carbon-offset.org**

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding from Annex I Parties for this Project.

Annex 3

BASELINE INFORMATION

1 the calculation of LOI* of project activity

2 the histroric records of the clinker production line with highest performance in the regin.

Annex 4

MONITORING INFORMATION

No additional information

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5 years Tax free income has been considered in NPV calculation

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<u>That method is sensible for following reasons:</u>

According to the FSR and a specific breakdown clarification[1], the fixed asset investment of project activity includes series additional technologies especially for CCR as main raw mix e.g. the CCR transportation system, elect mill for CCR raw mix and the precalcination system etc. Therefore the fixed asset investment of project activity is definitely higher than that in baseline scenario, and in term of the principle of conservativeness it is acceptable to assume that in both baseline scenario and project activity is equal.

According to the FSR, the annual material and power cost has account for more than 80% of total operation and maintaince cost.

---

[1] *Breakdown of additional investment than similar design but with conventional material,* Hefei Cement Institute.

Based on the above analysis, it is acceptable and reasonable to select the *annual material and power cost* as the key indicator to compare the financial cost of baseline scenario and project activity.

Secondly, the *annual material and power cost* of each alternatives is showing inTable.3, simultaneously, their values under variations of the most significant parameters including main materials and energy price are also calculated. Through that method a sensitivity test is done so as to illuminate whether the result of comparison is robust.

Table 3. Comparison and Sensitivity analysis of *annual material and power cost*
(Baseline scenario and project activity)

variable	**annual raw material and power cost (10^4 RMB/y)**					
	-10%		**0**		**10%**	
CCR price	10745.64	**10529.91**	10978.08	**10529.91**	11210.51	**10529.91**
limestone price	10959.66	**10360.03**	10978.08	**10529.91**	10996.50	**10699.79**
coal price	10658.49	**10176.69**	10978.08	**10529.91**	11297.67	**10883.12**
power price	10590.79	**10142.61**	10978.08	**10529.91**	11365.37	**10917.20**

Note: Alternative 1 (dark blue cells)
Alternative 2 (yellow cells)

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From the table 3, it is obvious that the *annual material and power cost* of ***Alternative 1*** is always lower than ***Alternative 2*** even considering the variation range of – 10% to +10% of critical parameters.

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more economy and financial attractive than ***Alternative 2.*** On the other hand, Considering the relevant national and sectoral policies, ***Alternative 1*** is consistent with current mandatory laws and regulations in cement sector of China.

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4	Estimated annual sales income	166.80 million RMB	FSR

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In accordance with the Feasibility Study report, following financial parameters were taken as uncertain factors for sensitive analysis of financial attractiveness:

Fixed asset investment

Annual O&M cost
Cement production

The impacts of Fixed asset investment, annual O&M cost and Cement production of the Project on NPV of total investment were analyzed. The results of sensitive analysis of three indicators are shown in Table 4.

Table 5. Sensitivity analysis of financial indicators of the Project
(NPV of total investment, without CER sales revenues)
Unit: 10^4 RMB

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range / parameter	-10%	0	10%
Fixed asset investment	￥-3,034	￥-4,989	￥-6,944
Annual O&M cost	￥2,850	￥-4,989	￥-12,829
Cement production	￥-14,198	￥-4,989	￥4,219

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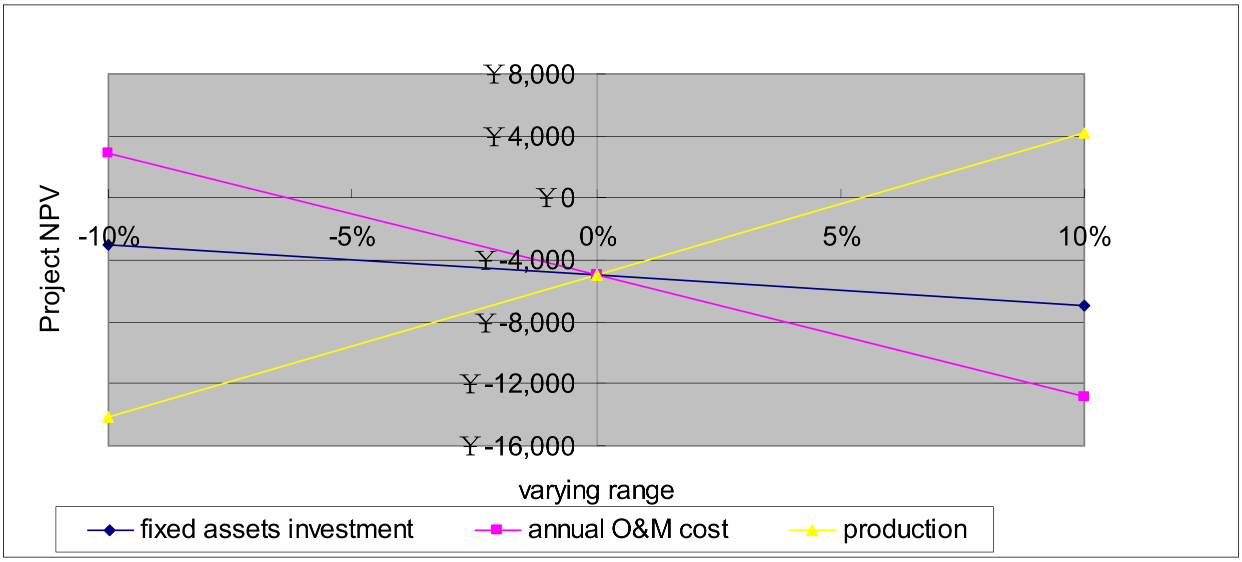

Figure 5. Sensitivity analysis of financial indicators of the Project

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except while decline of annual O&M cost or rising of cement production reach more than 5%. Nevertheless,

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on the one hand, due to the remarkablely raise of price for energy, particularly the coal, after the startup of the proposed project in 2007[2] had led to that the actual cost was evidently higher than the estimated level of FSR in 2006; on the other hand, the cement production is given according to the case based design thereby it is relatively stable and is unlikely solely increase by more than 5% while the annual O&M cost is fixed.

[2] http://www.sichuan.gov.cn/zwgk/swzc/hyzx/200707/t20070710_191073.shtml