CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 02 - in effect as of: 1 July 2004)

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.

SECTION A. General description of the small-scale project activity

A.1 Title of the small-scale project activity:

>> Vikram Cement: Energy efficiency by up-gradation of clinker cooler in cement manufacturing.
Version 01, 27th December 2005

A.2. Description of the small-scale project activities:

>> Vikram Cement (VC) is the progressive Cement Manufacturing Company of India, operating since 1985. Vikram cements belong to well known Grasim industries ltd. Aditya Birla group of companies. VC is manufacturing cement {ordinary portland cement (OPC), portland pozzolana cement (PPC)} & clinker. This project activity is applied to line III of VC out of three lines of production.

The project activity is to upgrade the clinker cooler for energy efficiency in the cement manufacturing process. VC line-III Plant was commissioned in 1991 with the best available technology by the KHD, Germany[1]. In the commissioning reciprocating grate cooler for clinker cooling was used.

The project is the redesigning of the grate system with IKN[2] plate type system, which will increase the cooler recuperation efficiency i.e. utilise more heat in clinker cooler. The project activity is the retrofitting of the clinker cooler for effective trapping of the heat in the clinker cooler. In this project activity new clinker inlet distribution system is used to distribute the clinker on the grate. Due to the benefits of the inlet grate system the proper cooling of inlet is taking place with additional benefit of high temperature tertiary air ducts.

GoI has stipulated the following indicators for sustainable development in the interim approval guidelines for CDM projects.

- Social well being
- Economic well being
- Environmental well being
- Technological well being

Social well being:

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[1] KHD Humboldt Wedag International Ltd.

[2] IKN specializes in the design, fabrication and supply of Pendulum Coolers and clinker cooling related products such as roll crushers, heat shields and KIDS (Clinker Inlet Distribution System). Formed in 1982 and headquartered in Neustadt, Germany, IKN has subsidiaries in USA, France and India and is well represented in South America the Middle East and Asia.

The project has directly and indirectly improved the job opportunity for the people. The increased efficiency has resulted in a reduction in fuel consumption and thus reduced pollution in the area. Thus the project has improved the social condition of the local population.

Economic well being:

Economics is about the efficient use of resources, usually expressed in monetary terms. The investment made to improve the efficiency of the clinker cooler, an important stage of cement manufacturing stage, has improved the economics of the process as a whole. This has a potential to have a positive multiplying effect on the whole cement industry in terms of saving in fuel consumptions with more and more cement plants taking a lesson and implementing similar 'clinker cooler efficiency improvement' projects. The proverb 'energy saved is energy generated' fits here well. Further, the financial benefits due to issuance of carbon credits contribute to monetary gains for the company.

Environmental well being:

From an environmental perspective the project benefits the environment by saving precious non renewable fuel resources and reducing GHGs and particulate emission. In the absence of the project activity, equivalent amount of fuel savings and emission reduction would not have been possible. Apart from that, reduction in emissions improves the environment of the area as a whole. Therefore clinker cooler efficiency improvement activity taken up by Grasim industries has both local and global environmental benefits.

Technological well being:

In India VC has taken a pivotal role to implement clinker cooler efficiency improvements projects. VC is paving the way for other cement manufacturing companies to follow them in implementing such projects, thereby creating conducive scenarios to reinforce the sustainable development objectives of the country.

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)
India	***Private entity:*** Vikram cement	No

A.4. Technical description of the small-scale project activities:

A.4.1 Location of the small-scale project activities

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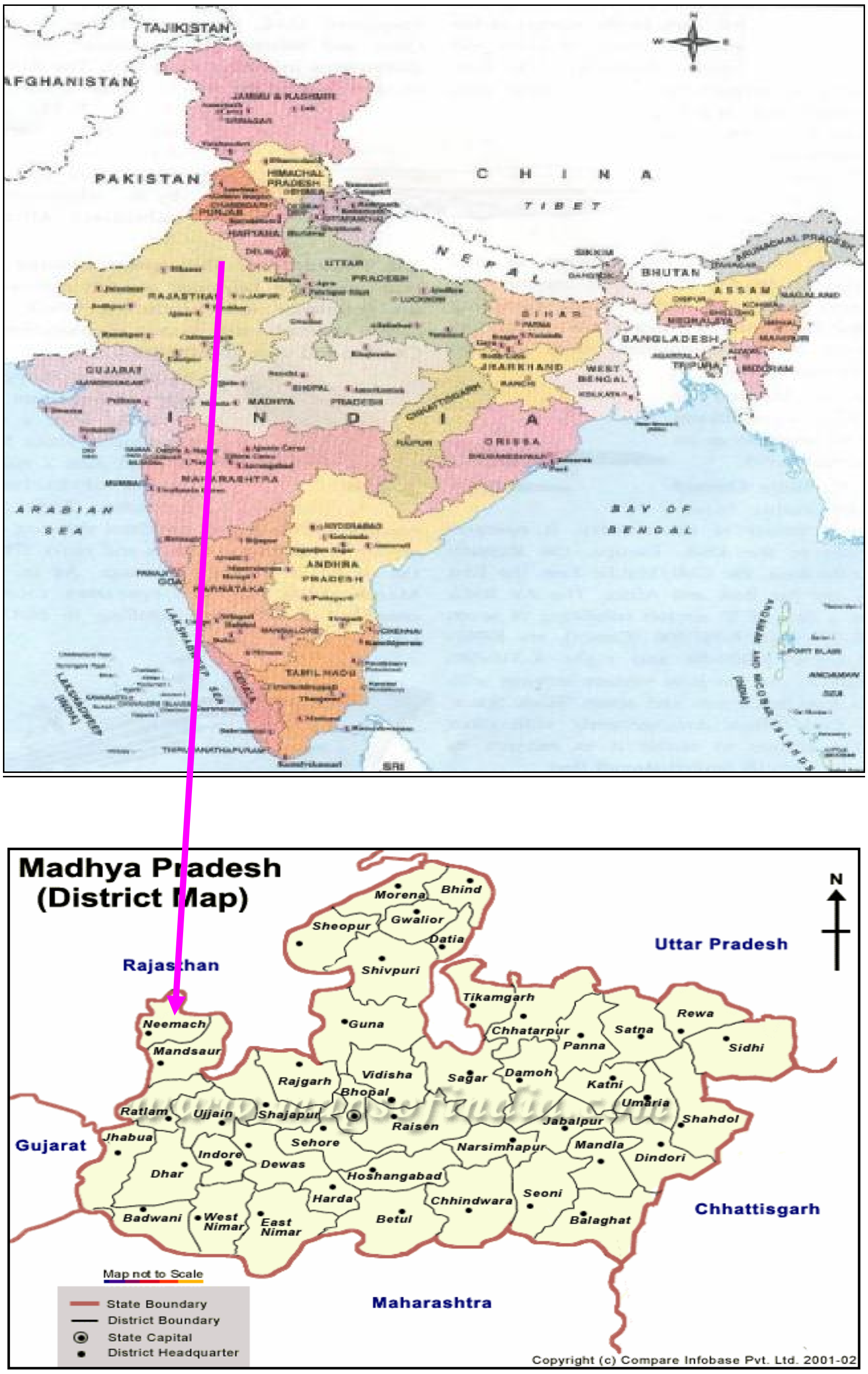
<u>Fig A 4 (a) : Country Map depicting activity site</u>



A.4.1.1.	<u>Host Party</u>(ies):

>> India

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

>> Madhya Pradesh

A.4.1.3. City/Town/Community etc:

>> P.O. Khor; district Neemuch (MP).

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

>> VC is located at P.O. Khor; district Neemuch (MP). Neemuch lies between the parallels of latitude 240 15' - 240 35' North, and between the meridians of longitude 740 45' - 750 37' East. The plant is well connected by railway and road transport.

A.4.2. Type and Category (ies) and technology of the small-scale project activity:

>> **Type and Category of Project Activity**

The project meets the applicability criteria of the small-scale CDM project activity category, Type-II: energy efficiency improvement projects (D: Energy efficiency and fuel switching measures for industrial facilities) of the 'Indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories'.

Main Category: ***Type II – Energy efficiency improvement project***

Sub Category: ***D. Energy efficiency and fuel switching measures for industrial facilities***

As per the provisions of appendix B of simplified modalities and procedures for small scale CDM project activities (version 07), Type II D "Comprises any energy efficiency and fuel switching measure implemented at a single industrial facility. This category covers project activities aimed primarily at energy efficiency; a project activity that involves primarily fuel switching falls into category III.B. Examples include energy efficiency measures (such as efficient motors), fuel switching measures (such as switching from steam or compressed air to electricity) and efficiency measures for specific industrial processes (such as steel furnaces, paper drying, tobacco curing, etc.). The measures may replace existing equipment or be installed in a new facility. The aggregate energy savings of a single project may not exceed the equivalent of 15 GWh_e per year. A total saving of 15 GWh_e per year is equivalent to a maximal saving of 45 GWh_{th} per year in fuel input."

As per paragraph 1 of II. D. of appendix B of the UNFCCC defined simplified modalities and procedures for small-scale CDM project activities, 'The aggregate energy savings of a single project may not exceed the equivalent of 15 GWh_e per year. A total saving of 15 GWh_e per year is equivalent to a maximal saving of 45 GWh_{th} per year in fuel input'. The project activity will reduce the thermal energy in tune of 31 GWh_{th}, which is well within the limit of small scale project activity of this category. The project activity is

energy efficiency project and saving depends on the cooler efficiency and clinker production. The efficiency increase will be almost constant (Reducing with the age) and the production may vary within the limit.
The baseline and emission reduction calculations from the project would be based on paragraphs 3 and 4 of appendix B (version 07, dated 28th November 2005) and the monitoring methodology would be based on guidance provided in paragraph 6, 7 and 8 of II D of the same appendix B.

Technology to be employed by the project activity

VC Line-III Plant was commissioned in 1991. The technology provider was KHD, Germany. They supplied reciprocating grate cooler for clinker cooling with original plant. The reciprocating grate system comprises rows of alternately fixed and movable grate plates, secured by means of T-bolts to grate support girders. The plates of various grades of steel are used along with the cooler corresponding to the different thermal and mechanical loading conditions. The holes in the rear part of the plate's acts as nozzles, directing the cooling air flow vertically upwards. Air is forced horizontally into the bed of clinker through the gaps between the fixed and the movable plate rows and through the holes in the end faces of the plates. The cooling stream and the continual agitation of the clinker by the grate movements ensures that the clinker particles come into intimate contact with the air.

The project is the redesigning of the grate system with IKN plate type system, which will increase the cooler recuperation efficiency. This technology is the retrofitting of the existing system. It uses the new clinker inlet distribution system to distributor the clinker on the grate. The inlet area consists of 7 fixed rows. This IKN type system works on the principle of coanda effect. The coanda nozzles turn the cooling air strong horizontal air jets with high velocity into clinker bed. The narrow slots inclined in the direction of transport produce sharp air jets with high dynamic pressure. This pressure keeps the jets adjacent to surface of coanda nozzles. The air velocity at nozzle is 40 m/Sec. The technology employed is advanced with only few such applications in cement plants of India.

Fig A.4.2 b: Coanda Effect[3]

The clinker is transported by inclination of the inlet and by the cooling air. IKN type system works on the principle of coanda effect. The coanda nozzles turn the cooling air strong horizontal air jets with high velocity into clinker bed. The narrow slots inclined in the direction of transport produce sharp air jets with high dynamic pressure.

This pressure keeps the jets adjacent to surface of coanda nozzles. As a result of the coanda effect the aeration of the grate of 1 m/s is converted by the grate floor with an open grate area of 2.5% into 40 m/s air jets close to grate surface. The surface of the coanda nozzles is completely swept by air and is very effectively cooled. With the application of this technology, proper cooling of the clinker is taking place as well as the heat transfer from the clinker to cooling air is also increased, which reduces the fuel consumption.

A.4.3. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed CDM project activity, including why the emission reductions would not occur in the absence of the proposed project activity, taking into account national and/or sectoral policies and circumstances:

>> The project activity would reduce the specific heat consumption in the clinker cooler section in the cement production. The project activity would thereby bring about a reduction in direct on-site emissions from reduced thermal energy consumption.

[3] http://jnaudin.free.fr/html/coanda.htm

Though the Ministry of Environment and Forest (MoEF), Ministry of Power (MoP) and Ministry of Non-conventional Energy Sources (MNES) in India encourage energy conservation, they do not force cement industries to reduce their specific energy consumption to a prescribed standard. Nor do the Department of Industries/ the Bureau of Indian Standards/ Cement Manufacturers Association/ National Council for Building Materials have imposed any directives towards specific energy consumption in specific section in cement manufacturing. The project proponent has implemented the project activity over and above the national or sectoral requirements. The GHG reductions achieved by the project activity are additional to those directed by the governmental policies and regulations. The other "additionality" criteria of the project activity are dealt with in section B.

A.4.3.1. Estimated amount of emission reductions over the chosen crediting period:

>> The GHG emission reductions for a 10 year crediting period are provided in table A.4:

Table A 4: Emission reductions

Year	Certified emission reduction
2001 – 2002 (August 01 to March 02)	6695
2002 – 2003	10564
2003 – 2004	10856
2004 – 2005	11183
2005 – 2006	11472
2006 – 2007	11019
2007 – 2008	11019
2008 – 2009	11019
2009 – 2010	11019
2010 – 2011	11019
2011 – 2012 (April 11 to July 11)	3673
Total estimated reductions (tones of CO_2 e)	**109,537**
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tones of CO_2 e)	10,954

The cumulative GHG emission reductions for a 10 year crediting period are estimated as 109,537 tCO2-e.

A.4.4. Public funding of the project activity:

>>

No public funding for the project activity is available till date.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a larger project activity:

>>

According to appendix C of simplified modalities and procedures for small-scale CDM project activities, '***debundling'*** is defined as the fragmentation of a large project activity into smaller parts. A small-scale project activity that is part of a large project activity is not eligible to use the simplified modalities and procedures for small-scale CDM project activities.

According to para 2 of appendix C[4]

A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

- With the same project participants;
- In the same project category and technology/measure;
- Registered within the previous 2 years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small- scale activity at the closest point

According to above-mentioned points of de-bundling, project activity is not a part of any of the above, therefore, considered as small scale CDM project activity.

[4] Appendix C to the simplified M&P for the small-scale CDM project activities, http://cdm.unfccc.int/Projects/pac/howto/SmallScalePA/sscdebund.pdf

SECTION B. Application of a baseline methodology:

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

>> Main Category: **Type II – Energy efficiency improvement projects**

Sub Category: **II. D-Energy efficiency and fuel switching measures for industrial facilities**

The reference has been taken from the list of the small-scale CDM project activity categories contained in 'Appendix B of the simplified M&P for small-scale CDM project activities-Version 7 (28th November 2005)'.

B.2 Project category applicable to the small-scale project activity:

>> The project activity fits under Type II.D – Energy efficiency and fuel switching measures for industrial facilities under Appendix B. The project activity is the retrofit in cooler for energy efficiency. The project activity is reducing the use of energy in cement manufacturing and will fall under the category II. D.of the appendix B.

The project activity is applied in a part of clinker manufacturing process i.e. cooler. The cooler used for cooling the clinker and waste heat recovery to the clinker manufacturing process. Since the cooler is not a direct energy user; it takes heat from the fuel applied to the preheater and kiln, efficiency before and after project activity is used for the estimation of heat saving.

All types of fuel use in the cement manufacturing will be monitored and the average emission factor will be calculated based on the fuel mix for the emission reduction calculations. The information regarding baseline and project data are presented in the table below:

Table B 2 (a): Baseline and project activity data requirement and data source

S. No.	Parameter	Data source
Baseline Scenario		
1	Cooler efficiency	Plant
2	Fuel used in clinker manufacturing	Plant
3	Calorific value of the fuel used	Plant
Project Scenario		
4	Cooler efficiency	Plant
5	Fuel used in clinker manufacturing	Plant
6	Calorific value of the fuel used	Plant
7	Emission factor of the fuel used	Default emission factor from

		IPCC

B.3. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

>> In accordance with paragraph 3 of the simplified modalities and procedures for small-scale CDM project activities, a simplified baseline and monitoring methodology listed in Appendix B may be used for a small-scale CDM project activity if project participants are able to demonstrate to a designated operational entity that the project activity would otherwise not be implemented due to the existence of one or more barrier(s) listed in Attachment A of Appendix. B. These barriers are:

- Investment barrier
- Technological barrier
- Barrier due to prevailing practice
- Other barriers

The main driving force to this 'Climate change initiative' is GHG reduction and Fossil fuel conservation. However, the project proponent was aware of the various barriers associated to project implementation. But it is felt that the availability of carbon financing against a sale consideration of carbon credits generated due to project activity would help to overcome these barriers. Some of the key barriers are discussed below:

Investment Barrier

The project activity is energy efficiency in clinker cooler. The project is saving the fossil fuel heat input in the clinker manufacturing. The project activity is a retrofit measure in the clinker manufacturing. The project activity involves a huge capital investment and low returns. The IRR below opportunity cost of capital 17% (financial benchmark) is not acceptable for any project in the Grasim Industries. This shows that any project should yield returns more than 17%, to consider it for implementation.

The financial analysis- internal rate of return (IRR) is calculated for the project.

Table B 3.: IRR (%) figures with and without CDM funds

	IRR (%) without CDM fund	**IRR (%) with CDM funds**
IRR of cooler up-gradation project	13.7%	23.5%

Following are the assumptions while conducting IRR analysis of the project.

1. The average fuel price is Rs. 2664/MT
2. Operation and Maintenance cost is considered as 1% of capital cost.
3. Life of project is considered as 15 years.

4. CDM funds are available at the rate of 5 Euro/CER.

The IRR calculations of all plants show that the IRR of the project (13.7%) is below minimum required rate of return (17%) that can be achieved without CDM funds. It improves to 23.5% with CDM funds availed against CERs, which is more than minimum required internal rate of return.

Technical Barriers

While crossing the well-established barriers of technology and going ahead with this project, Vikram cement had took a lot of risk in terms technological unfamiliarity, risk of stoppages and quality problems. Other barriers associated were plant shutdown for retrofitting, resulting into production loss. Following is the brief explanation of barriers associated with it. The main technological barrier was the mindset of the operators operating on the well established system for so long. Skilled and experienced engineers/ operators to operate and maintain the technology were not available, which could have lead to equipment disrepair and malfunctioning.

Barriers due to prevailing practice

The 'IKN static grate cooler energy efficiency project', when implemented in year 2001 as ***retrofit measure***, was "one of the first of a kind" project, due to low penetration of this technology, in Indian cement industries. Cooler is very critical part of the cement process, and general belief in Indian cement industry is that 'tempering with it may lead to production stoppages and quality problems'. Therefore, this technology, due to its 'state-of-the-art' features, risk potential and complexity, is still scarcely implemented in Indian cement industry.

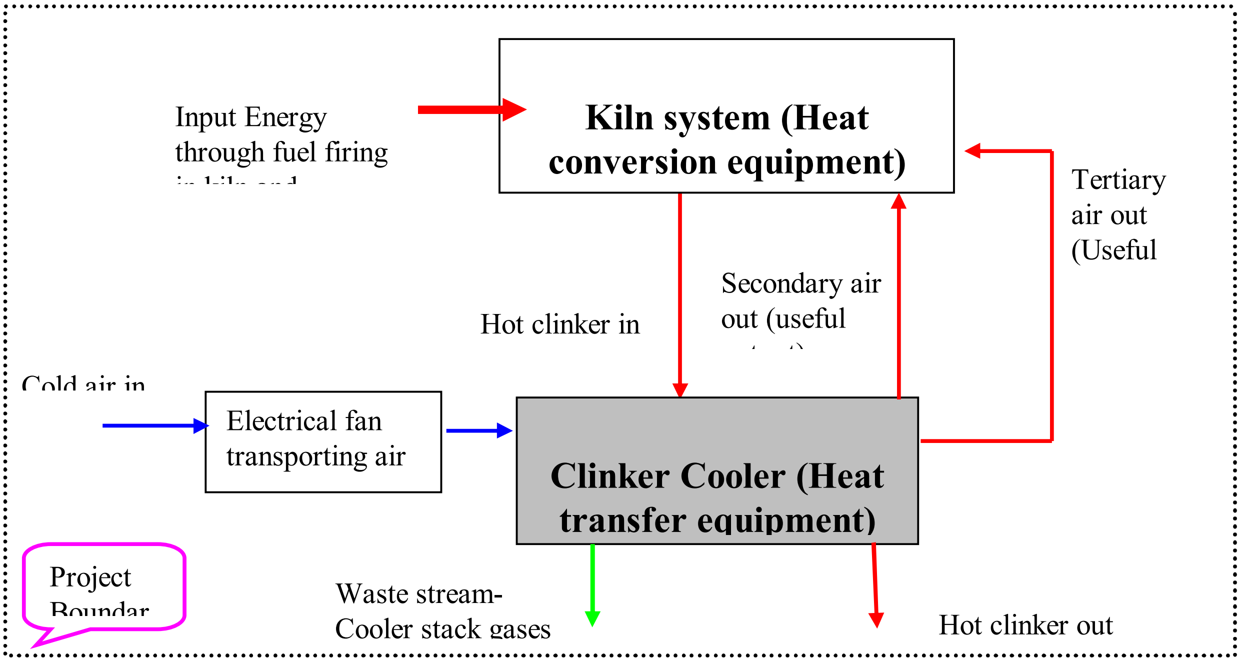
Other barriers

The project required a shutdown and therefore led to a loss of Rs 22.5 millions to VC. The prolonged production shutdown led to reduced market supply and permanent loss of market to some extent.

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the small-scale project activity:

>> Based on baseline methodology, 'the project boundary is the physical, geographical site of the industrial facility, processes or equipment that are affected by the project activity'. The project boundary selected is the clinker cooler (heat transfer equipment directly associated with heat conversion equipment *i.e.* kiln) and kiln system (heat conversion equipment), including preheater section because these all equipments are effecting from the project activity. The pictorial presentation of the project boundary is given below:

Figure B 4: Project Boundary



B.5. Details of the baseline and its development:

>> Detailed baseline information provided in Annex 1.

Date of completing the baseline: 25/12/2005

Name of person/entity determining the baseline: Vikram Cement and their consultants

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:

>> 31/01/2001

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

>> 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:

>> 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:

>> 01/04/2001

C.2.2.2. Length:

>> 10 years 0 months

SECTION D. Application of a monitoring methodology and plan:

>>

D.1. Name and reference of approved monitoring methodology applied to the small-scale project activity:

>> **Title:** Monitoring Methodology for the category II D – Energy efficiency and fuel switching measures for industrial facilities.

Reference: 'Paragraph 6 to 8' as provided in Type II.D. of Appendix B of the simplified modalities and procedures for small-scale CDM project activities - Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activity Categories.

D.2. Justification of the choice of the methodology and why it is applicable to the small-scale project activity:

>> As established in Section B.2 the project activity falls under Category II.D. Energy efficient power and steam generation leads to mitigation of GHG emissions that would have been produced by the inefficient operation. In order to monitor the mitigation of GHG due to the project activity, the fuel used and efficiency need to be measured. The project activity is the retrofit to cooler for energy efficiency. In the monitoring all the parameters related with fuel use and efficiency of cooler is monitored.

In the monitoring plan mainly these data is monitored:
Fuel used in clinker manufacturing
Calorific value of the fuel
Parameters related with the cooler efficiency
Based on the monitored data and the IPCC emission factors the baseline emissions and project activity emissions are calculated.

There is no technology transfer in the project activity therefore the project activity doesn't lead to any leakage emissions. The difference between the baseline and project emissions is reported as emission reductions from the project activity.

D.3 Data to be monitored:

>> Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
P.1	Clinker production (Clk)	Plant	Tons/day	Measured and calculated	Recorded continuously	100%	Electronic	
P.2	Quantity of fuel consumed (Q_{Fuel})	Plant	Tons/month	Measured and calculated	Recorded continuously and reported monthly	100%	Electronic	Weigh bridge
P.3	Emission factor of fuel (EF_{Fuel})	IPCC	TCO_2/TJ	Fixed	Fixed	100%	Electronic	Fixed
P.4	Calorific value of fuel consumed (CV_{Fuel})	Plant	Kcal/kg	Measured	Recorded continuously and reported monthly	100%	Electronic	Bomb calorimeter
P.5	Average emission factor ($EF_{average}$)	Plant	TCO_2/TJ	Calculated	Monthly	100%	Electronic	

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
Clinker cooler Efficiency calculations								
P.6	Inlet temperature of clinker in cooler ($T_{Clk\ In}$)	Plant	°C	Estimated	Fixed	100%	Electronic	The inlet temperature of clinker in cooler is estimated constant in pre and post project scenario, based on technology supplier.
P.7	Specific heat of clinker ($S_{Clk\ In}$)	Formulae provided by technology suppler	Kcal/kg°C	Calculated	Weekly	100%	Electronic	
P.8	Temperature of clinker dust from kiln to cooler (T_{Dust})	Plant	°C	Estimated	Fixed	100%	Electronic	Same as clinker temperature.
P.9	Clinker dust from kiln to cooler (M_{Dust})	Plant	TPD	Estimated	Fixed	100%	Electronic	Based on technology supplier mass of recirculation dust is 2% of the clinker produced.
P.10	Specific heat of clinker Dust	Formulae provided by technology	Kcal/kg°C	Calculated	Weekly	100%	Electronic	The specific heat is calculated based on the formula provided by technology supplier.

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
	from kiln to cooler (S_{Dust})	suppler						
P.11	Inlet temperature of cooling air in cooler ($T_{Cooling Air}$)	Plant	°C	Measured	Daily	100%	Electronic	Average temperature of minimum and maximum ambient temperature
P.12	Static pressure of cooler fans ($StPr_1$)	Plant	mm water gauge	measured	Weekly	100%	Electronic	Instrument used: Digital Manometer
P.13	Density of air (Da)	Data book	Kg/m^3	Calculated	Weekly	100%	Electronic	
P.14	Area of cooler fans (ArCf1)	Plant	M^2	Measured once on starting of project activity	Fixed	100%	Electronic	
P.15	Mass flow rate of cooling air in cooler (M	Plant	kg/hr	Measured & Calculated	Weekly	100%	Electronic	Calculated based on the flow rate of air and density of air.

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
	$_{Cooling\ Air}$)							
P.16	Specific heat of cooling air ($S_{Cooling\ Air}$)	Formulae provided by technology suppler	Kcal/ kg/°C	Calculated	Fixed	100%	Electronic	
P.17	Power consumed by cooler fans (P_{Fan})	Plant	KWh /day	Measured	Monitored continuously and reported weekly	100%	Electronic	Instrument used: Energy meter
P.18	Exhaust air temperature from cooler ($T_{Exhaust\ Air\ Cooler}$)	Plant	°C	Measured	Weekly	100%	Electronic	Instrument used: Thermocouple
P.19	Exhaust air temperature from ESP ($T_{Exhaust\ Air\ ESP}$)	Plant	°C	Measured	Weekly	100%	Electronic	Instrument used: Thermocouple
P.20	Static Pressure from ESP exhaust	Plant	mm water gauge	Measured	Weekly	100%	Electronic	Instrument used: Pitot Tube

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
	($StPr_{ESP\ Exhaust}$)							
P.21	Dynamic Pressure from ESP exhaust ($DyPr_{ESP\ Exhaust}$)	Plant	mm water gauge	Measured	Weekly	100%	Electronic	Instrument used: Pitot Tube
P.22	Mass flow rate of cooler exhaust gas ($M_{Exhaust\ gas}$)	Plant	kg/hr	Measured & Calculated	Weekly	100%	Electronic	Calculated based on the pressure and density.
P.23	Specific heat of cooler Exhaust gas ($S_{Exhaust\ gas}$)	Formulae provided by technology suppler	Kcal/ kg / °C	Calculated	Fixed	100%	Electronic	
P.24	Temperature of clinker dust from cooler ($T_{Dust\ cooler}$)	Plant	°C	Estimated	Weekly	100%	Electronic	Temperature of dust will be same as exhaust air temperature from cooler.

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
P.25	Clinker dust from cooler ($M_{Dust\ Cooler}$)	Plant	Kg /m^3 of exhaust air	Estimated	Every six month	100%	Electronic	Drop test should be conducted in every six month.
P.26	Specific heat of clinker Dust rom cooler ($S_{Dust\ cooler}$)	Formulae provided by technology suppler	Kcal/kg°C	Calculated	Fixed	100%	Electronic	
P.27	Temperature of clinker from cooler ($T_{Clk\ Out}$)	Plant	°C	Calculated	Weekly	100%	Electronic	Instrument used: Thermocouple
P.28	Clinker from cooler ($M_{Clk\ Out}$)	Plant	TPD	Measured and Calculated	Daily	100%	Electronic	Same as clinker inlet.
P.29	Specific heat of clinker from cooler ($S_{Clk\ Out}$)	Formulae provided by technology suppler	Kcal/kg°C	Calculated	Fixed	100%	Electronic	
P.30	Radiation losses from	Data book	Kcal/hr	Calculated	Weekly	100%	Electronic	Surface temperature is fixed based on temperatures measured by technology supplier.

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
	cooler (R_{Loss})							
P.31	Kiln running hours (K hrs)	Plant	Hrs	Monitored	Daily	100%	Electronic	
P.32	Cooler Efficiency (Eff_{Cooler})	Plant	%	Calculated	Weekly	100%	Electronic	

Relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project boundary and how such data will be collected and archived:

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
Clinker cooler Efficiency calculations								
B.1	Clinker production	Plant	Tons/day	Measured and calculated	Recorded continuously	100%	Electronic	

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
	(Clk)							
B.2	Inlet temperature of clinker in cooler ($T_{Clk\ In}$)	Plant	°C	Estimated	Fixed	100%	Electronic	The inlet temperature of clinker in cooler is estimated constant in pre and post project scenario, based on technology supplier.
B.3	Specific heat of clinker ($S_{Clk\ In}$)	Formulae provided by technology suppler	Kcal/kg°C	Calculated	Weekly	100%	Electronic	
B.4	Temperature of clinker dust from kiln to cooler (T_{Dust})	Plant	°C	Estimated	Fixed	100%	Electronic	Same as clinker temperature.
B.5	Clinker dust from kiln to cooler (M_{Dust})	Plant	TPD	Estimated	Fixed	100%	Electronic	Based on technology supplier mass of recirculation dust is 2% of the clinker produced.
B.6	Specific heat of clinker Dust	Formulae provided by technology	Kcal/kg°C	Calculated	Weekly	100%	Electronic	The specific heat is calculated based on the formula provided by technology supplier.

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
	from kiln to cooler (S_{Dust})	suppler						
B.7	Inlet temperature of cooling air in cooler ($T_{Cooling\ Air}$)	Plant	°C	Measured	Daily	100%	Electronic	Average temperature of minimum and maximum ambient temperature
B.8	Static pressure of cooler fans ($StPr_1$)	Plant	mm water gauge	measured	Weekly	100%	Electronic	Instrument used: Digital Manometer
B.9	Density of air (Da)	Data book	Kg/m^3	Calculated	Weekly	100%	Electronic	
B.10	Area of cooler fans (ArCf1)	Plant	M^2	Measured once on starting of project activity	Fixed	100%	Electronic	
B.11	Mass flow rate of cooling air in cooler (M	Plant	Kg/hr	Measured & Calculated	Weekly	100%	Electronic	Calculated based on the flow rate of air and density of air.

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
	$_{Cooling\ Air}$)							
B.12	Specific heat of cooling air ($S_{Cooling\ Air}$)	Formulae provided by technology suppler	Kcal/ kg/°C	Calculated	Fixed	100%	Electronic	
B.13	Power consumed by cooler fans (P_{Fan})	Plant	KWh /day	Measured	Monitored continuously and reported weekly	100%	Electronic	Instrument used: Energy meter
B.14	Exhaust air temperature from cooler ($T_{Exhaust\ Air\ Cooler}$)	Plant	°C	Measured	Weekly	100%	Electronic	Instrument used: Thermocouple
B.15	Exhaust air temperature from ESP ($T_{Exhaust\ Air\ ESP}$)	Plant	°C	Measured	Weekly	100%	Electronic	Instrument used: Thermocouple
B.16	Static Pressure from ESP exhaust	Plant	mm water gauge	Measured	Weekly	100%	Electronic	Instrument used: Pitot Tube

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
	($StPr_{ESP\ Exhaust}$)							
B.17	Dynamic Pressure from ESP exhaust ($DyPr_{ESP\ Exhaust}$)	Plant	mm water gauge	Measured	Weekly	100%	Electronic	Instrument used: Pitot Tube
B.18	Mass flow rate of cooler exhaust gas ($M_{Exhaust\ gas}$)	Plant	Kg/hr	Measured & Calculated	Weekly	100%	Electronic	Calculated based on the pressure and density.
B.19	Specific heat of cooler Exhaust gas ($S_{Exhaust\ gas}$)	Formulae provided by technology suppler	Kcal/ kg / °C	Calculated	Fixed	100%	Electronic	
B.20	Temperature of clinker dust from cooler ($T_{Dust\ cooler}$)	Plant	°C	Estimated	Weekly	100%	Electronic	Temperature of dust will be same as exhaust air temperature from cooler.

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
B.21	Clinker dust from cooler ($M_{Dust\ Cooler}$)	Plant	Kg /m³ of exhaust air	Estimated	Every six month	100%	Electronic	Drop test should be conducted in every six month.
B.22	Specific heat of clinker Dust rom cooler ($S_{Dust\ cooler}$)	Formulae provided by technology suppler	Kcal/kg°C	Calculated	Fixed	100%	Electronic	
B.23	Temperature of clinker from cooler ($T_{Clk\ Out}$)	Plant	°C	Calculated	Weekly	100%	Electronic	Instrument used: Thermocouple
B.24	Clinker from cooler ($M_{Clk\ Out}$)	Plant	TPD	Measured and Calculated	Daily	100%	Electronic	Same as clinker inlet.
B.25	Specific heat of clinker from cooler ($S_{Clk\ Out}$)	Formulae provided by technology suppler	Kcal/kg°C	Calculated	Fixed	100%	Electronic	
B.26	Radiation losses from	Data book	Kcal/hr	Calculated	Weekly	100%	Electronic	Surface temperature is fixed based on temperatures measured by technology supplier.

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
	cooler (R_{Loss})							
B.27	Kiln running hours (K hrs)	Plant	Hrs	Monitored	Daily	100%	Electronic	
B.28	Cooler Efficiency (Eff_{Cooler})	Plant	%	Calculated	Weekly	100%	Electronic	

D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures are undertaken:

>>

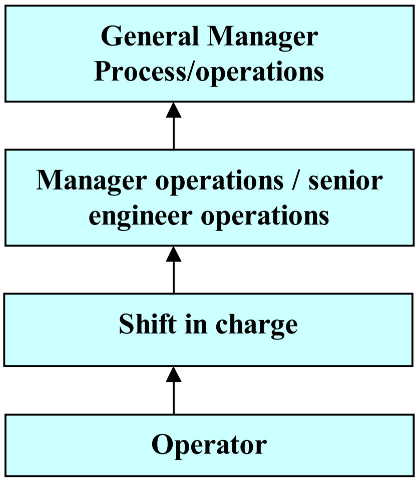
D.3. Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored		
Data *(Indicate table and ID number e.g. 3.-1.; 3.2.)*	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.

D.3. Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored		
P.3, P.5, P.7, P.10, P.13,P.14, P.16, P.23, P.26, P.29, P.31, B.3, B.6, B.9, B.10, B.12, B.19, B.22, B.25, B.27,	*Low*	IPCC values/ Values from Data books/ formulae from technology supplier/calculation
P.1, P.2, P.4, P.6, P.8, P.11, P.12, P.15, P.18, P.19, P.20, P.21, P.22, P.24, P.25, P.27, P.28, B.1,B.2, B.4, B.7, B.8, B.11, B.14, B.15, B.16, B.17, B.18, B.20, B.21, B.23, B.24	*Low*	ISO-9001 procedure is in place.
P.9, P.17, P.30, B.5, B.13, B.26	*Medium*	Standard measurement procedure is defined./ values from technology supply.

D.5. Please describe briefly the operational and management structure that the project participant(s) will implement in order to monitor emission reductions and any leakage effects generated by the project activity:

>> Emission monitoring and calculation procedure will follow the following organisational structure. All data and calculation formula required to proceed is given in the section D in PDD.

Organisational structure for monitoring plan



Monitoring and calculation activities and responsibility

Monitoring and calculation activities	**Procedure and responsibility**
Data source and collection	Data is taken from the purchase, materials and accounting system. Most of the data is available in ISO 9001 quality management system.
Frequency	Monitoring frequency should be as per section D of PDD.
Review	All received data is reviewed by the engineers in the production.
Data compilation	All the data is compiled and stored in production department.
Emission calculation	Emission reduction calculations will be done annual based on the data collected. Engineers of production department will do the calculations
Review	Sr. Manager/ Manager, Production will review the calculation.
Emission data review	Final calculations is reviewed and approved by General Manager process / Operations.
Record keeping	All calculation and data record will be kept with the Production.

D.6. Name of person/entity determining the monitoring methodology:

>> Vikram Cement and associated consultants

SECTION E.: Estimation of GHG emissions by sources:

E.1. Formulae used:

>>

E.1.1 Selected formulae as provided in appendix B:

>> No formulae for GHG emission reduction is specified for Category II.D of Appendix B of the Simplified Modalities and Procedures for Small-scale CDM Project Activities.

E.1.2 Description of formulae when not provided in appendix B:

>>

E.1.2.1 Describe the formulae used to estimate anthropogenic emissions by sources of GHGs due to the project activity within the project boundary:

>>

1. **Clinker Production**

Clinker production, Clk, (TPD) = (Raw meal feed to Kiln (TPD)/Raw meal to clinker conversion factor[5])

2. **Specific Heats of all materials**

Specific heat (Kcal/kg/C) = $a + b\,T + c\,T^2 + d\,T^3 + e\,T^4$

Heat Capacity Coefficients					
Gas/Mat	**a*T^0**	**B*T^1**	**c*T^2**	**d*T^3**	**e*T^4**
O2	0.2130	7.796E-05	-7.563E-08	4.074E-11	-8.183E-15
CO2	0.1906	1.771E-04	-1.733E-07	9.315E-11	-1.894E-14
N2+Ar	0.2465	-3.284E-06	4.366E-08	-2.750E-11	5.504E-15
H2O,steam	0.4445	2.910E-05	6.887E-08	-3.726E-11	6.472E-15
H2O, liq.	1.0000				
Raw meal	0.2060	1.014E-04	-3.673E-08		
Clinker	0.1742	1.414E-04	-1.283E-07	5.074E-11	

3. **Mass flow rate of cooling air**

3.1 Density of Air

Density of air (Da) (kg/m^3) = [1.293[6] x 273[7] x 9827[8]]/ [10336[9] x (273+air temp.)]

[5] Conversion factor is calculated by the National council for building and materials, India.

[6] Density of air at normal temp and pressure (NTP) =1.293 kg/Nm^3

[7] Temperature in Kelvin

3.2 Mass Flow rate of air in cooler (m3/hr)

M $_{\text{cooling air}}$ m^3/hr= $\left\lfloor \sqrt{(2 * g * St\,\mathrm{Pr}) * Density} \right\rfloor \times Area \times 3600$

Where

g = Acceleration due to gravity (9.8 m/s^2)

StPr = Static pressure of air (mm water gauge)

4. Heat delivered by cooler fan

Heat delivered by cooler fans (Kcal/hr) = (Power consumed by cooler fans (kWh/day) x 860[10]/ operating hours)

5. Flow rate of cooler exhaust gas

M $_{\text{Exhaust gas}}$ m^3/hr= $\left\lfloor \sqrt{(2 * g * Dy\,\mathrm{Pr}) * Density} \right\rfloor \times Area \times 3600$

Where

g = Acceleration due to gravity (9.8 m/s^2)

DyPr = Dynamic pressure of exhaust gas (mm water gauge)

5.1 Density of exhaust gas

Density of gas (kg/m^3) = [1.293 x 273 x 9827]/ [10336 x (273+gas temp.)]

6. Radiation losses

Radiation losses (Kcal/hr) = $(80.33*((T^{11}+t^{12})/2)^{-0.724} \times ((T-t)^{1.33}) + (4 \times 10^{-8} \times ((T)^4-(t)^4))$*cooler surface area ($m^2$)

Cooler efficiency calculation

1. Heat input by any incoming streams

$$Heat\ Input = \sum_{i=1.....n} Mass \times Specific\ Heat \times Temperature$$

2. Heat Loss from outgoing streams

$$Heat\ Loss = \sum_{i=1.....n} (Mass \times Specific\ Heat \times Temperature) + Radiation\ Losses$$

3. Efficiency of the clinker cooler

---

[8] Atmospheric pressure at 402 meter latitude (Latitude of plant, mm water gauge)

[9] Atmospheric pressure at 0 meter latitude (mm water gauge)

[10] Thermal equivalent of electricity 1 kWh = 860 Kcal

[11] Cooler average surface temperature in kelvin, 393 K

$$Efficiency_{Project} = (Heat\ Input - Losses) / Heat\ Input$$

Average emission factor

1. Total heat supplied to the system

$$Average\ \ Emission\ factor = \frac{\sum_{i=1.....n}(Quantity\ of\ \ fuel \times Calorific\ Value \times Emission\ Factor)}{\sum_{i=1.....n}(Quantity\ of\ \ fuel \times Calorific\ Value)}$$

E.1.2.2 Describe the formulae used to estimate leakage due to the project activity, where required, for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities

>> Not Applicable

E.1.2.3 The sum of E.1.2.1 and E.1.2.2 represents the small-scale project activity emissions:

>> Same as E.1.2.1

E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHGs in the baseline using the baseline methodology for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities:

>>

1. **Clinker Production**

   Clinker production, Clk, (TPD) = (Raw meal feed to Kiln (TPD)/Raw meal to clinker conversion factor[13])

2. **Specific Heats of all materials**

   Specific heat (Kcal/kg/C) = a + b T + c T^2 + d T^3 + e T^4

Heat Capacity Coefficients					
Gas/Mat	**a*T^0**	**B*T^1**	**c*T^2**	**d*T^3**	**e*T^4**
O2	0.2130	7.796E-05	-7.563E-08	4.074E-11	-8.183E-15
CO2	0.1906	1.771E-04	-1.733E-07	9.315E-11	-1.894E-14
N2+Ar	0.2465	-3.284E-06	4.366E-08	-2.750E-11	5.504E-15
H2O,steam	0.4445	2.910E-05	6.887E-08	-3.726E-11	6.472E-15

[12] Ambient temperature in kelvin

[13] Conversion factor is calculated by the National council for building and materials, India.

H2O, liq.	1.0000				
Raw meal	0.2060	1.014E-04	-3.673E-08		
Clinker	0.1742	1.414E-04	-1.283E-07	5.074E-11	

3. Mass flow rate of cooling air

a. Density of Air

Density of air (Da) (kg/m^3) = [1.293[14] x 273[15] x 9827[16]]/ [10336[17] x (273+air temp.)]

b. Mass Flow rate of air in cooler (m3/hr)

$M_{\text{cooling air}}$ m^3/hr= $\left\lfloor \sqrt{(2 * g * St\,\text{Pr}) * Density} \right\rfloor \times Area \times 3600$

Where

g = Acceleration due to gravity (9.8 m/s^2)

StPr = Static pressure of air (mm water guage)

4. Heat delivered by cooler fan

Heat delivered by cooler fans (Kcal/hr) = (Power consumed by cooler fans (kWh/day) x 860[18]/ operating hours)

5. Flow rate of cooler exhaust gas

$M_{\text{Exhaust gas}}$ m^3/hr= $\left\lfloor \sqrt{(2 * g * Dy\,\text{Pr}) * Density} \right\rfloor \times Area \times 3600$

Where

g = Acceleration due to gravity (9.8 m/s^2)

DyPr = Dynamic pressure of exhaust gas (mm water guage)

5.1 Density of exhaust gas

Density of gas (kg/m^3) = [1.293 x 273 x 9827]/ [10336 x (273+gas temp.)]

6. Radiation losses

Radiation losses (Kcal/hr) = $(80.33*((T^{19}+t^{20})/2)^{-0.724} \times ((T-t)^{1.33}) + (4 \times 10^{-8} \times ((T)^4-(t)^4))$*cooler surface area ($m^2$)

Cooler efficiency calculation

---

[14] Density of air at Normal temp and pressure (NTP) =1.293 kg/Nm3

[15] Temperature in Kelvin

[16] Atmospheric pressure at 402 meter latitude (Latitude of plant, mm water gauge)

[17] Atmospheric pressure at 0 meter latitude (mm water gauge)

[18] Thermal equivalent of electricity 1 kWh = 860 Kcal

[19] Cooler average surface temperature in kelvin, 393 K

[20] Ambient temperature in kelvin

1. Heat input by any incoming streams

$$Heat\ Input = \sum_{i=1.....n} Mass \times Specific\ Heat \times Temperature$$

2. Heat Loss from outgoing streams

$$Heat\ Loss = \sum_{i=1.....n} (Mass \times Specific\ Heat \times Temperature) + Radiation\ Losses$$

3. Efficiency of the clinker cooler

$$Efficiency_{Baseline} = (Heat\ Input - Losses) \big/ Heat\ Input$$

E.1.2.5 Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period:

>>

Emission Reduction Calculations

Step 1: Increase in efficiency

$$Increase\ in\ Efficiency = (Efficiency\ in\ project\ activity - Baseline\ efficiency)$$

Step 2: Saving in heat input due to increase in efficiency

$$Saving\ in\ Heat\ Input = \left(Increase\ in\ efficiency \big/ Efficiency\ in\ project\ case \right) \times Heat\ input\ in\ project\ activity$$

Step 3: Emission reduction

$$Emission\ Reduction = (Saving\ in\ heat\ input) \times\ Average\ Emission\ factor$$

E.2 Table providing values obtained when applying formulae above:

>>

The individual GHG emission reductions for a 10 year crediting period for Vikram cement are provided in table E.2:

Table E.2.: Emission reductions at Vikram cement

Year	Certified emission reduction
2001 – 2002 (August 01 to March 02)	6695
2002 – 2003	10564
2003 – 2004	10856

2004 – 2005	11183
2005 – 2006	11472
2006 – 2007	11019
2007 – 2008	11019
2008 – 2009	11019
2009 – 2010	11019
2010 – 2011	11019
2011 – 2012 (April 11 to July 11)	3673
Total estimated reductions (tones of CO_2 e)	**109,537**
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tones of CO_2 e)	10,954

The GHG emission reductions for a 10 year crediting period for Vikram cement is estimated as 109,537 tCO_2-equ.

SECTION F. Environmental impacts

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

>>

The Ministry of Environment and Forests (MoEF), Government of India, under the Environment Impact Assessment Notification vide S.O. 60(E) dated 27/01/94 has listed a set of industrial activities in Schedule I of the notification which for setting up new projects or modernization/ expansion will require environmental clearance and will have to conduct an Environment Impact Assessment (EIA) study. However, the project under consideration does not require any EIA to be conducted, as the activity is not included in Schedule I.

Article 12 of the Kyoto Protocol requires that a CDM project activity contribute to the sustainable development of the host country. Assessing the project activity's positive and negative impacts on the local environment and on society is thus a key element for each CDM project.

VC being an ISO 14001, OHSAS 18001 organization has specialized environmental management systems & consistent evaluation of the impacts, key parameters have ensured that the company meets the environmental targets. The project activity is one such voluntary measure, which has positive long-term environmental impact. The nature of the impacts that are evident during the operational phase is discussed in detail given below. The environmental impact during the construction phase is regarded as temporary or short term and hence does not affect the environment significantly.

F.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:

>>

Project activity does not lead to any significant negative impact. Neither does the host country require EIA study to be conducted for this kind of projects. As stated above project activities not included under Schedule I of Environment Impact Assessment Notification of MoEF for environmental clearance of new projects or modification of old ones needn't conduct the EIA.

SL. NO.	ENVIRONMENTAL IMPACTS & BENEFITS	REMARKS
A	CATEGORY: ENVIRONMENTAL – RESOURCE CONSERVATION	
1	**Coal / Petcoke conservation:** The project activity reduces specific thermal energy consumption for cement production and conserves the energy. By reducing the specific thermal energy, the project activity reduces an equivalent amount of coal / petcoke consumption per unit of cement produced that would have been required to cater to the baseline project option. "Coal is a finite natural resource" used as fuel to generate power and for production processes. Since this project activity reduces its thermal energy demand it positively contributes towards conservation of coal and making coal available for other important applications.	The project activity is a step towards limestone and coal petcoke conservation.
B	CATEGORY: ENVIRONMENTAL – AIR QUALITY	
	By reducing the thermal energy content of the cement manufacturing, the project activity reduces CO_2 emissions.	The project activity reduces emission of CO_2 -a global entity.
C	CATEGORY: ENVIRONMENTAL –WATER	
1	The project activity does not contribute to water pollution.	No impact
D	CATEGORY: ENVIRONMENTAL – LAND	
1	Reduction in specific consumption demand further reduces quarry/coal mining; which leads to loss of biodiversity, land destruction and erosions arising from such activities. There is no possible soil or land pollution arising due to project activity.	The project activity leads to positive impact on Land environment.
E	CATEGORY: ENVIRONMENTAL – NOISE GENERATION	
1	The project activity does not contribute to noise pollution.	-
F	CATEGORY: SOCIAL	

1	**Mining Risks:** Quarry mining of coal experiences landslides and destruction in the history of mining. Thus by less consumption of coal project activity would indirectly reduce chances of landslides and landscape destruction at mining sites. The adverse heath impacts caused from quarrying of materials on the mining persons, nearby habitats and ecosystem, would therefore be avoided.	The project is expected to bring positiv changes in the life style and quality of lif and reduce mining risks.
G	CATEGORY: ECOLOGY	
1	By reducing the coal, the project activity has a beneficial impact on the flora, fauna in the vicinity of the mining sites.	-

SECTION G. Stakeholders' comments:

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

>>

Stakeholder consultation is an important matter for an esteemed organisation, where comments on the project activity are invited from identified stakeholders with a view to maintain transparency in the activities of the project promoter and also assist to comply with applicable regulations. Representatives of Vikram have already identified the relevant stakeholders and they have been consulting with them looking for their comments and approvals for the project activity. The necessary consultation is the form of the oral and written documents. Vikram cement has communicated to identified stakeholders about the project activity and ask for the comments on the activity. This is a continuous process from the project proponent.

The project activity occurred at Grasim industries cement plant namely Vikram cement at MP. The project activity will reduce the use of thermal energy *i.e.* fossil fuel. The various stakeholders identified for the project are as under.

- State Pollution Control Board
- Elected body of representatives administering the local area (village Panchayat) / Local Pollution
- Ministry of Environment & Forest (MoEF), Government of India
- Consultants
- Equipment Suppliers

Stakeholders list includes the government and non-government parties, which are involved in the project at various stages. At the appropriate stage of the project development, stakeholders/ relevant bodies were involved to get the project clearance.

G.2. Summary of the comments received:

>> The project activity is energy efficiency in clinker cooler. Due to this project proponent will use less quantities of fossil fuels in clinker manufacturing. The project activity has positive environmental impact in term of emissions. MPCB has prescribed standards of environmental compliance and monitors the adherence to the standards. The cement plant received the Consent to Establish (or No Objection Certificate (NOC)) and the Consent to Operate from MPCB during the commissioning of the plant. The project activity reduces the environmental impacts on the local ambient quality and meets all the statutory requirements. VC submits an annual Environmental Statement to RPCB and also describes the Environmental aspects of the plant in its annual report.

The project is being implemented at existing facility of VC thus project does not require any displacement of the local population. This implies that the project will not cause any adverse social impacts on the local population but helps in improving the quality of life for them.

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

>> The project proponent has not received any negative comment for the project activity.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Vikram cement
Street/P.O.Box:	Vikramnagar, P. O. Khor
Building:	
City:	Neemuch
State/Region:	Madhya Pradesh
Postfix/ZIP:	458 470
Country:	India
Telephone:	07420 230830
FAX:	07420 235524
E-Mail:	sagarawal@adityabirla.com
URL:	www.adityabirla.com
Represented by:	
Title:	Vice President (Production Planning & Budgeting)
Salutation:	Mr.
Last Name:	Agrawal
Middle Name:	
First Name:	Sanjay
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	sagarawal@adityabirla.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding is available for the project.