Monitoring Report

Indocement Blended Cement Project

January 2005 to October 2006

Version 07, 19 June 2009

UNFCCC Reference No.0526

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Introduction

Title of the project activity

Indocement Blended Cement Project (revised version: post-validation site visit)
July, 2006

Date of the completion of the draft monitoring report: December 2006

Date of the completion of the monitoring report based on Clarification Requests and Corrective Action Request on Verification Protocol: 23 December 2007

Purpose

The purpose of this monitoring report is to calculate the Greenhouse Gas (GHG) emission reduction achieved by manufacturing new type of cement (herein after called "blended cement") categorized under a new Cement Standard (Indonesian standard SNI 15-7064-2004) (PCC or Semen Portland Komposit).

The monitoring report has been prepared for "Indocement Blended Project" of PT. Indocement Tunggal Prakarsa, Tbk, Indonesia. The project has been registered with UNFCCC as a CDM project activity under Kyoto Protocol. Submission of monitoring report and subsequent verification has been required mandatory by UNFCCC for issuance of Certified Emission Reductions (CERs) credits. The monitoring period covered under the report is during 01-01-2005 until 31-10-2006 and the GHG reduction has been calculated for the period during 01-01-2005 until 31-10-2006

Reference

The project is categorized in sectoral scope 4: Manufacturing industries

Project Design Document

"Indocement Blended Cement Project" of PT. Indocement Tunggal Prakarsa, Tbk, July 2006.

Baseline Methodology Adopted

Approved consolidated baseline methodology ACM 0005 "Consolidated Baseline Methodology for Increasing the Blend in Cement Production" version 3.

Monitoring Methodology Adopted

Approved consolidated monitoring methodology ACM 0005 "Consolidated Monitoring Methodology for increasing the Blend in Cement Production" version 3.

General Description of the project

Project Activity

The aim of this project is to manufacture and sell a new type of cement (herein after called "blended cement") categorized under a new Cement Standard (Indonesian standard SNI 15-7064-2004) (Semen Portland Komposit). This new cement type has been introduced as part of Indocement's efforts to increase the amount of various additive materials in the cement while maintaining a similar or improved

cement quality compared to Ordinary Portland Cement (OPC, SNI-2049-2004 the updated SNI OPC type I standard). Blended cement is produced by increasing the proportion of additive materials such as limestone and pozzolan in the cement fine grinding process, hence reducing the clinker content of cement. The pozzolanic materials used in Indocement's Sustainable Cement Production Project include coal fly ash and volcanic ash (trass).

The project is implemented at the three Indocement production sites located at Citeureup and Cirebon, both West Java, and Tarjun South, Kalimantan. Taken together, Indocement operates twelve cement kilns at three plants.

In this project, calcination-, fuel-, and power-related CO_2 emission reductions are achieved by lowering the clinker content per ton of cement.

The main barrier to a successful introduction of blended cement into the market is consumer aversion to this particular type of cement. A significant marketing effort by Indocement is required to overcome this prohibitive barrier.

The blended cement project will gradually reduce the clinker content of Indocement's cement production from about 90% in 2004 to about 82% over a 10-year crediting period, resulting in a total CO_2-emission reduction of about 6 million tCO_2e.

The clinker-to-cement ratio can be increased up to 25 % at the maximum and it is expected that the PCC share in the market would be about 60%.

With respect to the contribution to Indonesia's sustainable development, the project will deliver several environmental improvements and socio-economic benefits as follows:

- *Environmental sustainability:*
    - Maintain the environmental sustainability by diversifying the natural resources in producing cement:
        - Less exploitation of limestone, clay, sand due to fewer raw materials used to produce PCC compared to OPC leads to better soil condition of the raw material quarry and maintains the local ecology in raw material exploitation area.
        - Use of fly-ash helps in providing alternative solution in managing coal power plant wastes
    - The project complies with the national environmental quality standards, in terms of local air emissions, water and soil
    - The project does not disturb the genetic, species and ecosystem biodiversity due to less exploitation of raw material and less emission are generated. Moreover, the project is not located in a natural conservation area.
    - The project does not transform or modify the existing spatial planning and land-use because it takes place in the existing plant facilities and sites without involving any plant or site expansion.
    - The project ensure the health and safety conditions of their employees and local community by implementing health and safety procedures such as OHSAS 1800, implementation of risks control, and implementation of the national working safety management system

- *Economic sustainability*
    - The project does not create less income environment for the local community. It even creates more new employment opportunities as more labors are required to prepare and transport the additive materials

- *Social Sustainability*
    - The project is communicated to and consulted with the local community and other related stakeholder such as the national and local government and the local leaders. These activities are conducted by:
        - Presentation and discussion with the Ministry of Environment and the Ministry of Industry and Trade

        - Presentation and discussion with Bogor, Cirebon and Kota Baru regencies
        - Consultation with the local communities (12 villages in Citereup, 6 villages in Cirebon and 10 villages in Tarjun)
        - Communication through website (www.indocement.co.id) and national newspaper
    - Throughout the consultation and the communication process, no negative responses were received. People consulted are aware of the project benefits to the local community and they give supports to the project.
    - Indocement established a mechanism/procedure to address any disadvantages and complaints related to the project
    - The project does not create any conflicts with the local community

- *Technical sustainability*
    - This project requires transfer of technology from the HeidelbergCement to Indocement to produce high quality clinker, but not create a dependency to a foreign technology since the know-how is transferred by building the local capacity so that the operation and technical modification are conducted locally
    - The technology installed in this project is of a proven technology

Project Location

Citeureup Cement Factory. The Citeureup Cement Factory is located in Citeureup, approximately 45 kilometers south of Jakarta, and 20 kilometers north of Bogor. The access to the Citeureup Cement Factory from Jakarta is through the Jagorawi toll road using the exit at the Gunung Putri toll gate. The factory is located at Mayor Oking road about 5 kilometers from the Gunung Putri toll gate.

Cirebon Cement Factory. The Cirebon Cement Factory is located in Palimanan, Cirebon Regency, West Java Province. This Factory is one of three PT Indocement's Tunggal Prakarsa production facilities. It is situated approximately 20 km west of Cirebon (or 280 km east of Jakarta) at the main (provincial) road network connecting Cirebon and Bandung/Jakarta. The access to the Factory from Jakarta is to the East through the Cikampek toll road with the exit at the Cikopo toll gate and continues through the main (provincial) road to Cirebon.

Tarjun Cement Factory. The Tarjun Cement Factory is located in Tarjun Village, Kelumpang Selatan District, Kotabaru Regency, South Kalimantan Province. The plant is situated in a coastal area, approximately 280 km north of Banjarmasin, the capital city of South Kalimantan province. As an integrated operation, the cement plant operates four quarry areas – three quarries are located approximately 26 km northwest of- and one quarry is located approximately 10 km northwest of the cement plant. The nearest city to the cement plant is Batulicin, approximately 45 km southwest of the plant. The access roads are constructed to connect the quarries with the cement plant. The Cement Factory can be accessed by road transportation and river crossing from Banjarmasin. Additionally, the site can be accessed by fixed wing airplanes via Stagen Airport Kotabaru or by ship via a dedicated jetty within the cement plant complex.

Technology employed by the project activity

The proposed project produces the new blended cement with similar characteristics as the presently produced OPC. In order to meet this objective, improved clinker quality is required and the grinding process requires more stringent control. As a consequence this project must be supported by additional efforts including additional equipment and installations as well as research and development (R&D).

Additional equipment and installations:

- Facilities for production of PCC at P1 and P2 - phase 1
- Facilities for production of PCC at P1 and P2 - phase 2 (use of trass, limestone and wet fly ash)
- Additional handling system for wet fly ash, trass and limestone in cement mill P3/P4
- Installation and modification of hoppers with weighing feeders and conveyors for P 11
- Installation of additional hoppers, weighers and conveyors for P 9
- Additional handling system for wet fly ash, trass and limestone in cement mills P6, P7, P8

The cement plants undertaking the CDM project activities are described as follows:

Citeureup factory: With its nine kilns (P1-P8 and P11), the Citeureup cement factory is the biggest of the three factories, with a total installed capacity of about 10.4 million tons of clinker per year (MTPY). The nearly self-contained facility operates limestone and clay quarries, a 300 MW power station, and a paper sack factory (capacity about 200 million bags per year). The Citeureup cement factory produces OPC Type I, Type II, Type V, Portland Composite Cement (PCC), and oil well and white cement.

Cirebon factory: The Cirebon cement factory is a fully integrated cement factory with two kilns (P9 and P10). The total production capacity is about 2.4 MTPY of clinker. The facility operates its own limestone and clay quarries. Electricity is purchased from the national grid. The factory produces OPC Type I and PCC. (PCC introduced since 2005).

Tarjun factory: The Tarjun cement factory is a fully integrated cement factory with a single kiln (P12). The annual production capacity is about 2.4 MTPY of clinker. The cement plant operates a coal-fired power plant and port facilities. The factory produces OPC Type I and PCC. (PCC introduced since 2005).

Type of clinker: Clinker produced which is covered for this project is only clinker to produced OPC Type I. Clinker for cement oil well and white cement is not covered.

Project Status

The project has been registered with UNFCCC as CDM project activity under sectoral scope no. 4: Manufacturing industries. The project was registered on 27 October 2006 with crediting period of 01/01/2005 – 01/01/2014 (fixed). The UNFCCC reference number for the project activity is 0526. The DOE for the project was Det Norstke Veritas.

Monitoring Methodology and Plan

Monitoring Methodology

Approved consolidated monitoring methodology ACM 0005 “Consolidated Monitoring Methodology for increasing the Blend in Cement Production.” (version 3, sectoral scope: 4, 19 may 2006)

Applicability: This monitoring methodology is applicable within the project boundary as defined in the registered PDD (UNFCCC reference no: 0526)

Monitoring Period

All the necessary parameters are monitored for both baseline emission and project emissions calculations. Monitoring period selected for baseline emissions is from 01/01/2002 to 31/12/2004 and for project emission calculations the monitoring period is considered from 01-01-2005 until 31-10-2006. Parameters monitored during the period and their recording frequency and other details have been delineated below. All data has been archived for verification purpose.

Parameters monitored

Data monitored for Baseline emissions Calculations

ID number	Data Variable	Source of data	Symbol	Data Unit	Measured (m), calculated (c) or estimated (e)	Recording Frequency	Comment/Reference
1	CaO content of the raw material for raw meal already calcined	Plant records	$InCaO_{BSL}$	%	m,c	daily	
2	CaO content of the clinker	Plant records	$OutCaO_{BSL}$	%	m,c	daily	
3	MgO content of the raw material for raw meal already calcined	Plant records	$InMgO_{BSL}$	%	m,c	daily	
4	MgO content of the clinker	Plant records	$OutMgO_{BSL}$	%	m,c	daily	
5	Clinker production	Plant records	$CLNK_{BSL}$	Kilo ton of clinker	m	monthly	As per weigh feeder codes in ITP online system
6	Fossil fuel consumed	Plant records	FF_{i_BSL}	Ton of fuel i	m	monthly	As per weigh feeder codes in ITP online system
7	Emission factor for fossil fuel	IPCC/plant rec	EFFi	TCO2/ton of fuel i	c	monthly	Default as per IPCC standard
8	Grid electricity for clinker production	Plant records	$BELE_{grid\_CLNK,}$	MWh	m,c	monthly	Measured & calculated as per normal operation
8.a	Electricity for clinker production	Plant records	BELE_CLNK,y	Mwh	m,c	monthly	Calculated from electricity consumption from raw mill and from kiln,limestone raw meal, clay, laterite and coal
8.a.1	electricity consumption for raw mill	Plant records	BELE_raw mill, y	Mwh	m,c	monthly	Calculated from each kWh meter measured and installed to measure the raw mill electricity consumption. Below is the measurement point code for each plant, P1 to P12 ,

ID number	Data Variable	Source of data	Symbol	Data Unit	Measured (m), calculated (c) or estimated (e)	Recording Frequency	Comment/Reference
							except P5 since this plant is excluded in the project: Citereup: P1: KWH METER R.M P-1 LIMESTONE W.F P-1 SANDY CLAY P-1 SAND P-1 PYRITE CINDER P-1 P2 : KWHMETER RAWMILL P2 LIMESTONE WF P2 SANDY CLAY P2 SAND P2 PYRITE CINDER P2 P3 : FEEDER DRUM DRYER P3 LIMESTONE P3 SAND P3 P4 : FEEDER RAW MILL P4 TR1+2-(BB5+BC12+BD7) P6 : RAW MILL IMPACT HAMMER MILL P7 : RAW MILL P8 : RAW MILL LIMESTONE WF P8 SANDCLAY WF P8 SAND WF P8 P11 : LSS1 LSS2 LM BLND TR LSS3 M.GRIND RM STRG LSS3 M.GRIND-RM STRG Cirebon: P9 : RAW MILL GRINDING RAW MILL MOTOR P10 : RAW MTRL.TRANS.&GRIN RAW MILL FAN LIMESTONE WF CLAY WF. SAND WF. Tarjun: P12 : RAW MILL L'STONE RM#1 W.F. MIX MATL RM#1 W.F. S'STONE RM#1 W.F. IRON ORE RM#1 W.F.
8.a.2	electricity consumption for clinker burning in the	Plant records	BELE_kiln, y	MWh	mc	monthly	Calculated from each kWh meter measured and installed to measure

ID number	Data Variable	Source of data	Symbol	Data Unit	Measured (m), calculated (c) or estimated (e)	Recording Frequency	Comment/Reference
	kiln						the kiln electricity consumption. Below is the measurement point code for each plant, P1 to P12 , except P5 since this plant is excluded in the project Citeuruep : P1 : KWH METER BURNING P1 KWH METER KILN P1 KWH MTR EP COLER P1 R.COAL KL#1 RAW MEAL W.F P-1 P2 : KWH METER BURNING P2 KWH METER KILN P2 KWH MTR EP COOLER P2 RAW MEAL W.F P2 P3 : FEEDER BURNING CARBON FLY ASH SLUDGE PAPER WASTE FUEL PALM SHELL P4 : FEEDER BURNING P4 P6 : HEAT EXCHANGER I&II KILN & COOLER P7 : K I L N P8 : K I L N P11 : LSS4 KILN FEED &KILN LSS5 CLINKERIZATION Cirebon : P9 : KILN AND AQC HOMO AND SP P10 : HOMOGNZING&KILN FEED KILN,AQC&CLINKR.TRNS BOTTOM ASH FEEDER COAL MILL Tarjun : P12 : KILN KWH-METER WASTE OIL PALM SHELL
8.a.3	electricity consumption for limestone production	Mining records	BELE_total_LS, y	MWh	mc	Monthly	Citeuruep : P-4 CRS-1 / BA-4 P-3 CRUSHER-2 DP-101 P-3 CRUSHING SYSTEM P-4 CRS-2 / BA-4A P4 SYS.-D8 P-5 SYSTEM P-6A CRS-1/BA-4 P-6A CRS-2/BA-4A P-6B CRS-1/BA-5 P-6B CRS-2/BA-5A P-6 SYS.-D9 P-7 CRS/B1M.106 P-8 CRS/B1M.206 SYSTEM-D10 KWH CRS.P9

ID number	Data Variable	Source of data	Symbol	Data Unit	Measured (m), calculated (c) or estimated (e)	Recording Frequency	Comment/Reference
							KWH CRS.P10 UNIT 3 PROK CONVEYOR DP2-6 DP102 CONBLOCK (QUARRY-A) MINING CONVEYOR Cirebon : L T P 750 KVA MWB 103 MWB 109 LS CRUSHING TR FEEDE LS CRUSHER NO1 ROTOR LS CRUSHER NO2 ROTOR Tarjun : Feeder 2P1-1S1-U#1 (Incoming 11 kV) in LSS-3 Feeder 3P2-1S1-U#A (331-BC2-M#1 250 kW) in LSS-3 Feeder 3P2-1S1-U#B (Trafo 3P2-1T1) in LSS-3 Feeder 3P2-1V1/1M1 (Aux Trafo 3P2-1T1) in MCC LSS-3
8.a.4	electricity consumption for clay production	Mining records	BELE_clay, y	MWh	m,c	Monthly	Citeuruep : PHB-1 PHB-2 PHB-3 PHB-4 PHB-5 PHB-6 PHB-7 PHB-8 PHB-9 PHB-10 PCL01 PCL02 PCL03 PCL04 PCL05 PCA01 PCA02 PCA03 PHB-12 HAMBALANG Cirebon : 500 KVA MWB 202 ADD CRUSHER TR FEEDE ADDITIVE CRUSHER Tarjun : Feeder 2P1-1S1-U#1 (Incoming 11 kV) in LSS-3 Feeder 3P2-1S1-U#A (331-BC2-M#1 250 kW) in LSS-3 Feeder 3P2-1S1-U#B (Trafo 3P2-1T1) in LSS-3 Feeder 3P2-1V1/1M1 (Aux Trafo 3P2-1T1) in MCC LSS-3
8.a.5	electricity consumption for laterite production	Mining records	BELE_laterite, y	MWh	m,c	Monthly	Tarjun : Feeder 2P1-1S1-U#1 (Incoming 11 kV) in LSS-3 Feeder 3P2-1S1-U#A (331-BC2-

ID number	Data Variable	Source of data	Symbol	Data Unit	Measured (m), calculated (c) or estimated (e)	Recording Frequency	Comment/Reference
							M#1 250 kW) in LSS-3 Feeder 3P2-1S1-U#B (Trafo 3P2-1T1) in LSS-3 Feeder 3P2-1V1/1M1 (Aux Trafo 3P2-1T1) in MCC LSS-3
8.a.6	electricity consumption for coal production	Plant records	BELE_coal, y	MWh	m,c	Monthly	Citeureup : Coal Mill P.1/4 - COAL DRYER 1-4 - P4 COAL MILL Coal Mill P.6/8 - COAL DRYER 6-8 - AUX COAL MILL 6-8 - KWH COAL DRYER - P6 COAL MILL - P7 COAL MILL - P8 COAL MILL Coal Mill P.11 - P11 COAL MILL Cirebon : Coal Mill P.9 - COALMILL Coal Mill P.10 - P10 COAL PWR Tarjun : - PLANT 12
9	Grid Emission factor	Plant records	EF_{grid_BSL}	T CO2/MWh	c	monthly	ACM0002 is used to determined electricity emissions: Based on JAVA-BALI grid emission factor. Source: Decision on the meeting on determination of CDM emission factor of JAVA-MADURA-BALI (JAMALI) Grid submitted by Chevron and agreed by the committee, Directorate General of Electricity and Energy Utilization, Jakarta, Indonesia, Friday, 11 March 2006). This is estimated based on ACM 0002. Reference for cross checking: Directorate general electricity and energy utilization, Renewable energy division, 2006.
10	Self generation of electricity for clinker production	Plant records	$BELEs_{g\_CLNK,}$	MWh	m,c	monthly	Measured & calculated as per normal operation. This is deviated from the registered PDD since measurement only is impossible in practical condition.
11	Electricity self generation emission factor	Plant records	EF_{sg_BSL}	t CO_2/MWh	m,c	monthly	Measured & calculated as per normal operation. This is deviated from the registered PDD since measurement only is impossible in practical condition.
12	Blended cement (BC) production	Plant records	BC_{BSL}	Kilo ton of BC	m	monthly	Composite of clinker, gypsum and additives
13	Grid electricity for grinding BC	Plant records	$BELE_{grid\_BC}$	MWh	c	monthly	Reported by local electricity provider PLN
13.a	Electricity for grinding BC	Plant records	BELE_BC., y	Mwh	m,c	monthly	Calculated from each kWh meter measured and installed to measure the electricity consumption for grinding blended cement . Below is the measurement point code for each plant, P1 to P12 , except P5 since this plant is excluded in the project:

ID number	Data Variable	Source of data	Symbol	Data Unit	Measured (m), calculated (c) or estimated (e)	Recording Frequency	Comment/Reference
							Citeureup : P1 : KWH METER FM P1 P2 : KWH METER FM P2 CLINKER WF P2 P3 : FINISH MILL 3-A FINISH MILL 3-B P4 : CEMENT MILL 4A-1 CEMENT MILL 4A-2 CAF. 4A DISTRIB. CE FMP4A CEMENT MILL 4B-1 CEMENT MILL 4B-2 CAF.4B DISTRIB.CE FM P4B P6 : CEMENT MILL-I CEMENT MILL-II P7 : CEMENT MILL P8 : CEMENT MILL 8A INDOSIN 8B ROLLER PRESS 8B P11 : LSS6A FINISH-CMT.STR LSS6B F.GRIND-CMT ST Cirebon : P9 : NO.1 CEMENT NO.2 CEMENT P10 : CEMENT GRINDING CM.MILL MOTOR Tarjun : P12 : FINISH MILL 1 CEMENT MILL 2
14	Self generation of electricity for grinding BC	Plant records	$BELE_{sg\_BC,}$	MWh	m,c	monthly	Measured & calculated as per normal operation. This is deviated from the registered PDD since measurement only is impossible in practical condition.
15	Grid electricity for grinding additives	Plant records	$BELE_{grid\_ADD}$	MWh	m,c	monthly	Measured & calculated as per normal operation. This is deviated from the registered PDD since measurement only is impossible in practical condition.
15 a	Overall electricity for limestone	Plant records	BELE_total ADD, y	Mwh	m,c	monthly	Calculated from each kWh meter measured and installed to measure the electricity consumption for grindinglimestone t . Below is the

ID number	Data Variable	Source of data	Symbol	Data Unit	Measured (m), calculated (c) or estimated (e)	Recording Frequency	Comment/Reference
							measurement point code for each plant, P1 to P12 , except P5 since this plant is excluded in the project: Citeureup : P-4 CRS-1 / BA-4 P-3 CRUSHER-2 DP-101 P-3 CRUSHING SYSTEM P-4 CRS-2 / BA-4A P4 SYS.-D8 P-5 SYSTEM P-6A CRS-1/BA-4 P-6A CRS-2/BA-4A P-6B CRS-1/BA-5 P-6B CRS-2/BA-5A P-6 SYS.-D9 P-7 CRS/B1M.106 P-8 CRS/B1M.206 SYSTEM-D10 KWH CRS.P9 KWH CRS.P10 UNIT 3 PROK CONVEYOR DP2-6 DP102 CONBLOCK (QUARRY-A) MINING CONVEYOR Cirebon : L T P 750 KVA MWB 103 MWB 109 LS CRUSHING TR FEEDE LS CRUSHER NO1 ROTOR LS CRUSHER NO2 ROTOR Tarjun : Feeder 2P1-1S1-U#1 (Incoming 11 kV) in LSS-3 Feeder 3P2-1S1-U#A (331-BC2-M#1 250 kW) in LSS-3 Feeder 3P2-1S1-U#B (Trafo 3P2-1T1) in LSS-3 Feeder 3P2-1V1/1M1 (Aux Trafo 3P2-1T1) in MCC LSS-3
16	Self generation of electricity for grinding additives	Plant records	$BELE_{sg\_ADD,}$	MWh	m,c	monthly	Measured & calculated as per normal operation. This is deviated from the registered PDD since measurement only is impossible in practical condition.
17	Fuel consumption	Plant records	$F_{i,j,BSL}$	Ton of fuel i	m	monthly	
18	CO2 emission coefficient of fuel	IPCC	$COEF_{i,j,BSL}$	tCO2/ton of fuel i	c		IPCC 1996 value, wbcsd and DVZ, to maintain the consistency with the alternative fuel project.
19	Electricity generation	Plant records	$\Sigma GEN_{i,BSL}$	MWh	m,c	monthly	
20	Electricity generation from the grid in the year 2004, which is used to calculate the baseline	Plant records	GEN ele grid $_{i2004}$	MWh	m	monthly	This parameter is measured at the PLN power sourcing point and delivered to a single 33KV line for distribution
21	Electricity generation from self generation	Plant records	GEN ele sg diesel $_{i2004}$	MWh	m	monthly	This parameter is measured at the Diesel generation supply point and

ID number	Data Variable	Source of data	Symbol	Data Unit	Measured (m), calculated (c) or estimated (e)	Recording Frequency	Comment/Reference
	Diesel in the year 2004, which is used to calculate the baseline						delivered to a single 33KV line for distribution
22	Electricity generation from self generation Natural Gas in the year 2004, which is used to calculate the baseline	Plant records	GEN ele sg natural gas $_{i2004}$	MWh	m	monthly	This parameter is measured at the natural gas power generation supply point and delivered to a single 33KV line for distribution
23	Auxiliary power, baseline in the year 2004, which is used to calculate the baseline	Plant records	Auxiliary power, $_{2004}$	MWh	m	monthly	
24	Emission per ton clinker due to calcinations	Plant records	BE_{calcin}	t CO_2/ton clinker	c	monthly	
25	Emission per ton clinker due to combustion of fossil fuels for clinker production	Plant records	$BE_{fossil\_fuel,}$	t CO2/ton clinker	c	monthly	
28	Grid electricity emissions for BC grinding	Plant records	$BE_{ele\_grid\_BC}$	t CO2/ ton BC	c	monthly	
29	Self generated electricity emission for BC grinding	Plant records	$BE_{ele\_sg\_BC}$	t CO2/ ton BC	c	monthly	
30	Grid electricity emissions for additives preparation	Plant records	$BE_{ele\_grid\_ADD}$	t CO2/ ton BC	c	monthly	
31	Self generated electricity emission for additives preparation	Plant records	$BE_{ele\_sg\_ADD,}$	t CO2/ton BC	c	monthly	
32	Share of clinker per ton of BC	Plant records	Bblend,y	t of clinker/t of BC	c	monthly	Calculated from no.12

Data monitored for project emissions calculations

ID number	Data Variable	Source of data	Symbol	Data Unit	Measured (m), calculated (c) or estimated (e)	Recording Frequency	Comments/Reference
1	CaO content of the raw material for raw meal already calcined	Plant records	In CaOy	%	m,c	daily	
2	CaO content of the clinker	Plant records	OutCaOy	%	m,c	daily	
3	MgO content of the raw material for raw meal already calcined	Plant records	InMgOy	%	m,c	daily	
4	MgO content of the clinker	Plant records	Out MgOy	%	m,c	daily	
5	Clinker production	Plant records	CLNKy	Kilo ton of clinker	m	annually	As per weigh feeder codes in ITP online system
6	Fossil fuel consumed	Plant records	FFi_y	Ton of fuel i	m	annually	As per weigh feeder codes in ITP online system
7	Emission factor for fossil fuel	IPCC/plant records	EFFi	TCO2/ton of fuel i	c	annually	Default as per IPCC standard
8	Grid electricity for clinker production	Plant records	$PELE_{gridCLNK,y}$	MWh	m,c	annually	Measured & calculated as per normal operation

8.a	Electricity for clinker production	Plant records	PELE_CLNK,y	Mwh	m,c	monthly	Calculated from electricity consumption from raw mill and from kiln,limestone raw meal, clay, laterite and coal
8.a.1	electricity consumption for raw mill	Plant records	PELE_raw mill, y	Mwh	m,c	monthly	Calculated from each kWh meter measured and installed to measure the raw mill electricity consumption. Below is the measurement point code for each plant, P1 to P12 , except P5 since this plant is excluded in the project: Citereup: P1: KWH METER R.M P-1 LIMESTONE W.F P-1 SANDY CLAY P-1 SAND P-1 PYRITE CINDER P-1 P2 : KWHMETER RAWMILL P2 LIMESTONE WF P2 SANDY CLAY P2 SAND P2 PYRITE CINDER P2 P3 : FEEDER DRUM DRYER P3 LIMESTONE P3 SAND P3 P4 : FEEDER RAW MILL P4 TR1+2-(BB5+BC12+BD7) P6 : RAW MILL IMPACT HAMMER MILL P7 : RAW MILL P8 : RAW MILL LIMESTONE WF P8 SANDCLAY WF P8 SAND WF P8 P11 : LSS1 LSS2 LM BLND TR LSS3 M.GRIND RM STRG LSS3 M.GRIND-RM STRG Cirebon: P9 : RAW MILL GRINDING RAW MILL MOTOR P10 : RAW MTRL.TRANS.&GRIN RAW MILL FAN LIMESTONE WF CLAY WF. SAND WF. Tarjun: P12 : RAW MILL L'STONE RM#1 W.F. MIX MATL RM#1 W.F. S'STONE RM#1 W.F.

							IRON ORE RM#1 W.F.
8.a.2	electricity consumption for clinker burning in the kiln	Plant records	PELE_kiln, y	MWh	mc	monthly	Calculated from each kWh meter measured and installed to measure the kiln electricity consumption. Below is the measurement point code for each plant, P1 to P12 , except P5 since this plant is excluded in the project Citeuruep : P1 : KWH METER BURNING P1 KWH METER KILN P1 KWH MTR EP COLER P1 R.COAL KL#1 RAW MEAL W.F P-1 P2 : KWH METER BURNING P2 KWH METER KILN P2 KWH MTR EP COOLER P2 RAW MEAL W.F P2 P3 : FEEDER BURNING CARBON FLY ASH SLUDGE PAPER WASTE FUEL PALM SHELL P4 : FEEDER BURNING P4 P6 : HEAT EXCHANGER I&II KILN & COOLER P7 : K I L N P8 : K I L N P11 : LSS4 KILN FEED &KILN LSS5 CLINKERIZATION Cirebon : P9 : KILN AND AQC HOMO AND SP P10 : HOMOGNZING&KILN FEED KILN,AQC&CLINKR.TRNS BOTTOM ASH FEEDER COAL MILL Tarjun : P12 : KILN KWH-METER WASTE OIL PALM SHELL
8.a.3	electricity consumption for limestone production	Mining records	PELE_total_LS, y	MWh	mc	Monthly	Citeuruep : P-4 CRS-1 / BA-4 P-3 CRUSHER-2 DP-101 P-3 CRUSHING SYSTEM P-4 CRS-2 / BA-4A P4 SYS.-D8 P-5 SYSTEM P-6A CRS-1/BA-4 P-6A CRS-2/BA-4A P-6B CRS-1/BA-5 P-6B CRS-2/BA-5A P-6 SYS.-D9 P-7 CRS/B1M.106 P-8 CRS/B1M.206 SYSTEM-D10 KWH CRS.P9

							KWH CRS.P10 UNIT 3 PROK CONVEYOR DP2-6 DP102 CONBLOCK (QUARRY-A) MINING CONVEYOR Cirebon : L T P 750 KVA MWB 103 MWB 109 LS CRUSHING TR FEEDE LS CRUSHER NO1 ROTOR LS CRUSHER NO2 ROTOR Tarjun : Feeder 2P1-1S1-U#1 (Incoming 11 kV) in LSS-3 Feeder 3P2-1S1-U#A (331-BC2-M#1 250 kW) in LSS-3 Feeder 3P2-1S1-U#B (Trafo 3P2-1T1) in LSS-3 Feeder 3P2-1V1/1M1 (Aux Trafo 3P2-1T1) in MCC LSS-3
8.a.4	electricity consumption for clay production	Mining records	PELE_clay, y	MWh	m,c	Monthly	Citeuruep : PHB-1 PHB-2 PHB-3 PHB-4 PHB-5 PHB-6 PHB-7 PHB-8 PHB-9 PHB-10 PCL01 PCL02 PCL03 PCL04 PCL05 PCA01 PCA02 PCA03 PHB-12 HAMBALANG Cirebon : 500 KVA MWB 202 ADD CRUSHER TR FEEDE ADDITIVE CRUSHER Tarjun : Feeder 2P1-1S1-U#1 (Incoming 11 kV) in LSS-3 Feeder 3P2-1S1-U#A (331-BC2-M#1 250 kW) in LSS-3 Feeder 3P2-1S1-U#B (Trafo 3P2-1T1) in LSS-3 Feeder 3P2-1V1/1M1 (Aux Trafo 3P2-1T1) in MCC LSS-3
8.a.5	electricity consumption for laterite production	Mining records	PELE_laterite, y	MWh	m,c	Monthly	Tarjun : Feeder 2P1-1S1-U#1 (Incoming 11 kV) in LSS-3 Feeder 3P2-1S1-U#A (331-BC2-M#1 250 kW) in LSS-3 Feeder 3P2-1S1-U#B (Trafo 3P2-1T1) in LSS-3 Feeder 3P2-1V1/1M1 (Aux Trafo 3P2-1T1) in MCC LSS-3

8.a.6	electricity consumption for coal production	Plant records	PELE_coal, y	MWh	m,c	Monthly	Citeureup : Coal Mill P.1/4 - COAL DRYER 1-4 - P4 COAL MILL Coal Mill P.6/8 - COAL DRYER 6-8 - AUX COAL MILL 6-8 - KWH COAL DRYER - P6 COAL MILL - P7 COAL MILL - P8 COAL MILL Coal Mill P.11 - P11 COAL MILL Cirebon : Coal Mill P.9 - COALMILL Coal Mill P.10 - P10 COAL PWR Tarjun : - PLANT 12
9	Grid Emission factor	See comment	$EF_{grid\_y\_}$	T CO2/MWh	c	annually	ACM0002 is used to determined electricity emissions: Based on JAVA-BALI grid emission factor. Source: Decision on the meeting on determination of CDM emission factor of JAVA-MADURA-BALI (JAMALI) Grid submitted by Chevron and agreed by the committee, Directorate General of Electricity and Energy Utilization, Jakarta, Indonesia, Friday, 11 March 2006). This is estimated based on ACM 0002. Reference for cross checking: Directorate general electricity and energy utilization, Renewable energy division, 2006.
10	Self generation of electricity for clinker production	Plant records	$PELE_{sg\_CLNK,y}$	MWh	m	monthly	
11	Electricity self generation emission factor	Plant records /IPCC	EFsg_y	T CO_2/MWh	c	monthly	
12	Blended Cement production in year y (ton), which is sold domestically (data is verifiable)	Plant records	$BC_{DOM}y$	ton	m	monthly	
13	Grid electricity for grinding BC	Plant records	$PELE_{grid\_BC,y}$	MWh	m	monthly	
13.a	Electricity for grinding BC	Plant records	PELE_BC., y	Mwh	m,c	monthly	Calculated from each kWh meter measured and installed to measure the electricity consumption for grinding blended cement . Below is the measurement point code for each plant, P1 to P12 , except P5 since this plant is excluded in the project: Citeureup : P1 : KWH METER FM P1 P2 : KWH METER FM P2 CLINKER WF P2

							P3 : FINISH MILL 3-A FINISH MILL 3-B P4 : CEMENT MILL 4A-1 CEMENT MILL 4A-2 CAF. 4A DISTRIB. CE FMP4A CEMENT MILL 4B-1 CEMENT MILL 4B-2 CAF.4B DISTRIB.CE FM P4B P6 : CEMENT MILL-I CEMENT MILL-II P7 : CEMENT MILL P8 : CEMENT MILL 8A INDOSIN 8B ROLLER PRESS 8B P11 : LSS6A FINISH-CMT.STR LSS6B F.GRIND-CMT ST Cirebon : P9 : NO.1 CEMENT NO.2 CEMENT P10 : CEMENT GRINDING CM.MILL MOTOR Tarjun : P12 : FINISH MILL 1 CEMENT MILL 2
14	Self generation of electricity for grinding BC	Plant records	$PELE_{sg\_BC,y}$	MWh	m	annually	
15	Grid electricity for grinding additives	Plant records	$PELE_{grid\_ADD}$	MWh	m	annually	
15 a	Overall electricity for limestone	Plant records	PELE_total ADD, y	Mwh	m,c	monthly	Calculated from each kWh meter measured and installed to measure the electricity consumption for grindinglimestone t . Below is the measurement point code for each plant, P1 to P12 , except P5 since this plant is excluded in the project: Citeureup : P-4 CRS-1 / BA-4 P-3 CRUSHER-2 DP-101 P-3 CRUSHING SYSTEM P-4 CRS-2 / BA-4A P4 SYS.-D8 P-5 SYSTEM P-6A CRS-1/BA-4 P-6A CRS-2/BA-4A P-6B CRS-1/BA-5 P-6B CRS-2/BA-5A P-6 SYS.-D9 P-7 CRS/B1M.106 P-8 CRS/B1M.206 SYSTEM-D10

							KWH CRS.P9 KWH CRS.P10 UNIT 3 PROK CONVEYOR DP2-6 DP102 CONBLOCK (QUARRY-A) MINING CONVEYOR Cirebon : L T P 750 KVA MWB 103 MWB 109 LS CRUSHING TR FEEDE LS CRUSHER NO1 ROTOR LS CRUSHER NO2 ROTOR Tarjun : Feeder 2P1-1S1-U#1 (Incoming 11 kV) in LSS-3 Feeder 3P2-1S1-U#A (331-BC2-M#1 250 kW) in LSS-3 Feeder 3P2-1S1-U#B (Trafo 3P2-1T1) in LSS-3 Feeder 3P2-1V1/1M1 (Aux Trafo 3P2-1T1) in MCC LSS-3
16	Self generation of electricity for grinding additives	Plant records	$PELE_{sg\_\_ADD,y}$	MWh	m	annually	
17	Fuel consumption	Plant records	Fi,j,y	Ton of fuel i	m	annually	
18	Carbon content of the fuel used	IPCC/Plant records	COEFi,j,y	tCO2/ton of fuel i	c		IPCC default
19	Electricity generation	Plant records	GENi,y	MWh	m	annually	
20	Emission per ton clinker due to calcinations	Plant records	$PE_{calcin,y}$	t CO_2/ton clinker	c	annually	
21	Electricity generation from the grid	Plant records	GEN ele grid $_{,y}$	MWh	m	annually	This parameter is measured at the PLN power sourcing point and delivered to a single 33KV line for distribution
22	Electricity generation from self generation Diesel	Plant records	GEN ele sg diesel $_{iy}$	MWh	m	annually	This parameter is measured at the Diesel generation supply point and delivered to a single 33KV line for distribution
23	Electricity generation from self generation Natural Gas	Plant records	GEN ele sg natural gas $_{iy}$	MWh	m	annually	This parameter is measured at the natural gas power generation supply point and delivered to a single 33KV line for distribution
24	Auxiliary power, project	Plant records	Auxiliary power, y	MWh	m	annually	
25	Emission per ton clinker due to combustion of fossil fuels for clinker production	Plant records	$PE_{fossil\_fuel,y}$	t CO2/ton clinker	c	annually	
26	Grid electricity emissions for clinker production	Plant records	$PE_{ele\_grid\_CLNK,y}$	t CO2/ton clinker	c	annually	
27	Self generated electricity emission for clinker production	Plant records	$PE_{ele\_sg\_CLNK,y}$	t CO2/ton clinker	c	annually	
28	Grid electricity emissions for BC grinding	Plant records	$PE_{ele\_grid\_BC,,y}$	t CO2/ ton BC	c	annually	
29	Self generated electricity emission for BC grinding	Plant records	$PE_{ele\_sg\_BC,y}$	t CO2/ ton BC	c	annually	
30	Grid electricity emissions for additives preparation	Plant records	$PE_{ele\_grid\_ADD,,y}$	t CO2/ ton BC	c	annually	
31	Self generated electricity emission for additives preparation	Plant records	$PE_{ele\_sg\_ADD,y}$	t CO2/ton BC	c	annually	
32	Share of clinker per ton of BC	Plant records	P_{blend}	t of clinker/t of BC	c	annually	Calculated from no.12

Data monitored for Leakage Emissions Calculations

ID number	Data Variable	Source of data	Symbol	Data Unit	Measured (m), calculated (c) or estimated (e)	Recording Frequency	Comments/Reference
Truck Load							
1	Fly-ash truck load	Plant records	Qadd	Ton of gypsum /trip	m	daily	
2	Trass truck load	Plant records	Qadd	Ton of gypsum /trip	m	daily	
Ship Load							
Distance (D_{add_source}), overland							
3	Fly-ash carried	Plant records	D_{add_source}	Km/trip	m	per trip	
4	Trass carried	Plant records	D_{add_source}	Km/trip	m	Per trip	
Distance (D_{add_source}), overseas							
Emission factor for transport of fuel (kg CO_2/kg of fuel), TEF							
5	Emission factor for transport fuel	IPCC	TEF_{truck}	Kg CO2/kg of fuel	e	annually	
6	Emission factor for transport fuel	IPCC	TEF_{ship}	Kg CO2/kg of fuel	e	annually	
Fuel consumption for the vehicle per kilometer (kg of fuel/kilometer), TF Cons							
7	CO_2 emissions/trip for fly-ash	Plant records		Kg of CO_2/trip	c	monthly	
8	CO_2 emissions/trip for trass	Plant records		Kg of CO_2trip	c	monthly	
9	CO_2 emissions/trip for fly-ash	Plant records		Kg of CO_2/trip	c	monthly	
10	CO_2 emissions/trip for trass	Plant records		Kg of CO_2trip	c	monthly	

Quality Control (QC) and Quality Assurance

Quality management system

The quality management system of the CDM monitoring activities is organized and illustrated as given in Figure 1. The activity is led by a CDM project manager which works together with the Monitoring Plant Officer to manage and monitor all data and calculations in each factory. The responsibilities of each member of quality management team are described hereafter.

CDM Project Manager is responsible to:

- determine, evaluate and develop CO2 emission reduction project program,
- ensure sufficient, accurate and valid calculation
- approve CO2 emission reduction report

Monitoring Plan Officer is responsible to:

- Provide program calculation software based on the approved methodology by UNFCCC.
- Prepare form of calculation worksheet such as daily database, Material consumption, and calculation.
- Verify all calculating and analysis of the CO2 emission reduction calculation result.
- report with the data obtain from all area

General Manager Operation Staff is responsible to:

- Ensure correct calculation.

Monitoring Area is responsible to:

- ensure CO2 emission reduction program applied properly
- ensure facilities related in the scope of CO2 emission reduction are sufficient and accurate
- ensure the sufficiency of data entry

Plant/Division:
Plant/Division Manager is responsible to:

- implement CO2 emission reduction program that include developing, executing, updating and reviewing facilities such as equipment, measuring device, storage required in the scope of CO2 emission reduction
- develop the corrective action in case of nonconformance,
- ensure the sufficiency of data entry

Dept Head is responsible to certify data and ensure on-time data submission

Operator is responsible to conduct data entry

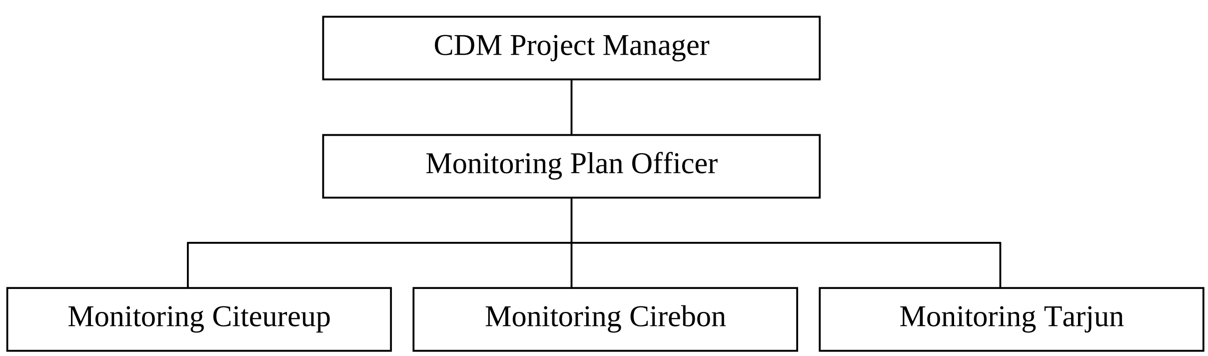

Figure 1. Quality Assurance Management system for monitoring activities Emissions Reduction Calculations Procedures (Organizational Structure)

Quality Assurance: Standard Operation Procedure for monitoring and emission reduction calculation activities

To ensure the quality assurance of data and calculation monitoring, a standard operation procedure is established and is described hereafter.

Emissions Monitoring and Calculation Procedure			
Monitoring and calculation activities	**Citeureup**	**Cirebon**	**Tarjun**
Data Source and collection	Data is taken from the accounting section	Data is taken from the accounting section	Data is taken from the accounting section
	Most data is available and recorded according to ISO 9001 management system	Most data is available and recorded according to ISO 9001 management system	Most data is available and recorded according to ISO 9001 management system
	Frequency of data collection is based on Monitoring Tables given in section D of the PDD	Frequency of data collection is based on Monitoring Tables given in section D of the PDD	Frequency of data collection is based on Monitoring Tables given in section D of the PDD
	All data is reviewed and approved by Monitoring Citeureup.	All data is reviewed and approved by Monitoring Cirebon.	All data is reviewed and approved by Monitoring Tarjun
Data compilation	All data is centralized at Citeureup for data processing		
	Data from Citeureup, Cirebon and Tarjun is transmitted to Monitoring Plan Officer		
Emissions calculation	Emissions calculation is conducted on a yearly basis from data which is collected daily, monthly or annually, depending on the nature of the data. Frequency of data collection and recording is listed in section D of the monitoring section		
	All data is calculated by Monitoring Plan Officer using a comprehensive excel spreadsheet as shown in annex3a.xls and annex3b.xls		
Emissions data review and approval	Calculation is reviewed and approved by CDM project manager,		
Record Keeping	All data is recorded electronically and also kept manually in hard copy, the Monitoring Plan Officer is responsible for record keeping		

DATA ENTRY

Raw Data & Online System

A trained operator should record requirement input data for calculation AF ER such as quantity alternative Material, clinker production, etc. and pay attention to important and relevant process stage at online system.

For other data that is not available at online system, it should be recorded using form provided by and reported to Monitoring Plan Officer.

Daily Data Base
Based on data in online system & other data General Manager Operation Staff prepare data summary into daily data base. The daily data base is verified by Monitoring Plan Officer.

Material Consumption Data
General Manager Operation Staff summarizes the verified daily data base into monthly Material consumption data. The Material consumption data is adjusted by physical check result and the result is verified by Monitoring Plan Officer

Calculation BC ER
General Manager Operation Staff calculates Area CO2 emission reduction in yearly basis on the verified monthly Material consumption data.
Monitoring Plan Officer verify the Area yearly CO2 emission reduction, and back up all data related to CO2 emission reduction.

PROCESS CHANGE
In case of activities which may or would bring about significant changes in CO2 emission reduction project, or there is change on methodology; Monitoring Plan Officer shall review and determine the changes in CO2 emission reduction calculation method. The result is reported to be approved by CDM Project Manager.

INTERNAL AUDIT
An auditor will be officially assigned to check the consistency and data quality for GHG compliance. The auditor must have basic knowledge on GHG emission calculations and familiar with the cement production processes at Indocement. The auditor ensure CO2 emission reduction calculation include raw data, data entry accuracy in on line system, daily data basis summary, fuel consumption summary, CO2 emission reduction summary and report; comply with the approved procedure & methodology.

CORRECTIVE ACTIONS
The internal audit will identify and highlight the inconsistency of the calculation with the existing GHG reduction monitoring plan and calculation formula/algorithm. Based on this audit, corrective actions may be required prior to verification process by an accredited CDM Designated Operation Entity

Quality control (QC) and quality assurance (QA) procedures are undertaken for data monitored

Data *(Indicate table and ID number e.g. 3.-1.; 3.2.)*	Uncertainty level of data (High/Medium/Low)	Are QA/QC procedures planned for these data?	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
Project emissions			
ID 1-29	Low-Medium	Yes	These data will be collected as part of normal plant level operations. QA/QC requirements consist of cross-checking these with other internal company reports. Local data and where applicable IPCC data will be used. Independent agency verification will also be used.
ID 9 and 11	Medium	Yes	The source of uncertainties in the grid emission factor is the fuel composition mix of the grid. This will be updated every year to incorporate the changes in fuel composition mix. Data will be requested to DGEEU (directorate general of energy and electricity utilization). The uncertainty of the grid emission factor is about ± 10%. This will be verified regularly during the verification process. In the absence of actual fuel emission factor for the fuel composition mix of the self generated electricity, IPCC default value will be used.
Baseline emissions			
ID 1-29	Low-Medium	Yes	These data will be collected as part of normal plant level operations. QA/QC requirements consist of cross-checking these with other internal company reports. Local data and where applicable IPCC data will be used. Independent agency verification will also be used.

Data *(Indicate table and ID number e.g. 3.-1.; 3.2.)*	Uncertainty level of data (High/Medium/Low)	Are QA/QC procedures planned for these data?	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
ID 9.11	Medium	Yes	The source of uncertainties in the grid emission factor is the fuel composition mix of the grid. This will be updated every year to incorporate the changes in fuel composition mix. Data will be requested to DGEEU (directorate general of energy and electricity utilization). The uncertainty of the grid emission factor is about ± 10%. This will be verified regularly during the verification process. In the absence of actual fuel emission factor for the fuel composition mix of the self generated electricity, IPCC default value will be used.

Quality management and Environment Management System associated with CDM project activity

CDM project operation is integrated in the normal plant management structure. All monitoring equipment were be installed by experts and regularly calibrated to the highest standards by project staff. The three factories where the Indocement Blended Cement project is conducted are ISO 9001 (QMS) and ISO 14001 (EMS) and OHSAS 18001 certified. All the relevant monitoring, recording, calibration are carried out in the three factories.

GHG Calculations

In the Indocement Blended Cement Project, the increase of the additive materials and lower clinker to cement ratio in the new cement type further reduce GHG emissions which are mainly due to:

- Reduction in process CO_2-emissions due to reduced clinker in calcination process
- Reduction in CO_2 emissions resulting from reduced fuel consumption in clinker burning (caused by reduced amount of clinker)

Formula for emission reduction calculation

Emission reductions

$ER\ y = \{[BE_{BC,y} – PE_{BC,y}]\}*BC_{Dom}y+Ly *(1- \alpha y)$

Where:

ER y = Emission reductions in year y due to project activity (ton of CO_2)
$BE_{BC,y}$ = Baseline emissions per ton of BC (t of CO_2/ton of BC)
$PE_{BC,y}$ = Project emissions per ton of BC (t of CO_2/ton of BC)
$BC_{Dom}y$[1]= BC production in year y (ton), which is sold domestically (data is verifiable)
Ly = Leakage emissions (t of CO_2)
αy = x ton of additives in year y / total additional additives used in year y. The additional amount of additives are surplus and data to substantiate the surplus is available for verification purpose.

	Description	Unit	Year 2005	Year 2006 (01/01/06-31/10/06)
ER y	Emission reductions in year y due to project activity	(ton of CO_2)	-33,057	128,095
$BE_{BC,y}$	Baseline emissions per ton of BC	(t of CO_2/ton of BC)	0.850	0.845
$PE_{BC,y}$	Project emissions per ton of BC	(t of CO_2/ton of BC)	0.854	0.829
$BC_{dom}y$	BC production in year y (ton), which is sold domestically	Ton	9,393,427	7,932,971
Ly	Leakage emissions	(t of CO_2)	-452	-3,040
αy	Proof of additional flyash added in the year y is surplus	0	0	0

[1] The additional parameters $BC_{DOM}y$ is introduced since this is to ensure that only the production for domestic market is taken into account in the project and to maintain the conservativeness of the project

Baseline emissions

$BE_{BC,y}$ = $[BE_{clinker} * B_{Blend,y}] + BE_{ele\_ADD\_BC}$

where:

$BE_{BC,y}$ = Baseline CO2 emissions per ton of blended cement type (BC) (tCO2/ton BC)

$BE_{clinker}$ = CO2 emissions per ton of clinker in the baseline in the project activity plant (t CO2/ton clinker)[2].

$B_{Blend,y}$ = Baseline benchmark of share of clinker per ton of BC updated for year y (ton of clinker/ton of BC)

$BE_{ele\_ADD\_BC}$ = Baseline electricity emissions for BC grinding and preparation of additives (tCO2/ton of BC)

	Description	Unit	Year 2005	Year 2006 (01/01/06-31/10/06)
$BE_{BC,y}$	Baseline CO2 emissions per ton of blended cement type (BC)	tCO2/ton BC	0.850	0.845
$BE_{clinker}$	CO2 emissions per ton of clinker in the baseline in the project activity plant	t CO2/ton clinker	0.906	0.902
$B_{Blend,y}$	Baseline benchmark of share of clinker per ton of BC updated for year y	ton of clinker/ton of BC	0.898	0.896
$BE_{ele\_ADD\_BC}$	Baseline electricity emissions for BC grinding and preparation of additives	tCO2/ton of BC	0.037	0.037

$BE_{clinker,y}$ = $BE_{calcin,y} + BE_{fósil\_fuel,y} + BE_{ele\_grid\_CLNK,y} + BE_{ele\_sg\_CLNK,y}$

where:

$BE_{clinker,y}$ = Emissions of CO2 per ton of clinker in the Baseline in year 2004 (t CO2/ton clinker)

$BE_{calcin,y}$ = Emissions per ton of clinker due to calcinations of calcium carbonate and magnesium carbonate in year 2004 (t CO2/ton clinker)

$BE_{fossil\_fuel,y}$ = Emissions per ton of clinker due to combustion of fossil fuels for clinker production in year 2004 (t CO2/ton clinker)

$BE_{ele\_grid\_CLNK,y}$ = Grid electricity emissions for clinker production per ton of clinker in year 2004 (t CO2/ton clinker)

$BE_{ele\_sg\_CLNK,y}$ = Emissions from self-generated electricity per ton of clinker production in year 2004 (t CO2/ton clinker)

[2] Determination and definition of the BE clinker is given in the PDD, section E

Consistent with the methodology ACM0005, and explanation on selection on benchmark baseline emissions in section B.2, The representative year taken for the baseline is 2004, because the project starts in 2005.

Following the ACM 0005, page 8, In certain year y, the $BE_{clinker,y}$, determination of Baseline emission clinker follow condition (i) where in case of emissions per ton of clinker during the crediting period are less than baseline emissions per ton of clinker ($PE_{Clinker,y} < B_{EClinker}$), the baseline value is substituted by the project activity value. That is, if emissions per ton of clinker are lower during the crediting period, the lower value is taken as the baseline. The adjusted baseline value following this condition is reflected in row "adjusted baseline clinker emission" factor" in the spreadsheet. This condition applies even in the absence of the alternative fuel project which is currently conducted by Indocement in parallel with this project.

	Description	Unit	Year 2004	Adjusted Baseline emission factor in 2005	Adjusted Baseline emission factor in 2006 (Jan-Oct)
$BE_{clinker,y}$	Emissions of CO2 per ton of clinker in the project activity plant in year y	(t CO2/ton clinker)	0.906	0.906	0.902
$BE_{calcin,y}$	Emissions per ton of clinker due to calcinations of calcium carbonate and magnesium carbonate in year y	(t CO2/ton clinker)	0.536	Not applicable	Not applicable
$BE_{fósil\_fuel,y}$	Emissions per ton of clinker due to combustion of fossil fuels for clinker production in year y	(t CO2/ton clinker)	0.304	Not applicable	Not applicable
$BE_{ele\_grid\_CLNK,y}$	Grid electricity emissions for clinker production per ton of clinker in year y	(t CO2/ton clinker)	0.020	Not applicable	Not applicable
$BE_{ele\_sg\_CLNK,y}$	Emissions from self-generated electricity per ton of clinker production in year y	(t CO2/ton clinker)	0.046	Not applicable	Not applicable
$GEN_{ele\_grid\ 2004}$	Power generation from the grid (2004)	Mwh	344,795	Not applicable	Not applicable
$GEN_{ele\_sg\ 2004}$	Power generation by self generation Diesel (2004)	Mwh	1,100,117	Not applicable	Not applicable

$GEN_{ele\_sg\ 2004}$	Power generation by self generation Turbine Generator (2004)	Mwh	529,643	Not applicable	Not applicable
$\Sigma GEN_{i,BSL}$	Total Power generation from both grid and self generator electricity	Mwh	1,527,580	Not applicable	Not applicable
Auxiliary power, (2004)	Auxiliary power, (2004)	Mwh	82,667	Not applicable	Not applicable

Project emissions

$PE_{BC,y}$ = $[PE_{clinker} * P_{Blend,y}] + PE_{ele\_ADD\_BC}$

Where:

$PE_{BC,y}$ = CO2 emissions per ton of BC in the project activity plant in year y(t CO2/ton BC)

$PE_{clinker}$ = CO2 emissions per ton of clinker in the project activity plant in year y (t CO2/ton clinker) and defined below

$P_{Blend,y}$ = Share of clinker per ton of BC in year y (ton of clinker/ton of BC)

$PE_{ele\_ADD\_BC}$ = Electricity emissions for BC grinding and preparation of additives in year y (tCO2/ton of BC)

	Description	Unit	Year 2005	Year 2006 (01/01/06-31/10/06)
$PE_{BC,y}$	CO2 emissions per ton of blended BC in the project activity plant in year y	tCO2/ton BC	0.854	0.829
$PE_{clinker}$	CO2 emissions per ton of clinker in the project activity plant in year y	t CO2/ton clinker	0.916	0.912
$P_{Blend,y}$	Share of clinker per ton of BC in year y	ton of clinker/ton of BC	0.885	0.866
$PE_{ele\_ADD\_BC}$	Electricity emissions for BC grinding and preparation of additives in year y	tCO2/ton of BC	0.043	0.039

$PE_{clinker,y}$ = $PE_{calcin,y} + PE_{fósil\_fuel,y} + PE_{ele\_grid\_CLNK,y} + PE_{ele\_sg\_CLNK,y}$

where:

$PE_{clinker,y}$ = Emissions of CO2 per ton of clinker in the project activity plant in year y (t CO2/ton clinker)

$PE_{calcin,y}$ = Emissions per ton of clinker due to calcinations of calcium carbonate and magnesium carbonate in year y (t CO2/ton clinker)

$PE_{fossil\_fuel,y}$ = Emissions per ton of clinker due to combustion of fossil fuels for clinker production in year y (t CO2/ton clinker)
$PE_{ele\_grid\_CLNK,y}$ = Grid electricity emissions for clinker production per ton of clinker in year y (t CO2/ton clinker)
$PE_{ele\_sg\_CLNK,y}$ = Emissions from self-generated electricity per ton of clinker production in year y (t CO2/ton clinker)

	Description	Unit	Year 2005	Year 2006 (01/01/06-31/10/06)
$PE_{clinker,y}$	Emissions of CO2 per ton of clinker in the project activity plant in year y	(t CO2/ton clinker)	0.916	0.912
$PE_{calcin,y}$	Emissions per ton of clinker due to calcinations of calcium carbonate and magnesium carbonate in year y	(t CO2/ton clinker)	0.535	0.538
$PE_{fósil\_fuel,y}$	Emissions per ton of clinker due to combustion of fossil fuels for clinker production in year y	(t CO2/ton clinker)	0.312	0.308
$PE_{ele\_grid\_CLNK,y}$	Grid electricity emissions for clinker production per ton of clinker in year y	(t CO2/ton clinker)	0.028	0.030
$PE_{ele\_sg\_CLNK,y}$	Emissions from self-generated electricity per ton of clinker production in year y	(t CO2/ton clinker)	0.041	0.036
$GEN_{ele\_grid,y}$	Power generation from the grid (project)	Mwh	572,753	561,203
$GEN_{ele\_sg,y}$	Power generation by self generation Diesel (project)	Mwh	459,326	313,523
$GEN_{ele\_sg,y}$	Power generation by self generation Turbine Generator (project)	Mwh	523,691	463,860
$\Sigma GEN_{i,y}$	Total Power generation from both grid and self generation electricity (project)	Mwh	1,555,770	1,338,406
Auxiliary power, y(project)	Auxiliary power, (project)	Mwh	77,110	72,586

$PE_{calcin,y}$ = 0.785*(OutCaOy - InCaOy) + 1.092*(OutMgOy - InMgOy) / [CLNKy]

where:

$PE_{calcin,y}$ = Emissions from the calcinations of limestone (tCO_2/ton clinker)
0.785 = Stoichiometric emission factor for CaO (tCO_2/t CaO)
1.092 = Stoichiometric emission factor for MgO (tCO_2/t MgO)
InCaO,y = CaO content (%) of the raw material * raw material quantity (ton) **(**for raw meal already calcined)
OutCaO,y = CaO content (%) of the clinker * clinker produced (ton)
InMgO,y = MgO content (%) of the raw material * raw material quantity (ton) (for raw meal already calcined)
OutMgO,y = MgO content (%) of the clinker * clinker produced (ton)
CLNKy = Annual production of clinker in year y (ton of clinker)[3]

	Description	Unit	Year 2005	Year 2006 (01/01/06-31/10/06)
$PE_{calcin,y}$	Emissions from the calcinations of limestone	(tCO_2/ton clinker)	0.535	0.538
InCaO,y	CaO content (%) of the raw material * raw material quantity (ton) (for raw meal already calcined)	ton	1,028	1,139
OutCaO,y	CaO content (%) of the clinker * clinker produced (ton)	ton	6,254,365	6,381,767
InMgO,y	MgO content (%) of the raw material * raw material quantity (ton) (for raw meal already calcined)	ton	15,762	18,363
OutMgO,y	MgO content (%) of the clinker * clinker produced (ton)	ton	180,536	208,239
CLNKy	Annual production of clinker in year y	(ton of clinker)	9,518,389	8,557,592

$PE_{fossil\_fuel,\ y}$ = [$\sum FF_{i\_,y}$ * EFF_i] /CLNK,y

where:

FFi_,y = Fossil fuel of type i consumed for clinker production in year y (ton of fuel i)
EFFi = Emission factor for fossil fuel i (tCO2/ton of fuel)

[3] Since the unit is in ton, the CLNKy is not multiplied by 1000 as stated in the methodology ACM 0005

CLNKy = Annual production of clinker in year y (ton of clinker)

	Description	Unit	Year 2005	Year 2006 (01/01/06-31/10/06)
FFi_,y	Fuels of type i consumed for clinker production in year y)			
	– coal	(ton)	1,299,434	1,290,560
	– Industrial diesel oil	(Kliter)	24,610	19,860
	– natural gas	(Mscf)	374,393	598,364
	– waste tire	(ton)	6,159	3,399
	– sludge oil	(ton)	0	481
	– waste oil	(Kliter)	336	387
	– waste solvent	(Kliter)	0	0
	– textile	(ton)	0	0
	– palm shell	(ton)	11,417	8,665
	– paper	(ton)	208	943
	– sloop oil	(kliter)	0	151
	– rice husk	(ton)	4,365	7,625
	– carbon fly ash	(ton)	201	690
	– saw dust	(ton)	1,038	0
EFFi	Emission factor for fossil fuel i			
	– coal	(tCO2/ton)	2.21	2.24
	– industrial diesel oil	(tCO2/Kliter)	2.72	2.74
	– natural gas	(tCO2/Mscf)	0.04	0.04
	– waste tire	(tCO2/ton)	2.21	2.21
	– sludge oil	(tCO2/ton)		2.17
	– waste oil	(tCO2/Kliter)	2.56	2.56
	– waste solvent	(tCO2/Kliter)		
	– textile	(tCO2/ton)		
	– palm shell	(tCO2/ton)	0.00	0.00
	– paper	(tCO2/ton)	0.00	0.00
	– sloop oil	(tCO2/Kliter)		2.88
	– rice husk	(tCO2/ton)	0.00	0.00
	– carbon fly ash	(tCO2/ton)	0.71	0.66
	– saw dust	(tCO2/ton)	0.00	0.00
CLNKy	Annual production of clinker in year y	(ton of clinker)	9,518,389	9,691,152

$PE_{ele\_grid\_CLNK,y}$ = [$PELE\__{gris\_CLNK,y}$ * $EF_{grid\ y}$] / [CLNKy]

Where:

$PE_{ele\_grid\_CLNK,y}$ = Grid electricity emission for clinker production in year y (tCO2/MWh)
$PELE_{grid\_CLNK,y}$ = Grid electricity for clinker production in year y (MWh)
EF_{grid_y} = Grid emission factor in year y(t CO2/MWh)
CLNKy = Annual production of clinker in year y (ton of clinker)

	Description	Unit	Year 2005	Year 2006 (01/01/06-31/10/06)
$PE_{ele\_grid\_CLNK,y}$	Grid electricity emissions for clinker production in year y	(tCO2/tclinker)	0.028	0.030
$PELE\_{}_{grid\_CLNK,y}$	Grid electricity for clinker production in year y	(MWh)	291,516	330,302
EF_{grid_y}	Grid emission factor in year y	(t CO2/MWh)	0.913	0.890
CLNKy	Annual production of clinker in year y	(ton of clinker)	9,518,389	9,691,152

$PE_{ele\_sg\_CLNK,y}$ = [$PELE\_{}_{sg\_CLNK,y}$ * $EF_{sg\ y}$] / [CLNKy]

Where:

$PE_{ele\_sg\_CLNK,y}$ = Self Generated electricity emission for clinker production in year y (tCO2/MWh)
$PELE_{sg\_CLNK,y}$ = Self Generated electricity for clinker production in year y (MWh)
EF_{sg_y} = Self Generated emission factor in year y(t CO2/MWh)
CLNKy = Annual production of clinker in year y (ton of clinker)

	Description	Unit	Year 2005	Year 2006 (01/01/06-31/10/06)
$PE_{ele\_sg\_CLNK,y}$	Self Generated electricity emissions for clinker production in year y	(tCO2/tclinker)	0.041	0.036
$PELE\_{}_{sg\_CLNK,y}$	Self Generated electricity for clinker production in year y	(MWh)	461,083	414,710
EF_{sg_y}	Self Generated emission factor in year y	(t CO2/MWh)	0.810	0.818
CLNKy	Annual production of clinker in year y	(ton of clinker)	9,518,389	9,691,152

$PE_{ele\_ADD\_BC,y}$ = $PE_{ele\_grid\_BC,y}$ + $PE_{ele\_sg\_BC,y}$ + $PE_{ele\_grid\_ADD,y}$ + $PE_{ele\_sg\_ADD,y}$

Where:

$PE_{ele\_ADD\_BC,y}$ =
$PE_{ele\_grid\_BC,y}$ = Grid electricity emissions for BC grinding in year y (tCO2/ton of BC)

$PE_{ele\_sg\_BC,y}$ = Emissions from self generated electricity for BC grinding in year y (tCO2/ton of BC)
$PE_{ele\_grid\_ADD,y}$ = Grid electricity emissions for additive preparation in year y (tCO2/ton of BC)
$PE_{ele\_sg\_ADD,y}$ = Emissions from self generated electricity additive preparation in year y (tCO2/ton of BC)

	Description	Unit	Year 2005	Year 2006 (01/01/06-31/10/06)
$PE_{ele\_ADD\_BC,y}$	Grid electricity emissions for BC grinding in year y	(tCO2/ton of BC)	0.043	0.039
$PE_{ele\_sg\_BC,y}$	Emissions from self generated electricity for BC grinding in year y	(tCO2/ton of BC)	0.025	0.019
$PE_{ele\_grid\_ADD,y}$	Grid electricity emissions for additive preparation in year y	(tCO2/ton of BC)	0.000	0.000
$PE_{ele\_sg\_ADD,y}$	Emissions from self generated electricity additive preparation in year y	(tCO2/ton of BC)	0.000	0.000

$PE_{ele\_grid\_BC,y} = [PELE_{gris\_BC,y} * EF_{gris\_BSL,y}] / [BCy]$

Where:
$PELE_{grid\_BC,y}$ = Baseline grid electricity for grinding BC (MWh)
EFgrid_y = Grid emission factor in year y(t CO2/MWh)
BCy = Annual production of BC in year y (ton of BC)

	Description	Unit	Year 2005	Year 2006 (01/01/06-31/10/06)
$PELE_{grid\_BC,y}$	grid electricity for grinding BC in the project activity	MWh	189,037	187,318
$EF_{gridBSL,y}$	Grid emission factor in year y for Citeureup and Cirebon, both are connected to JAMALI Grid	t CO2/MWh	0.913	0.890
BCy	Annual production of BC in year y	ton of BC	9,780,196	8,557,592

$PE_{ele\_sg\_BC,y}$ = $[PELE_{sg\_BC,y} * EF_{sg\_y}] / [BCy]$

Where:
$PELE_{sg\_BC,y}$ = Self generated electricity for grinding BC in year y (MWh)

EF_{sg_y} = Emission factor for self generated electricity in year y (t CO2/MWh)
BCy = Annual production of BC in year y (ton of BC)

	Description	Unit	Year 2005	Year 2006 (01/01/06-31/10/06)
$PELE_{sg\_BC,y}$	Self generated electricity for grinding BC in the project activity in year y	MWh	292,727	206,921
EF_{sg_y}	Emission factor for self generated electricity in year y - Citeureup - Tarjun	t CO2/MWh	0.810	0.818
BCy	Annual production of BC in year y	ton of BC	9,780,196	8,557,592

$PE_{ele\_grid\_ADD, y}$ = [$PELE_{gris\_ADD}$ * EF_{grid_y}] /[BCy]

Where:
$PELE_{grid\_ADD}$ = Grid electricity for preparing additives (MWh)
EFgrid_y = Grid emission factor in year y(t CO2/MWh)
BCy = Annual production of BC in year y (kiloton of BC)

	Description	Unit	Year 2005	Year 2006 (01/01/06-31/10/06)
$PELE_{grid\_ADD}$	Grid electricity for preparing additives	MWh	343	327
EF_{grid_y}	Grid emission factor in year y for Citeureup and Cirebon, both are connected to JAMALI Grid	t CO2/MWh	0.913	0.890
BCy	Annual production of BC in year y	kiloton of BC	9,780,196	8,557,592

$PE_{elec\_sg\_ADD,y}$ = [$PELE_{sg\_ADD,y}$ * EF_{sg_y}] / [BCy]

Where:

$PELE_{sg\_ADD,y}$ = Self-generation electricity for grinding additives (MWh)
EF_{sg_y} = Emission factor for self generated electricity in year y (t CO2/MWh)
BCy = Annual production of BC in year y (ton of BC)

	Description	Unit	Year 2005	Year 2006 (01/01/06-31/10/06)
$PELE_{sg\_ADD,y}$	Self generated electricity for grinding additives in the project activity in year y	MWh	747	656
EF_{sg_y}	Emission factor for self generated electricity in year y - Citeureup - Tarjun	t CO2/MWh	0.810	0.818
BCy	Annual production of BC in year y	ton of BC	9,780,196	8,557,592

L_{add_trans} = [(TF_{cons} * D_{add_source} * TEF)/Q_{add} + (($PELE_{conveyor\_drid\ ADD}$ * EFgrid) + ($PELE_{conveyor\_sg\ ADD}$ * EFsg))/ADDy][4]

where:

L_{add_trans} = Transport related emissions per ton of additives (t CO2/ton of additive)
TF_{cons} = Fuel consumption for the vehicle per kilometer (kg of fuel/kilometer)
D_{add_source} = Distance between the source of additive and the project activity plant (km)
TEF = Emission factor for transport fuel (kg CO2/kg of fuel)
$PELE_{conveyor\_grid\ ADD}$ = Annual Electricity consumption for conveyor system for additives ($PE\_{}_{grid\_ADD}$) (MWh)
$PELE_{conveyor\ sg\ ADD}$ = Annual Electricity consumption for conveyor system for additives ($PE\_{}_{sg\_ADD}$) (MWh)

EFgrid = Grid electricity emission factor (ton of CO2/MWh)
PEFsg = Self generated electricity emission factor (ton of CO2/MWh)
Q_{add} = Quantity of additive carried in one trip per vehicle (ton of additive)
ADDy = Annual consumption of additives in year y. (t of additives)

[4] In the methodology, only electricity emission of the grid (EF Grid) is taken into account. In Indocement, this comprises both grid and self generated, therefore, the formula is slightly modified to incorporate the self generated electricity

	Description	Unit	Year 2005	Year 2006 (01/01/06-31/10/06)
L_{add_trans}	Transport related emissions per ton of additives - Limestone (1) - Flyash(2) - Trass (3) - Catalyst (4)	kg CO2/ton of additive	 2.5 13.6 8.4 8.1	 2.8 16.1 10.6 8.4
TF_{cons}	Fuel consumption for the vehicle per kilometer - Limestone (1) - Flyash (2) - Trass (3) - Catalyst (4)	kg of fuel/kilometer	 3.000 0.391 0.391 0.391	 3.000 0.391 0.391 0.391
D_{add_source}	Distance between the source of additive and the project activity plant - Limestone (1) - Flyash (2) - Trass (3) - Catalyst (4)	km	 6.6 304.5 102.8 130.0	 7.1 354.9 134.6 130.0
TEF	Emission factor for transport fuel	kg CO2/kg of fuel	3.2	3.2
$PELE_{conveyor\_grid\ ADD}$	Annual Electricity consumption for conveyor system for additives from grid	MWh	343	327
$PELE_{conveyor\_sg\ ADD}$	Annual Electricity consumption for conveyor system for additives from self generated	MWh	747	656
EFgrid	Grid electricity emission factor	ton of CO2/MWh	0.913	0.890
EFsg	Self generated electricity emission factor	ton of CO2/MWh	0.810	0.818
Q_{add}	Quantity of additive carried in one trip per vehicle - Limestone (1) - Fly ash (2) - Trass (3) - Catalyst (4)	ton of additive	 26.4 31.2 18.3 20.0	 26.0 30.8 18.9 20.0
ADDy	Annual consumption of additives in year y - Limestone (1) - Fly ash (2)	t of additives	 483,669 115,822	 437,713 136,451

	- Trass (3) - Catalyst (4)		197,329 243	260,457 4,408

Leakage emissions per ton of BC due to additional additives are determined by

Ly = L_{add_trans} * [Bblend,y – Pblend,y] * BCy

where:
Ly = Leakage emissions for transport of additives (ton of CO2)
BCy = Production of BC in year y (ton of BC)
Bblend,y = Baseline benchmark share of clinker per ton of BC updated for year y (ton of clinker/ton of BC)
Pblend,y = Share of clinker per ton of BC in year y (ton of clinker/ton of BC)

	Description	Unit	Year 2005	Year 2006 (01/01/06-31/10/06)
Ly	Leakage emissions for transport of additives	ton of CO2	-452	-3,040
BCy	Production of BC in year y	ton of BC	9,780,196	8,557,592
Bblend,y	Baseline benchmark share of clinker per ton of BC updated for year y	ton of clinker/ton of BC	0.898	0.896
Pblend,y	Share of clinker per ton of BC in year y	ton of clinker/ton of BC	0.885	0.866

Summary of CER calculated

CREDIT PERIOD : 01-01-2005 TO 31-12-2005

DESCRIPTION	CITEUREUP	CIREBON	TARJUN	TOTAL
- Baseline	4,996,615	1,899,997	1,088,895	7,985,507
- Project	5,006,278	1,863,756	1,148,079	8,018,112
- Leakage	-436	-97	81	-452
Emission Reduction	-10,099	36,145	-59,103	-33,057

CREDIT PERIOD : 01-01-2006 TO 31-10-2006

DESCRIPTION	CITEUREUP	CIREBON	TARJUN	TOTAL
- Baseline	4,164,426	1,655,414	885,119	6,704,959
- Project	4,106,504	1,598,836	868,484	6,573,824
- Leakage	-1,569	-122	-1,349-	-3,040
Emission Reduction	56,352	56,456	15,286	128,095

TOTAL 01-01-2005 TO 31-10-2006

DESCRIPTION	CITEUREUP	CIREBON	TARJUN	TOTAL
- Baseline	9,161,041	3,555,410	1,974,015	14,690,465
- Project	9,112,782	3,462,591	2,016,563	14,591,936
- Leakage	-2,005	-219	-1,268	-3,492
Emission Reduction	46,253	92,601	-43,817	95,038

From sheet “SUM 01-01-2005 TO 31-10-2006” of “Indocement BC Project 2006 Jan-Oct Rev 19 June 2009.xls” in the reference.

References

PDD: Indocement Blended Cement Project, July 2006

Approved methodology: ACM 0005 Version 3, 19 May 2006

CO_2 Emission Reduction of Blended Cement Calculation Procedure, PT. Indocement Tunggal Prakarsa, Tbk, 2006

Excel Calculation spreadsheets