AAC BLOCKS PROJECT BY

MOHIT INDUSTRIES LIMITED

NXTBLOC
AUTOCLAVED AERATED CONCRETE BLOCKS

MOHIT
MOHIT INDUSTRIES LTD.

Document Prepared By First Climate (India) Private Limited

Project Title	AAC blocks project by Mohit Industries Limited, Gujarat, India
Version	03
Report ID	VCS/MIL/01
Date of Issue	01-December-2015
Project ID	VCS project database ID: **VCSPD1238**
Monitoring Period	25-November-2012 to 31-December-2014 (Both days inclusive)
Prepared By	First Climate (India) Private Limited
Contact	3C, Camac Street, Camac Tower, 4th Floor, Kolkata – 700016, West Bengal, India Ph: +91 33 4022 3456 Email: subhendu.biswas@firstclimate.co.in Website: www.firsclimate.com

Table of Contents

CONTENTS

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Summary Description:

Mohit Industries Limited (hereinafter referred to as MIL or PP) has installed an autoclaved aerated concrete (AAC) blocks manufacturing unit of capacity 300,000 m3/annum in Gujarat, India. The project activity involves setting up a new facility and is accordingly classified as a Greenfield project. The AAC blocks manufactured at the project plant uses, waste material fly ash generated from thermal power plants as the primary raw material. The AAC blocks produced replaces conventional fired (baked) clay bricks as construction material. The specific energy demand for manufacturing AAC blocks is lower as compared to conventional clay bricks.

The energy requirement for fired clay bricks manufactured in India is supplied predominantly by high carbon intensive fossil fuel sources. AAC blocks are manufactured by the autoclaving process, which is less energy intensive as compared to the thermal baking process used for manufacturing of fired clay bricks. Thus, the project activity results in lower greenhouse gas emission as compared to the conventional clay bricks manufacturing process. In terms of performance standard of AAC blocks, the AAC blocks are being manufactured in compliance with the requirements of the relevant national standard. The GHG emissions accrued from the project activity during the monitoring period 25-November-2012 to 31-December-2014 (both days inclusive) is **61,671** tCO2e.

The current monitoring period which commences from 25-November-2012 till 31-December-2014 is the first monitoring period.

Implementation Status:

The project has been implemented on 25-November-2012 and the primary technology for the AAC block manufacturing at the project plant is from **M/s Changzhou Mingjie Building Material Equipment Manufacturing Co., Ltd, China**. The blocks are manufactured, largely through mechanical processes, using cement, lime, gypsum and fly ash from thermal power plants as major raw materials along with aluminium powder (in small quantities).The batched raw materials are mixed with water and the slurry formed is fed to the moulds to set and form green cakes. The green cakes are finally cured by autoclaving with steam to form the AAC blocks. Steam is generated in coal fired boiler.

The major components of equipment installed as part of project activity are as follows:

- Raw materials storage silos
- Raw material mixer
- Hydraulically operated moulding section
- Autoclave section
- Steam boilers
- Compressed air network
- Internal transportation system.

Specifications of AAC blocks manufactured under the project activity are as follows:

Particulars	Unit	Value	Remarks (if any)
Dimension of AAC blocks	**Mm**	**650X240X150**	**As per actual production data**
Density (dry)	**kg/m3**	**551-600**	**As per Lab test Report**
Dry shrinkage (maximum)	**%**	**0.1**	**As per Indian Standard – IS 2185**
Thermal conductivity	**W/m-K**	**0.24**	
Compressive strength	**N/mm2**	**>3.75**	
Fly ash	**%**	**72.11**	**Lab test report and actual monitoring data at the plant**
Cement	**%**	**18.37**	
Lime	**%**	**7.38**	
Gypsum	**%**	**2.06**	
Aluminium powder	**%**	**0.064**	

Commissioning Date:

Commissioning of the Project Activity	**25-November-2012**

Period of Continued Operation & Shutdown

Period	Days of Operation(Days)	Days of Shutdown(Days)
25-Nov-2012 to 31-Dec-2012	37	0
01-Jan-2013 to 31-Dec-2013	352	13
01-Jan-2014 to 31-Dec-2014	358	7
For the Monitoring Period	**747**	**20**

1.2 Sectoral Scope and Project Type

The project activity is a non AFOLU project, developed in line with UNFCCC approved CDM methodology. With reference to Appendix B to the simplified modalities and procedures for small scale CDM project activities, the project activity falls under the following category:

Type	(iii)- Other Project Activities
Scale	Small Scale
Category	Z: Fuel switch, process improvement and energy efficiency in brick manufacture
Methodology	AMS-III.Z: Fuel Switch, process improvement and energy efficiency in brick manufacture
Version	04
Weblink	*http://cdm.unfccc.int/methodologies/DB/WPNWYRJ0FN59EFPA4A7NABU0849FD3*
Sectoral Scope	*4-Manufacturing Industries*

1.3 Project Proponent

Organization name	Mohit Industries Limited
Contact person	Mr. Manish Narayan Saboo
Title	Director
Address	A/601-B, International Trade Centre, Majura Gate, Ring Road, Surat, Gujarat, 395 002, India
Telephone	+91 261 2463261
Email	Manishsaboo84@gmail.com

Organization name	First Climate (India) Private Limited
Contact person	Mr. Subhendu Biswas
Title	Director
Address	3C, Camac Street, 4th Floor, Camac Towers, Kolkata 700 016, West Bengal
Telephone	+91 33 4022 3456
Email	subhendu.biswas@firstclimate.co.in

It has been confirmed that Mohit Industries Limited and First Climate (India) Private Limited are project proponents of the aforesaid Project Activity.

1.4 Other Entities Involved in the Project

Organization name	Not Applicable
Role in the project	Not Applicable
Contact person	Not Applicable
Title	Not Applicable
Address	Not Applicable
Telephone	Not Applicable
Email	Not Applicable

1.5 Project Start Date

The start date of the project activity is **25-November-2012** which corresponds to the first production start date of the NXTBLOCK Autoclaved Aerated Concrete Block.

1.6 Project Crediting Period

Crediting period start date: 25-November-2012

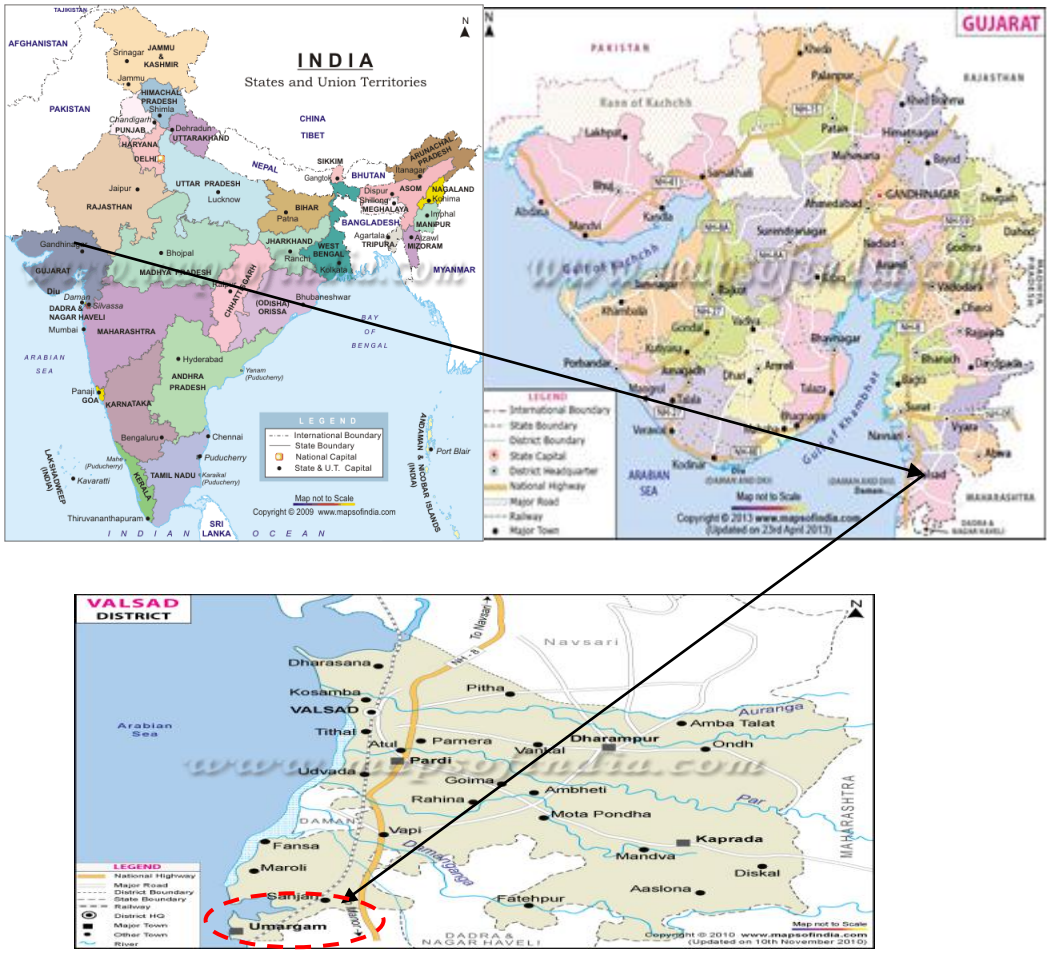
Crediting period end date: 24-November-2022

Length: 10 years 00 months

1.7 Project Location

Country	India
Region	Western India

State	Gujarat
District	Valsad
Tehsil/Mandal	Umargaon
Village	Khatalwada
Latitude	20.217° N
Longitude	72.794°E
Nearest Airport	Surat
Nearest Railway Station	Surat



1.8 Title and Reference of Methodology

The project has been developed using the following baseline and monitoring methodology approved under CDM program of UNFCCC:

Methodology	**AMS-III.Z: Fuel Switch, process improvement and energy efficiency in brick manufacture**
Version	04
Weblink	*http://cdm.unfccc.int/methodologies/DB/WPNWYRJ0FN59EFPA4A7NABU0849FD3*

Following Tools have also been referred by the project activity.

Tool	**Guidelines on the demonstration of additionality of small-scale project activities**
EB Reference	EB 68
Annex	27
Date	20-July-2012
Weblink	*https://cdm.unfccc.int/filestorage/c/p/I5FZTH0DK3O2QLA1VRWU9X7SE6MBY8.pdf/eb68_repan27.pdf?t=MU18bnVhcG9sfDA-BrGz6jQ6boj8lwDkbSLy*
Version	09

Tool	**"Tool to calculate baseline, project and/or leakage emissions from electricity consumption"**
EB Reference	EB 39
Annex	7
Date	16-May-2008
Weblink	http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf
Version	01

Tool	**"Tool to calculate project or leakage CO2 emissions from fossil fuel combustion"**
EB Reference	EB 41
Annex	11
Date	02-August-2008
Weblink	http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf
Version	02

Tool	**"Tool to calculate "project and leakage emissions from road transportation of freight"**
EB Reference	EB 70
Annex	23
Date	23-November-2012
Weblink	https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-12-v1.1.0.pdf
Version	01.1.0

1.9 Other Programs

- Emission Trading Programs and Other Binding Limits: The project activity has not participated in Emission Trading Programs and other binding limits
- Other Forms of Environmental Credit: The project has not availed nor it is in the process of availing any other forms of environmental credit
- Participation under Other GHG Programs: The project activity has not participated in any other GHG program

The above mentioned points have been justified with the aid of a management declaration.

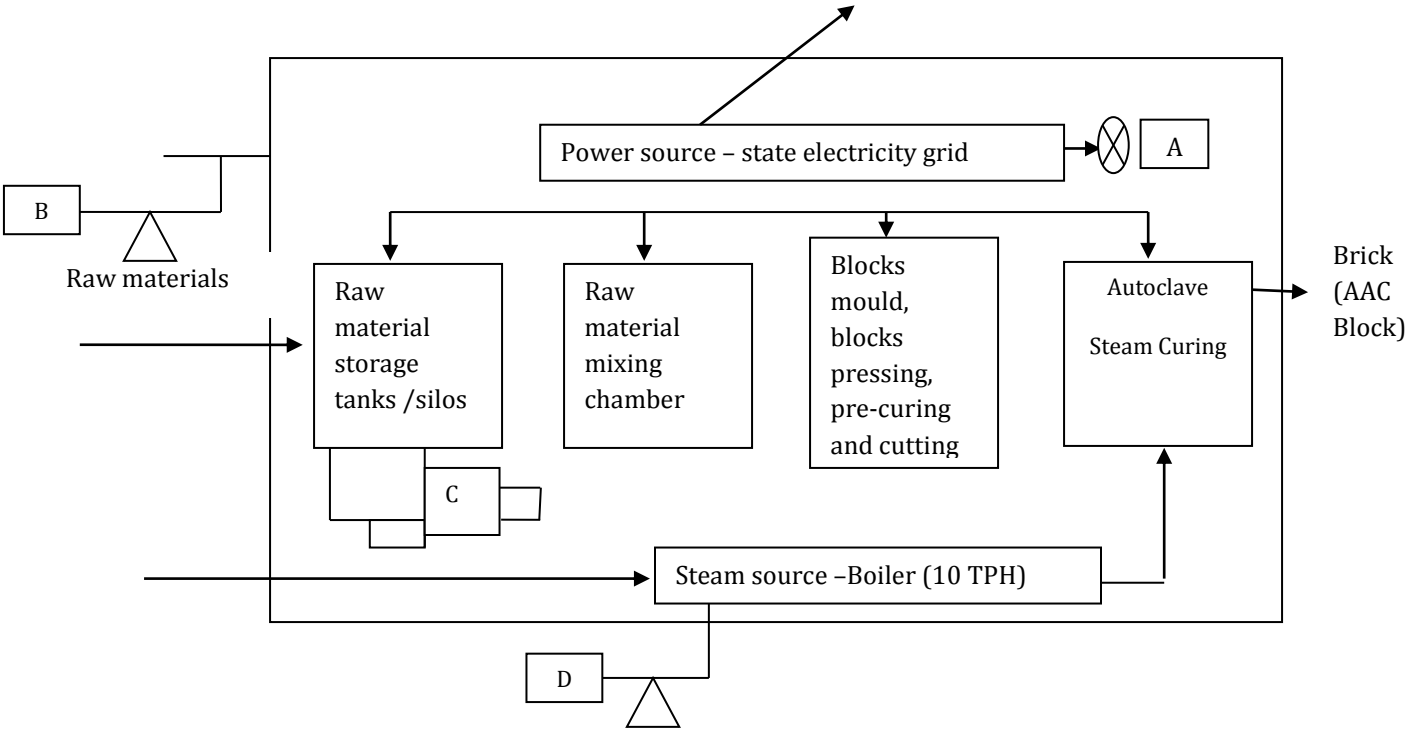
2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

The project activity has been implemented on 25-November-2012. There has not been any change in technology/equipment/ design or any other critical factor which may affect GHG emissions associated with this project activity. The major components of equipment installed as part of project activity are as follows:

- Raw materials storage silos
- Raw material mixer
- Hydraulically operated moulding section
- Autoclave section
- Steam boilers
- Compressed air network
- Internal transportation system

A brief layout of the metering arrangement has been provided below:



Metering Details

Parameter	Denotes	Instrument Details
$EC_{PJ,y}$ A	Quantity of electricity consumed by the project plant in year y	**Energy Meter.**
RMP_{cement},RMP_{flyash} RMP_{gypsum} $RMP_{aluminium\ powder}$ RMP_{lime} B	Quantity of cement, flyash, gypsum, aluminium powder & lime purchased for producing AAC blocks in the year y	**Weighbridge**
RMC_{cement},RMC_{flyash} RMC_{gypsum} $RMC_{aluminium\ powder}$ RMC_{lime} C	Quantity of cement, flyash, gypsum, aluminium powder & lime consumed for producing AAC blocks in the year y	**Electronic Load Cell**
$FC_{coal,y}$ D	Quantity of coal combusted by the project activity boiler during the year y	**Electronic Weighbridge**

Consents & Clearances

Mohit Industries Limited has taken all the requisite clearance. A list of clearances is provided below:

Consent/Clearance Name	Date	Statutory Authority
Factory License	17-September-2012	Directorate Industrial Safety & Health
Clearance from District Industries Centre	01-August-2012	District Industries Centre, Valsad(Govt. of Gujarat)
Consent to Operate	18-December-2011	Gujarat State Pollution Control Board

Permission for Erection of Boiler	21-April-2012	Office of Directorate of Boiler

2.2 Deviations

2.2.1 Methodology Deviations

There has not been any methodology deviation which has affected the aforesaid project activity

2.2.2 Project Description Deviations

1. Measurement of Raw Material Consumption (using Load Cell)

The raw material batch mixer has a Load Cell. The load cell is used to calculate the raw material consumption. The details of the same are being provided below:

Equipment	Electronic Load Cell
Make	Mettler Toledo Ind. Pvt. Ltd
Model	TWS
Maximum Capacity	1500kg
Error %	0.5 kg
Serial Number	MTIN0765
Minimum Weight	10kg
Class	**III**

Calibration Frequency of Load Cell: The calibration of the load cell has been performed once in a year by the manufacturer (Mettler Toledo Ind. Pvt. Ltd)

Note: ***This may be noted that the technical specifications of the load cell were inadvertently missed out in the validated Project Description Document. Additionally, the calibration frequency had been provided as quarterly.***

2. **The parameters $D_{f,y}$ & $FR_{f,m}$ has been used to compute the leakage emissions.**

In the validated PD, the purpose of the parameter **$D_{f,y}$** (Return trip road distance between the origin and destination of freight transportation activity f in monitoring period m[1]) & **$FR_{f,m}$**(Total mass of freight transported in freight transportation activity f in monitoring period m) in Section 4.2 has been mistakenly mentioned as Project Emissions. The data has been actually used to compute leakage emissions.

3. Accuracy Class of the Energy Meter

The accuracy class of the energy meter has been inadvertently mentioned in the registered as: Accuracy class: **0.55 for Active 1.05 for Reactive.** However, the same has been found to be: **0.5S for Active 1.0S for Reactive.** The same can be checked from the manufacturer's (**Larsen & Toubro Limited, Metering & Protection Systems)**) website http://www.lntebg.com/mps/tmer300p.pdf

[1] *Section 4.2 Page 45 of the validated VCS Project Description Document*

4. Calculation procedure to compute the annual production of the facility.

The formula to compute the total production of the facility has been mentioned in the registered VCS PD as Production = (Number of cakes in kg) x (Standard Volume per cake). However, corrected formula for computing the same would be: **Production = (Total Number of Blocks in kg) / (Density in kg/m^3).**

2.3 Grouped Project

The project activity is not a grouped project

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data / Parameter	**EF_{BL}**
Data unit	tCO_2/m^3
Description	The annual production specific baseline emission factor
Source of data	Calculated based on data taken from: 1. "Brick and ceramic sectors" report by Asian Institute of Technology[2] 2. "Energy Conservation and Pollution Control in brick kilns" report by Sameer Maithel, N Vasudevan, Lt. Col. Rakesh Joshi (Retrd.)[3] 3. Density of bricks taken from www.reade.com[4]
Value applied:	0.3993
Justification of choice of data or description of measurement methods and procedures applied	The value is a calculated value. It has been derived based on CO_2 emission per brick data taken from "Brick and ceramic sector report", which has been converted to CO_2 emission per unit volume of baseline brick with weight of each brick taken from "Energy conservation and Pollution Control in brick kilns" report and density of each brick from the engineering tool box. Values used are such that conservativeness of baseline emission factor is ensured.
Purpose of the data	This value has been used to baseline emissions
Comments	This value is fixed ex-*ante*

Data / Parameter	**$COEF_{cement}$**
Data unit	tCO_2/kt
Description	CO_2 emission factor of cement production
Source of data	Cement Sustainability Initiative (CSI)- The Cement CO_2 and Energy Protocol . [5] CO_2 and Energy Accounting and Reporting Standard for the Cement Industry(May 2011) by

[2] http://www.faculty.ait.ac.th/visu/Prof%20Visu's%20CV/Books%20and%20research%20reports/BRICK%20AND%20CERAMIC.pdf
[3] http://www.cosmile.org/papers/brick_statuspaperVSBKsindia2003.pdf
[4] http://www.reade.com/Particle_Briefings/spec_gra2.html
[5] http://www.wbcsdcement.org/pdf/tf1_co2%20protocol%20v3.pdf

	WBCSD- Version 3.0
Value applied:	$0.638x10^3$
Justification of choice of data or description of measurement methods and procedures applied	This value is a default value as per Cement Sustainability Initiative protocol and is an authentic source of data
Purpose of Data	Leakage emissions calculation
Comments	This value is fixed ex-*ante*

Data / Parameter	**$COEF_{aluminium}$**
Data unit	tCO_2/kt
Description	CO_2 emission factor of aluminium production
Source of data	IPCC 2006 Report Volume 3 Chapter 1 for Soderberg Smelting Technology
Value applied:	1.7×10^3
Justification of choice of data or description of measurement methods and procedures applied	IPCC Report is an authentic source of data. Further, for leakage emission more emission intensive of the two available technologies (Prebake and Soderberg) for aluminium production is taken for conservativeness.
Purpose of Data	Leakage emissions calculation
Comments	This value is fixed ex-*ante*

Data / Parameter	**$COEF_{lime}$**
Data unit	tCO_2/kt
Description	CO_2 emission factor of lime production
Source of data	IPCC Guidelines 2006 for NGGI (Vol 3 Ch 2 Eqn 2.8)
Value applied:	$0.75x10^3$
Justification of choice of data or description of measurement methods and procedures applied	IPCC 2006 data is an authentic source of data
Purpose of Data	Leakage emissions calculation
Comments	This value is fixed ex-*ante*

Data / Parameter	**$COEF_{gypsum}$**
Data unit	-tCO2/t
Description	CO_2 emission factor of gypsum production
Source of data	Methodology for free allocation of emission allowances in the EU ETS post 2012[6]
Value applied:	[7]0.01
Justification of choice of data or description of measurement methods and procedures applied	EU ETS data is an authentic source of data
Purpose of Data	Leakage emissions calculation

[6] http://ec.europa.eu/clima/policies/ets/cap/allocation/docs/bm_study-gypsum_en.pdf.

[7] *With reference to the source of data (Methodology for the free allocation of emission allowances in the EU ETS post 2012-Sector report for the gypsum industry), the value has been given as 0.01 tCO2/tonne.*

Comments	This value is fixed ex-*ante*

Data / Parameter	$EF_{CO2,f}$
Data unit	$gCO_2/t\text{-}km$
Description	Default CO_2 emission factor for freight transportation activity f
Source of data	Default value as provided in the methodological tool to calculate "*Project and leakage emissions from road transportation of freight*" version 01.1.0 [8]
Value applied:	Light vehicles – 245 Heavy vehicles – 129
Justification of choice of data or description of measurement methods and procedures applied	This is a default data as provided by UNFCCC and is an authentic source of data
Purpose of Data	Leakage emissions calculation
Comments	This value is fixed ex-*ante*

Data / Parameter	D_{brick}
Data unit	kg/m^3
Description	Density of each baseline brick produced
Source of data	Density of common clay bricks taken from www.reade.com[9]
Value applied:	1920
Justification of choice of data or description of measurement methods and procedures applied	This data has been taken from public domain (www.reade.com).
Purpose of Data	Baseline emissions calculation
Comments	The source of data is a third party publicly available source. The value can also be cross-checked from the following source http://www.simetric.co.uk/si_materials.htm

Data / Parameter	W_{brick}
Data unit	Kg
Description	Weight of each baseline brick produced
Source of data	Section 3.0 page 3/29 of the report: "Energy Conservation and Pollution Control in brick kilns" report by Sameer Maithel, N Vasudevan, Lt. Col. Rakesh Joshi (Retrd.)[10]
Value applied:	3.75
Justification of choice of data or description of measurement methods and procedures applied	Higher value of the range of weight provided is chosen for conservativeness. The source of data chosen is an authentic 3rd party source.
Purpose of Data	Baseline emissions calculation
Comments	http://www.reade.com/Particle_Briefings/spec_gra2.html

[8] *Project and leakage emissions from transportation of freight* (*https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-12-v1.1.0.pdf*)
[9] *http://www.reade.com/Particle_Briefings/spec_gra2.html*
[10] *http://www.cosmile.org/papers/brick_energyconservationpollutioncontrol.pdf*

	http://www.cosmile.org/papers/brick_energyconservationpollutioncontrol.pdf Both the websites are authentic sources of data

Data / Parameter	**$EF_{CO2,brick}$**
Data unit	$kgCO_2$/brick
Description	CO_2 emission per baseline brick produced
Source of data	Page # 25of the "Brick and ceramic sectors" report by Asian Institute of Technology[11]
Value applied:	0.78
Justification of choice of data or description of measurement methods and procedures applied	Lower value of the range of CO_2 emission per brick provided is chosen for conservativeness. The source of data chosen is an authentic 3rd party source.
Purpose of Data	Baseline emissions calculation
Comments	Report by the "Brick and ceramic sectors" is an authentic source of data

Data / Parameter	**$EF_{EL,plant,y}$**
Data unit	tCO_2/MWh
Description	Emission factor for electricity used in project plant in year y
Source of data	Tool to calculate baseline, project and/or leakage emission from electricity consumption, version no. 1
Value applied:	1.3
Justification of choice of data or description of measurement methods and procedures applied	Higher of the CO_2 emission factor for captive source (DG set) or the regional grid. Emission factor data for captive source taken from Tool to calculate baseline, project and/or leakage emission from electricity consumption, version no. 1 and emission factor of NEWNE grid taken from CEA database Version 09.
Purpose of Data	Project emissions calculation
Comments	The values have been taken from ***Tool to calculate baseline, project and/or leakage emission from electricity consumption, version no. 01***[12], which is an authentic source of data.

Data / Parameter	**$TDL_{plant,y}$**
Data unit	%
Description	Average technical transmission and distribution losses for providing electricity to project plant in year y

[11] http://www.faculty.ait.ac.th/visu/Prof%20Visu's%20CV/Books%20and%20research%20reports/BRICK%20AND%20CERAMIC.pdf

[12] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v1.pdf *(Version 01, EB 39, Annex 07, Date: 16-May-2008)*

Source of data	Default value for project electricity source taken from ***Tool to calculate baseline, project and/or leakage emissions from electricity consumption, version 01***[13]
Value applied:	20
Justification of choice of data or description of measurement methods and procedures applied	Project emissions calculation
Purpose of Data	The emission factor for project emission has been selected as the default transmission and distribution losses for project emission estimation applicable to scenario CIII. Data taken from "Tool to calculate baseline, project or leakage emission from electricity consumption", which is an authentic source.
Comments	The values have been taken from ***Tool to calculate baseline, project and/or leakage emission from electricity consumption, version no. 01***[14], which is an authentic source of data.

3.2 Data and Parameters Monitored

Data / Parameter	**Compressive strength of AAC blocks**
Data unit	N/mm^2
Description	Compressive strength of project blocks
Source of data	Laboratory test report
Description of measurement methods and procedures to be applied	Dry compressive strength of the project block has been tested in nationally approved laboratory
Frequency of monitoring/recording	Monitoring Frequency: Once in 6 Months Recording Frequency: Once in 6 Months
Value monitored:	**Date of Test** / **Value(N/mm^2)** 30-November-2012 — 3.9 10-May-2013 — 3.7 09-November-2013 — 3.6 06-May-2014 — 3.7 05-November-2014 — 3.9 **Period** / **Compressive Strength N/mm^2** 2012 — 3.90 2013 — 3.65 2014 — 3.80
Monitoring equipment	Not Applicable. Compressive strength was carried out in external laboratory.
QA/QC procedures to be applied	The external laboratory is accredited by JAS-ANZ (for ISO 9001:2008). **Accreditation Number: M3111204IN**. The external laboratory is also **CRISIL certified lab with a NSIC CRISIL**

[13] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v1.pdf *(Version 01, EB 39, Annex 07, Date: 16-May-2008)*
[14] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v1.pdf *(Version 01, EB 39, Annex 07, Date: 16-May-2008)*

	rating of SE-3B
Purpose of the data	Baseline Emissions
Calculation method	This is a measured data. Hence not applicable
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later

Data / Parameter	**Density of AAC blocks**
Data unit	kg/m^3
Description	Density of AAC blocks
Source of data	Laboratory test reports
Description of measurement methods and procedures to be applied	Density of the project block has been tested at a nationally approved laboratory.
Frequency of monitoring/recording	Monitoring frequency: Once in every 6 months Recording frequency: Once in every 6 months
Value monitored:	**Date of Test** / **Value(kg/m^3)** 30-November-2012 / 570 10-May-2013 / 565 09-November-2013 / 570 06-May-2014 / 569 05-November-2014 / 569 **Period** / **Density (kg/m$^{3)}$** 2012 / 570 2013 / 567.5 2014 / 569
Monitoring equipment	Not Applicable. Compressive strength was carried out in external laboratory
QA/QC procedures to be applied	The external laboratory is accredited by JAS-ANZ (for ISO 9001:2008). **Accreditation Number: M3111204IN**. The external laboratory is also **CRISIL certified lab with a NSIC CRISIL rating of SE-3B.**
Purpose of the data	Baseline Emissions
Calculation method	This is a measured data. Hence not applicable
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later

Data / Parameter	$P_{PJ,y}$
Data unit	m^3
Description	The annual production of the facility in year y
Source of data	Plant Records – production log book data
Description of measurement methods and procedures to be applied	Number of standard sized cakes being manufactured is being monitored manually. Number of cakes manufactured has been converted to volume units.
Frequency of	Monitoring frequency: Continuously

monitoring/recording	Recording frequency: Daily
Value monitored:	Period: Total Production(m^3) 25-Nov-2012 to 31-Dec-2012: **10,415.504** 01-Jan-2013 to 31-Dec-2013: **130,212.373** 01-Jan-2014 to 31-Dec-2014: **188,702.517** **Total for the monitoring period**: **329,330.394**
Monitoring equipment	Number of blocks produced have been manually counted
QA/QC procedures to be applied	Blocks selling data and blocks stocks data can be used for verification of figures.
Purpose of the data	This data has been used to calculate Baseline Emission.
Calculation method	Production = (Total Number of Blocks in kg) / (Density in kg/m3).
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later

Data / Parameter	**$FC_{coal,y}$**
Data unit	kT
Description	Quantity of coal combusted by the project activity boiler during the year y
Source of data	Plant log book
Description of measurement methods and procedures to be applied	Coal Consumption has been measured with Electronic Weighbridge. Coal inventory has been maintained and monitored through the equation: Coal consumed = Opening Stock + Purchases – Closing Stock
Frequency of monitoring/recording	Monitoring frequency: Daily Recording frequency: Daily
Value monitored:	Period: Coal Consumption(kt) 25/11/2012 to 31/12/2012: 0.286 01/01/2013 to 31/12/2013: 4.545 01/01/2014 to 31/12/2014: 4.137
Monitoring equipment	Electronic weighbridge has been used to measure the parameter (**$FC_{coal,y}$**). The weighbridge details are being provided below: Equipment: Electronic Weighbridge Make: Endeavour Industries Pvt. Ltd Model Number: WB-E-50T Serial Number: 26/12-13 Capacity: 50T Accuracy Class: III
QA/QC procedures to be applied	The QA/QC of the parameter has been ensured by annual calibration of the weighbridge. The weighbridge calibration details have been provided below: Calibration Agency: Endeavour Instrument Pvt. Ltd Calibration Date: Next Calibration Due 22/02/2012: 23/02/2013 22/02/2013: 23/02/2014 22/02/2014: 23/02/2015
Purpose of the data	This data has been used to calculate project emissions
Calculation method	The following equation has been used to ascertain the coal consumption quantity: Quantity = Opening Stock + Purchases – Closing stock
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later

Data / Parameter	**$NCV_{,coal,y}$**
Data unit	TJ/kt
Description	Weighted average net calorific value of coal in the year y
Source of data	IPCC 2006 Vol 2 Chapter 1
Description of measurement methods and procedures to be applied	Higher value of the uncertainty range of IPCC default values as provided in Table 1.2 Vol 2 of the 2006 IPCC Guidelines has been selected
Frequency of monitoring/recording	Monitoring frequency: Every update of IPCC Recording frequency: Annually
Value monitored:	26
Monitoring equipment	The value is taken from IPCC's publicly available report.
QA/QC procedures to be applied	IPCC data is an authentic source; hence no QA/QC was required.
Purpose of the data	This data has been used to calculate the project emissions due to coal consumption
Calculation method	Not Applicable
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later

Data / Parameter	**$EF_{coal,y}$**
Data unit	tCO_2/TJ
Description	Weighted average CO_2 emission factor of coal in the year y
Source of data	Table 1.2 Vol 2 of the 2006 IPCC Guidelines
Description of measurement methods and procedures to be applied	Higher value of the uncertainty range of IPCC default values as provided in Table 1.4 Vol 2 of the 2006 IPCC Guidelines has been selected
Frequency of monitoring/recording	Monitoring frequency: Every update of IPCC Recording frequency: Annually
Value monitored:	100
Monitoring equipment	The value is taken from IPCC's publicly available report.
QA/QC procedures to be applied	IPCC data is an authentic source; hence no QA/QC was required.
Purpose of the data	Project Emissions
Calculation method	Not Applicable
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later.

Data / Parameter	**$EC_{PJ,y}$**
Data unit	MWh
Description	Quantity of electricity consumed by the project activity in year y
Source of data	Plant records – Electricity consumption logbook
Description of measurement methods and procedures to be applied	Energy meter has been used to measure the electricity consumption by the project activity.

<table>
<tr><td>Frequency of monitoring/recording</td><td>Monitoring frequency: Continuously
Recording frequency: Daily</td></tr>
<tr><td>Value monitored:</td><td><table><tr><td>Period</td><td>Electricity Consumption(MWh)</td></tr><tr><td>25-Nov-2012 to 31-Dec-2012</td><td>158.85</td></tr><tr><td>01-Jan-2013 to 31-Dec-2013</td><td>1372.24</td></tr><tr><td>01-Jan-2014 to 31-Dec-2014</td><td>1444.74</td></tr></table></td></tr>
<tr><td>Monitoring equipment</td><td>Energy Meter has been used to measure the electricity consumption in the project activity. Equipment details have been provided below:<table><tr><td>Equipment</td><td>Electricity Consumption Meter</td></tr><tr><td>Make</td><td>L&T Electronic Trivector</td></tr><tr><td>Model Number</td><td>ER-300P[15]</td></tr><tr><td>Serial Number</td><td>11490797</td></tr><tr><td rowspan="2">Accuracy Class</td><td>0.5S for Active</td></tr><tr><td>1.0S for Reactive</td></tr></table></td></tr>
<tr><td>QA/QC procedures to be applied</td><td>The QA/QC has been ensured by yearly testing/checking of the energy meter. The calibration details have been provided below:<table><tr><td>Calibration Agency</td><td>Dakshin Gujarat Vij Company Ltd</td></tr><tr><td>Test/Check Date</td><td>Next Test/Check Due</td></tr><tr><td>31-Oct-2012</td><td>30-Oct-2013</td></tr><tr><td>31-July-2013</td><td>30-July-2014</td></tr><tr><td>10-Feb-2014</td><td>09-Feb-2015</td></tr></table>
This may be noted that the Energy meter is under purview of DGVCL (Dakshin Gujarat Vij Company Limited). The meter is an import (only) meter and thus a property of DGVCL. The responsibility of testing/calibration of the energy meter lies solely with DGVCL and MIL doesn't have the authority to carry out the calibration/testing of the meter. The calibration/testing frequency being once in a year.</td></tr>
<tr><td>Purpose of the data</td><td>This data has been used to determine the project emissions from electricity consumption</td></tr>
<tr><td>Calculation method</td><td>Not Applicable. This is a directly measured parameter</td></tr>
<tr><td>Comments</td><td>All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later</td></tr>
</table>

<table>
<tr><td>Data / Parameter</td><td>$\mathbf{RMP_{cement,y}}$</td></tr>
<tr><td>Data unit</td><td>kT</td></tr>
<tr><td>Description</td><td>Quantity of cement purchased for producing AAC blocks in the year y</td></tr>
<tr><td>Source of data</td><td>Purchase records maintained at plant</td></tr>
<tr><td>Description of measurement methods and procedures to be applied</td><td>Cement purchased for producing AAC blocks have been have been measured using weighbridge</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Monitoring frequency: Every purchase of raw material
Recording frequency: Monthly</td></tr>
<tr><td>Value monitored:</td><td><table><tr><td>Period</td><td>Cement Purchased(kt)</td></tr><tr><td>25-Nov-2012 to 31-Dec-2012</td><td>0.679</td></tr><tr><td>01-Jan-2013 to 31-Dec-2013</td><td>15.060</td></tr></table></td></tr>
</table>

[15] *http://www.lntebg.com/mps/tmer300p.pdf*

	01-Jan-2014 to 31-Dec-2014: 19.591
Monitoring equipment	Electronic Load Cell has been used to measure the parameter. The details for the equipment are being provided below: Equipment: Electronic Weighbridge Make: Endeavour Industries Pvt. Ltd Model Number: WB-E-50T Serial Number: 26/12-13 Capacity: 50T Accuracy Class: III
QA/QC procedures to be applied	The QA/QC of the parameter has been ensured by yearly calibration of the weighbridge. The weighbridge calibration details have been provided below: Calibration Agency: Endeavour Instrument Pvt. Ltd Calibration Date: Next Calibration Due 22/02/2012: 23/02/2013 22/02/2013: 23/02/2014 22/02/2014: 23/02/2015 Purchase data has also been used to cross verify the total raw material(cement) purchase from 3rd party sources
Purpose of the data	This data has been used to calculate leakage.
Calculation method	This is a measured parameter.
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later

Data / Parameter	**$RMC_{cement,y}$**
Data unit	kt
Description	Quantity of cement consumed for producing AAC blocks in the year y
Source of data	Consumption records maintained at plant
Description of measurement methods and procedures to be applied	Cement consumed for producing AAC blocks have been have been measured using electronic load cell
Frequency of monitoring/recording	Monitoring frequency: Batch-wise Recording frequency: Daily
Value monitored:	**Period** | **Cement Consumption(kt)** 25-Nov-2012 to 31-Dec-2012: 0.881 01-Jan-2013 to 31-Dec-2013: 14.180 01-Jan-2014 to 31-Dec-2014: 18.632
Monitoring equipment	Electronic Load Cell has been used to measure the parameter. The details for the equipment are being provided below: Equipment: Electronic Load Cell Make: Mettler Toledo Ind. Pvt. Ltd Model: TWS Maximum Capacity: 1500kg Error %: 0.5 kg

	Serial Number: MTIN0765 Minimum Weight: 10kg Class: III
QA/QC procedures to be applied	The QA/QC of the parameter has been ensured by yearly calibration of the load cell. The load cell calibration details have been provided below: Calibration Agency: Mettler Toledo India. Pvt. Ltd Calibration Date / Next Calibration Due: 04-August -2012 / 03-August-2013 03-August-2013 / 02-August-2014 2-August-2014 / 01-August-2015 Purchase invoices have also been used to cross verify the total raw material (cement) purchase from 3rd party sources.
Purpose of the data	This data has been used to calculate leakage emission
Calculation method	This is a measured parameter.
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later

Data / Parameter	**$RMP_{flyash,y}$**
Data unit	kt
Description	Quantity of flyash purchased for producing AAC blocks in the year y
Source of data	Purchase records maintained at plant
Description of measurement methods and procedures to be applied	Flyash purchased for producing AAC blocks have been have been measured using weighbridge
Frequency of monitoring/recording	Monitoring frequency: Every purchase of raw material(flyash) Recording frequency: Monthly
Value monitored:	**Period** / **Flyash Purchased(kt)** 25-Nov-2012 to 31-Dec-2012: 3.767 01-Jan-2013 to 31-Dec-2013: 66.275 01-Jan-2014 to 31-Dec-2014: 100.669
Monitoring equipment	Electronic Weighbridge has been used to measure the parameter. The details for the equipment are being provided below: Equipment: Electronic Weighbridge Make: Endeavour Industries Pvt. Ltd Model Number: WB-E-50T Serial Number: 26/12-13 Capacity: 50T Accuracy Class: III
QA/QC procedures to be applied	The QA/QC of the parameter has been ensured by yearly calibration of the weighbridge. The weighbridge calibration details have been provided below: Calibration Agency: Endeavour Instrument Pvt. Ltd Calibration Date / Next Calibration Due: 22/02/2012 / 23/02/2013 22/02/2013 / 23/02/2014 22/02/2014 / 23/02/2015 Purchase data has also been used to cross verify the total raw material(flyash) purchase from 3rd party sources
Purpose of the data	This data has been used to calculate leakage emission.

Calculation method	This is a measured parameter.
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later

Data / Parameter	**$RMC_{flyash,y}$**
Data unit	kt
Description	Quantity of flyash consumed for producing AAC blocks in the year y
Source of data	Consumption records maintained at plant
Description of measurement methods and procedures to be applied	Flyash consumed for producing AAC blocks have been have been measured using weighbridge
Frequency of monitoring/recording	Monitoring frequency: Batch-wise Recording frequency: Daily
Value monitored:	**Period** / **Flyash Consumption(kt)** 25-Nov-2012 to 31-Dec-2012 / 3.753 01-Jan-2013 to 31-Dec-2013 / 51.058 01-Jan-2014 to 31-Dec-2014 / 90.969
Monitoring equipment	Electronic Load Cell has been used to measure the parameter. The details for the equipment are being provided below: Equipment: Electronic Load Cell Make: Mettler Toledo Ind. Pvt. Ltd Model: TWS Maximum Capacity: 1500kg Error %: 0.5 kg Serial Number: MTIN0765 Minimum Weight: 10kg Class: III
QA/QC procedures to be applied	The QA/QC of the parameter has been ensured by yearly calibration of the load cell. The load cell calibration details have been provided below: Calibration Agency: Mettler Toledo India. Pvt. Ltd Calibration Date / Next Calibration Due 04-August -2012 / 03-August-2013 03-August-2013 / 02-August-2014 2-August-2014 / 01-August-2015 Purchase invoices have also been used to cross verify the total raw material (flyash) purchase from 3rd party sources.
Purpose of the data	This data has been used to calculate leakage emission
Calculation method	This is a measured parameter.
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later

Data / Parameter	**$RMP_{Lime,y}$**
Data unit	kt
Description	Quantity of Lime purchased for producing AAC blocks in the year y
Source of data	Purchase records maintained at plant

Description of measurement methods and procedures to be applied	Lime purchased for producing AAC blocks have been have been measured using weighbridge
Frequency of monitoring/recording	Monitoring frequency: Every purchase of raw material(lime) Recording frequency: Monthly
Value monitored:	**Period** / **Lime Purchased(kt)** 25-Nov-2012 to 31-Dec-2012 / 0.455 01-Jan-2013 to 31-Dec-2013 / 6.522 01-Jan-2014 to 31-Dec-2014 / 9.101
Monitoring equipment	Electronic Weighbridge has been used to measure the parameter. The details for the equipment are being provided below: Equipment: Electronic Weighbridge Make: Endeavour Industries Pvt. Ltd Model Number: WB-E-50T Serial Number: 26/12-13 Capacity: 50T Accuracy Class: III
QA/QC procedures to be applied	The QA/QC of the parameter has been ensured by yearly calibration of the weighbridge. The weighbridge calibration details have been provided below: Calibration Agency: Endeavour Instrument Pvt. Ltd Calibration Date / Next Calibration Due 22/02/2012 / 23/02/2013 22/02/2013 / 23/02/2014 22/02/2014 / 23/02/2015 Purchase data has also been used to cross verify the total raw material(lime) purchase from 3rd party sources
Purpose of the data	This data has been used to calculate leakage emission
Calculation method	This is a measured parameter.
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later

Data / Parameter	**$RMC_{Lime,y}$**
Data unit	kt
Description	Quantity of lime consumed for producing AAC blocks in the year y
Source of data	Consumption records maintained at plant
Description of measurement methods and procedures to be applied	Lime consumed for producing AAC blocks have been have been measured using weighbridge
Frequency of monitoring/recording	Monitoring frequency: Batch-wise Recording frequency: Daily
Value monitored:	**Period** / **Lime Consumption(kt)** 25-Nov-2012 to 31-Dec-2012 / 0.525 01-Jan-2013 to 31-Dec-2013 / 6.563 01-Jan-2014 to 31-Dec-2014 / 9.206
Monitoring equipment	Electronic Load Cell has been used to measure the parameter. The details for the equipment are being provided below: Equipment: Electronic Load Cell Make: Mettler Toledo Ind. Pvt. Ltd Model: TWS Maximum Capacity: 1500kg

	Error % — 0.5 kg Serial Number — MTIN0765 Minimum Weight — 10kg Class — III
QA/QC procedures to be applied	The QA/QC of the parameter has been ensured by yearly calibration of the load cell. The load cell calibration details have been provided below: Calibration Agency — Mettler Toledo India. Pvt. Ltd Calibration Date — Next Calibration Due 04-August -2012 — 03-August-2013 03-August-2013 — 02-August-2014 2-August-2014 — 01-August-2015 Purchase invoices have also been used to cross verify the total raw material (Lime) purchase from 3rd party sources.
Purpose of the data	This data has been used to calculate leakage emission
Calculation method	This is a measured parameter.
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later

Data / Parameter	**$RMP_{gypsum,y}$**
Data unit	kt
Description	Quantity of gypsum purchased for producing AAC blocks in the year y
Source of data	Purchase records maintained at plant
Description of measurement methods and procedures to be applied	Gypsum purchased for producing AAC blocks have been have been measured using weighbridge
Frequency of monitoring/recording	Monitoring frequency: Every purchase of raw material(gypsum) Recording frequency: Monthly
Value monitored:	**Period** — **Gypsum Purchased(kt)** 25-Nov-2012 to 31-Dec-2012 — 0.066 01-Jan-2013 to 31-Dec-2013 — 0.876 01-Jan-2014 to 31-Dec-2014 — 0.982
Monitoring equipment	Electronic Weighbridge has been used to measure the parameter. The details for the equipment are being provided below: Equipment — Electronic Weighbridge Make — Endeavour Industries Pvt. Ltd Model Number — WB-E-50T Serial Number — 26/12-13 Capacity — 50T Accuracy Class — III
QA/QC procedures to be applied	The QA/QC of the parameter has been ensured by yearly calibration of the weighbridge. The weighbridge calibration details have been provided below: Calibration Agency — Endeavour Instrument Pvt. Ltd Calibration Date — Next Calibration Due 22/02/2012 — 23/02/2013 22/02/2013 — 23/02/2014 22/02/2014 — 23/02/2015 Purchase data has also been used to cross verify the total raw material(gypsum) purchase from 3rd party sources

Purpose of the data	This data has been used to calculate leakage emission
Calculation method	This is a measured parameter.
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later

Data / Parameter	**$RMC_{gypsum,y}$**
Data unit	kt
Description	Quantity of gypsum consumed for producing AAC blocks in the year y
Source of data	Consumption records maintained at plant
Description of measurement methods and procedures to be applied	Quantity of Gypsum consumed for producing AAC blocks have been have been measured using weighbridge
Frequency of monitoring/recording	Monitoring frequency: Batch-wise Recording frequency: Monthly
Value monitored:	**Period** / **Gypsum Consumption(kt)** 25-Nov-2012 to 31-Dec-2012 — 0.081 01-Jan-2013 to 31-Dec-2013 — 0.987 01-Jan-2014 to 31-Dec-2014 — 0.939
Monitoring equipment	Electronic Load Cell has been used to measure the parameter. The details for the equipment are being provided below: Equipment: Electronic Load Cell Make: Mettler Toledo Ind. Pvt. Ltd Model: TWS Maximum Capacity: 1500kg Error %: 0.5 kg Serial Number: MTIN0765 Minimum Weight: 10kg Class: III
QA/QC procedures to be applied	The QA/QC of the parameter has been ensured by yearly calibration of the load cell. The load cell calibration details have been provided below: Calibration Agency: Mettler Toledo India. Pvt. Ltd Calibration Date / Next Calibration Due 04-August -2012 — 03-August-2013 03-August-2013 — 02-August-2014 2-August-2014 — 01-August-2015 Purchase invoices have also been used to cross verify the total raw material (gypsum) purchase from 3rd party sources.
Purpose of the data	This data has been used to calculate leakage emission
Calculation method	This is a measured parameter.
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later

Data / Parameter	**$RMP_{aluminium,y}$**
Data unit	kT
Description	Quantity of Aluminium powder purchased for producing AAC blocks in the year y
Source of data	Purchase records maintained at plant

Description of measurement methods and procedures to be applied	Aluminium Powder purchased for producing AAC blocks have been have been measured using weighbridge
Frequency of monitoring/recording	Monitoring frequency: Every purchase of raw material(gypsum) Recording frequency: Monthly
Value monitored:	**Period** / **Aluminium Purchased(kt)** 25-Nov-2012 to 31-Dec-2012 / 0 01-Jan-2013 to 31-Dec-2013 / 5.050 01-Jan-2014 to 31-Dec-2014 / 0.078
Monitoring equipment	Electronic Weighbridge has been used to measure the parameter. The details for the equipment are being provided below: Equipment: Electronic Weighbridge Make: Endeavour Industries Pvt. Ltd Model Number: WB-E-50T Serial Number: 26/12-13 Capacity: 50T Accuracy Class: III
QA/QC procedures to be applied	The QA/QC of the parameter has been ensured by yearly calibration of the weighbridge. The weighbridge calibration details have been provided below: Calibration Agency: Endeavour Instrument Pvt. Ltd Calibration Date / Next Calibration Due 22/02/2012 / 23/02/2013 22/02/2013 / 23/02/2014 22/02/2014 / 23/02/2015 Purchase data has also been used to cross verify the total raw material(Aluminium Powder) purchase from 3rd party sources
Purpose of the data	This data has been used to calculate leakage emission
Calculation method	This is a measured parameter.
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later

Data / Parameter	**$RMC_{aluminium,y}$**
Data unit	kT
Description	Quantity of aluminium powder consumed for producing AAC blocks in the year y
Source of data	Consumption records maintained at plant
Description of measurement methods and procedures to be applied	Quantity of aluminium powder consumed for producing AAC blocks have been have been measured using weighbridge
Frequency of monitoring/recording	Monitoring frequency: Batch-wise Recording frequency: Daily
Value monitored:	**Period** / **Aluminium Consumption(kt)** 25-Nov-2012 to 31-Dec-2012 / 0.081 01-Jan-2013 to 31-Dec-2013 / 0.987 01-Jan-2014 to 31-Dec-2014 / 0.939
Monitoring equipment	Electronic Load Cell has been used to measure the parameter. The details for the equipment are being provided below: Equipment: Electronic Load Cell Make: Mettler Toledo Ind. Pvt. Ltd Model: TWS

	Maximum Capacity: 1500kg Error %: 0.5 kg Serial Number: MTIN0765 Minimum Weight: 10kg Class: III
QA/QC procedures to be applied	The QA/QC of the parameter has been ensured by yearly calibration of the load cell. The load cell calibration details have been provided below: Calibration Agency: Mettler Toledo India. Pvt. Ltd Calibration Date / Next Calibration Due: 04-August -2012 / 03-August-2013 03-August-2013 / 02-August-2014 2-August-2014 / 01-August-2015 Purchase invoices have also been used to cross verify the total raw material (aluminium) purchase from 3rd party sources.
Purpose of the data	This data has been used to calculate leakage emission
Calculation method	This is a measured parameter.
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later

Data / Parameter	$D_{f,y}$
Data unit	Km
Description	Return trip road distance between the origin and destination of freight transportation activity f in monitoring period m
Source of data	Purchase records
Description of measurement methods and procedures to be applied	This data has been measured using online maps and purchase invoices
Frequency of monitoring/recording	Monitoring frequency: Whenever road trip distance changes Recording frequency: Whenever road trip distance changes
Value monitored:	**Raw Mat. / From / To / Roundtrip Distance** Cement / Surat / Umargaon / 296[16] Flyash / Dahanu / Umargaon / 60[17] Lime / Nagaur / Umargaon / 1946[18] Gypsum / Mumbai / Umargaon / 306[19] Aluminium Powder / Nagpur / Umargaon / 1658[20]
Monitoring equipment	Purchase invoices and online maps have been used to estimate the roundtrip distances
QA/QC procedures to be applied	This is a third party data.
Purpose of the data	This data has been used to calculate leakage emissions
Calculation method	Roundtrip road travel distances calculated from online maps
Comments	All data would be stored for a minimum of 2 years after the end of

[16] http://www.distancesfrom.com
[17] http://www.distancesfrom.com
[18] http://www.distancesfrom.com
[19] http://www.distancesfrom.com
[20] http://www.distancesfrom.com

	the crediting period or last verification, whichever occurs later

Data / Parameter	**$FR_{f,m}$**
Data unit	Tonne
Description	Total mass of freight transported in freight transportation activity f in monitoring period m
Source of data	Purchase records
Description of measurement methods and procedures to be applied	This parameter has been measured through Raw material purchase invoices. Raw materials include (cement, flyash, limestone, gypsum & aluminium powder)
Frequency of monitoring/recording	Monitoring frequency: Continuously Recording frequency: Monthly
Value monitored:	

Period	Freight Type	Total Freight Transported
25-Nov-2012 to 31-Dec-2012	Cement	679.38
	Flyash	3767.60
	Lime	455.33
	Gypsum	66
	Aluminium Powder	0
01-Jan-2013 to 31-Dec-2013	Cement	15060.24
	Flyash	66275.31
	Lime	6522.36
	Gypsum	876.01
	Aluminium Powder	5050.15
01-Jan-2014 to 31-Dec-2014	Cement	19591.07
	Flyash	100669.46
	Lime	9101.41
	Gypsum	982.71
	Aluminium Powder	78.04

Monitoring equipment	3rd party purchase invoices would be used to ascertain this parameter
QA/QC procedures to be applied	The data is a 3rd party data.
Purpose of the data	This data would be used to calculate leakage emissions
Calculation method	Not Applicable
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later

Data / Parameter	**The vehicle class used**
Data unit	-
Description	The vehicle class used for freight transportation
Source of data	Transportation records
Description of measurement methods and procedures to be applied	Vehicle type (light/heavy) used for raw material transportation has been monitored based on road challan for raw material transported during each transportation activity.
Frequency of monitoring/recording	Monitoring frequency: Continuously Recording frequency: Every receipt of raw materials at site
Value monitored:	From the purchase records, it has been found that the raw materials have been transported in **heavy vehicles**

Monitoring equipment	Way bills and UNFCCC guidelines[21] are 3rd party sources of data
QA/QC procedures to be applied	The data is a 3rd party data. The value has been further confirmed with the weigh bridge slip generated for raw materials inward quantity.
Purpose of the data	This data has been used to determine leakage Emissions
Calculation method	Not Applicable
Comments	All data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later

3.3 Monitoring Plan

The monitoring plan involves structure for:

- Monitoring, recording and archiving of all data required for calculation of *ex-post* emission reduction from the project.
- Storing documents required for emission reduction calculations.
- Conducting/arranging calibration tests for monitoring equipment
- Ensuring quality of recorded data
- Co-ordinating with consultants and verifiers to submit monitored data to APX VCS Registry for verification

The monitoring team will be structured as follows:

Position	Report to:
Operators	Plant head
Supervisor managers (technical/maintenance)	
VCS monitoring project manager	

Detailed responsibility of each member in the monitoring team is provided below:

#	Tasks description	Operator(s)	Supervisor	Plant Manager	VCS monitoring project manager
Monitoring activity					
1	Recording of monitored data	✓	✓		
Quality Assurance & Quality Control					
2	Verification of data monitored (consistency and completeness)		✓	✓	
3	Ensuring adequate training of staff			✓	✓

[21] *Project and leakage emissions from transportation of freight (EB70, Annex23, Version 01.1.0, Tool 12)* http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-12-v1.1.0.pdf

4	Ensuring adequate maintenance		✓	✓	✓
	Ensuring calibration of monitoring instruments		✓	✓	✓
5	Data archiving: ensuring adequate storage of data monitored (integrity and backup)			✓	✓
6.	Identification of non-conformance and corrective/preventive actions and monitoring plan improvement			✓	✓
7	Emergency procedures		✓	✓	
Calculation of GHG emission reductions and reporting					
8	Processing of data and calculation of emission reductions				✓
9	Monitoring report: management review of monitoring report (internal audit)			✓	✓

Data Collection & Storage:

All data has been collected in paper log books and/or online data collection system and has been converted to spreadsheet form on an annual basis. It has been ensured that raw data would be stored for a minimum of 2 years after the end of the crediting period or last verification, whichever occurs later. In case there is any inconsistency on monitored data, the period will be removed from emission reduction crediting period, unless sufficiently reliable alternative methods are available and validated by external agencies appointed to verify monitoring report submitted to VCS Board.

QA & QC Procedures followed: All meters have been calibrated as per industry practices at regular intervals. Records of calibration certificates have been maintained for verification. The details of the calibrations have been provided below:

Equipment	Serial Number	Accuracy Class	Calibration Date	Next Calibration
Weighbridge	26/12-13	III	22-Feb-2012	23-Feb-2013
			22-Feb-2013	23-Feb-2014
			22-Feb-2014	23-Feb-2015
Energy Meter	11490797	0.5S for Active 1.0S for Reactive	31-Oct-2012	30-Oct-2013
			31-July-2013	30-July-2014
			10-Feb-2014	09-Feb-2015
Load Cell	MTIN0765	III	04-August-2012	03-August-2013
			03-August-2013	02-August-2014

			02-August-2014	01-August-2015

Emergency Preparedness: In the event of emergency situations like non-functioning of equipments/instruments, the same has to be reported to Plant Head. The faulty equipment/instrument would be replaced with immediate effect. In the event of unavailability of the instrument, the emission reductions for the concerned would not be considered and generation records for the aforesaid months would be adjusted with reference to the **GUIDELINES FOR ASSESSING COMPLIANCE WITH THE CALIBRATION FREQUENCY REQUIREMENTS**

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Baseline emissions are quantified in line with paragraph 15 of the methodology ***AMS-III.Z Fuel Switch, process improvement and energy efficiency in brick manufacture (Version 04)*** as follows:

$$BE_y = EF_{BL} * P_{PJ,y}$$ _____Equation no. 1

Where:

BE_y	tCO_2e	The annual baseline emissions from fossil fuels displaced by the project activity in the year y
EF_{BL}	tCO_2/m^3	The annual production specific baseline emission factor
$P_{PJ,y}$	m^3	The annual net production of the facility in year y

For the project activity

Annual Net Production of the facility from 25-Nov-2012 to 31-Dec-2012 =10415.50m^3
Annual Net Production of the facility from 01-Jan-2013 to 31-Dec-2013 =130212.37m^3
Annual Net Production of the facility from 01-Jan-2014 to 31-Dec-2014 =188702.52m^3
[22]Specific Baseline Emission Factor=0.3993 tCO2/m^3
As per Equation No.1Baseline Emissions for the aforesaid monitoring period has been calculated as:

Period	**Annual Production($P_{PJ,y}$)**	**Specific Baseline EF EF_{BL}**	**Baseline Emission BE_y**
	m^3	tCO_2/m^3	tCO_2
25-Nov-2012 to 31-Dec-2012	10415.50	0.3993	**10415.594x0.3993=4,158**
01-Jan-2013 to 31-Dec-2013	130212.37	0.3993	**132012.373x0.3993=51,993**
01-Jan-2014 to 31-Dec-2014	188702.52	0.3993	**188702.517*0.3993=75,348**
Total for the monitoring period			**131,499 tCO_2e**

[22] http://www.faculty.ait.ac.th/visu/Prof%20Visu's%20CV/Books%20and%20research%20reports/BRICK%20AND%20CERAMIC.pdf

Baseline Emission (BE_y) for the monitoring period (25-Nov-2012 to 31-Dec-2014) = 131, 499 tCO_2e

4.2 Project Emissions

Project emission sources relevant for this project are:

- **Project emissions from electricity consumption within the project boundary**
- **Project emissions from coal consumption in the boiler for steam generation**

- **Project emission from electricity consumption within the project boundary:**

Referring to, "***Tool to calculate baseline, project and/or leakage emission from electricity consumption, version no. 01***[23]", the project emission from electricity consumption has been calculated as follows:

$$PE_{elec,y} = \sum_j EC_{PJ,j,y} * EF_{EL,j,y} * (1 + TDL_{j,y}) \quad \text{Equation 2}$$

Where:

$PE_{elec,y}$	tCO_2/year	Project emissions due to electricity consumption in year y
$EC_{PJ,j,y}$	MWh/year	Quantity of electricity consumed by the project emission source j in year y
$EF_{EL,j,y}$	tCO_2/MWh	Emission factor for electricity generation for source j in year y
$TDL_{j,y}$	%	Average technical transmission and distribution losses for providing electricity to source j in year y

For the project activity

Quantity of electricity consumed by the project activity from 25-Nov-2012 to 31-Dec-2012=158.85MWh

Quantity of electricity consumed by the project activity from 01-Jan-2013 to 31-Dec-2013=1372.24MWh

Quantity of electricity consumed by the project activity from 01-Jan-2014 to 31-Dec-2014=1444.74MWh

[24]Emission factor for electricity generation for source j in year y=1.3

Average technical transmission and distribution losses for providing electricity to project=20%

As per the equation 2 as mentioned above

[23] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v1.pdf *(Version 01, EB 39, Annex-7, date 16-May-2008)*

[24] *Tool to calculate baseline, project and/or leakage emission from electricity consumption, version no. 01(http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v1.pdf(Version 01, EB 39, Annex-7, date 16-May-2008)*

Period	Electricity Consumption ($EC_{PJ,j,y}$)	Emission factor for electricity generation for source j in year y ($EF_{EL,j,y}$)	Average technical transmission and distribution losses for providing electricity to project ($TDL_{j,y}$)	Project Emissions from electricity consumption within the project boundary
	MWh/year	tCO_2/MWh	%	tCO_2
25-Nov-2012 to 31-Dec-2012	158.85	1.3	20	248
01-Jan-2013 to 31-Dec-2013	1372.24	1.3	20	2141
01-Jan-2014 to 31-Dec-2014	1444.74	1.3	20	2254

Calculation of Project Emissions from electricity consumption within the project boundary:

Project Emissions from electricity consumption within the project boundary for the period 25-Nov-2012 to 31-Dec-2012=158.85MWh*1.3tCO_2/MWh* (1+20%) **= 248tCO_2**

Project Emissions from electricity consumption within the project boundary for the period 01-Jan-2013 to 31-Dec-2013=1372.24MWh*1.3tCO_2/MWh* (1+20%) = **2141tCO_2**

Project Emissions from electricity consumption within the project boundary for the period 01-Jan-2014 to 31-Dec-2014=1444.74MWh*1.3tCO_2/MWh* (1+20%) =**2254tCO_2**

- **Project emissions from coal consumption in the boiler for steam generation**

Referring to, "***Tool to calculate project or leakage CO_2 emission from fossil fuel combustion, version no. 2",*** the project emissions due to combustion of coal in boilers has been calculated as follows:

As per the tool, CO_2 emission from fossil fuel combustion are calculated based on quantity of fuels combusted and the CO_2 emission co-efficient of these fuels.

The applicable equation is:

$$PE_{FC,y} = \sum_i FC_{i,y} * COEF_{i,y}$$ _____Equation 3

Where:

$PE_{FF,y}$	tCO_2	Project emission due to fossil fuel consumption in the year y
$FC_{i,y}$	kt	Quantity of fossil fuel type i combusted by the project activity equipment during the year y
$COEF_{i,y}$	tCO_2/kt	CO_2 emission coefficient of fuel type i in the year y

As per the tool, the CO_2 emission coefficient can be calculated using one of the options, depending on the availability of data.

- Option A: Based on the chemical composition of the fossil fuel type i
- Option B: Based on the net calorific value and the CO_2 emission factor of the fuel type i.

Option A should be the preferred approach, if the necessary data is available.

In absence of available data to implement option A, option B has been used to calculate the CO_2 emission co-efficient as follows:

$$COEF_{i,y} = NCV_{i,y} * EF_{i,y}$$ _____Equation 4

Where:

$_dNCV_{i,y}$		(GJ/mass or volume unit)	Weighted average net calorific value of the fuel type i in year y
$EF_{i,y}$		tCO_2/GJ	weighted average CO_2 emission factor of fuel type i in year y
$COEF_{i,y}$		tCO_2/kt	CO_2 emission coefficient of fuel type i in the year y

For the project activity

Coal consumption for the period 25-Nov-2012 to 31-Dec-2012= 286 tonnes

Coal consumption for the period 01-Jan-2013 to 31-Dec-2013= 4545.01 tonnes

Coal consumption for the period 01-Jan-2014 to 31-Dec-2014= 4137.37 tonnes

Using equation 3 and equation 4

Period	Coal Consumption	Weighted average net calorific value of coal	Weighted average CO2 emission factor of coal	Project Emissions from Coal Consumption
	Tonnes	TJ/kt	tCO_2/TJ	tCO_2
25-Nov-2012 to 31-Dec-2012	286	26	100	744
01-Jan-2013 to 31-Dec-2013	4545.01	26	100	11,818
01-Jan-2014 to 31-Dec-2014	4137.37	26	100	10,758

Calculation of Project emissions from coal consumption in the boiler for steam generation

Project Emissions from coal consumption for the period 25-Nov-2012 to 31-Dec-2012= 286*26*10^-3*100=**744 tCO_2**
Project Emissions from coal consumption for the period 01-Jan-2013 to 31-Dec-2013= 4545.01*26*10^-3*100=**11,818 tCO_2**
Project Emissions from coal consumption for the period 01-Jan-2014 to 31-Dec-2014= 4137.37*26*10^-3*100=**10,758 tCO_2**

Total Project Emissions (PEy) for the monitoring period (25-November-2012 to 31-Dec-2014) has been tabulated below:

Period	Project Emissions from electricity consumption within the project boundary	Project Emissions from Coal Consumption	Total Project Emissions from the Project Activity
	tCO_2	tCO_2	tCO_2
25-Nov-2012 to 31-Dec-2012	248	744	992
01-Jan-2013 to 31-Dec-2013	2141	11,818	13,959
01-Jan-2014 to 31-Dec-2014	2254	10,758	13,012
Total for the monitoring period (25-Nov-2012 to 31-Dec-2014)			**27,963**

Project Emission (PE_y) for the monitoring period (25-Nov-2012 to 31-Dec-2014) = 27,963 tCO_2e

4.3 Leakage

Leakage emission sources relevant for this project are:

- **Leakage emissions due to raw material production**
- **Leakage emission due to raw material transportation**

- **Leakage emissions due to raw material production**

Leakage emission due to raw material production has been calculated based on the formula:

$$LE_{rm,prod,y} = RMC_{cement,y} * COEF_{cement} + RMC_{lime,y} * COEF_{lime} + RMC_{gypsum,y} * COEF_{gypsum} + RMC_{aluminium,y} * COEF_{aluminium}$$

Equation no. 5

Where:

$LE_{rm,prod,y}$	tCO_2	Leakage emission from raw material production in the year y
$RMC_{cement,y}$	kt	Quantity of cement consumed for producing AAC blocks in the year y
$COEF_{cement}$	tCO_2/kt	CO_2 emission factor of cement production
$RMC_{lime,y}$	kt	Quantity of lime consumed for producing AAC blocks in the year y
$COEF_{lime}$	tCO_2/kt	CO_2 emission factor of lime production
$RMC_{gypsum,y}$	kt	Quantity of gypsum consumed for producing AAC blocks in the year y
$COEF_{gypsum}$	tCO_2/kt	CO_2 emission factor of gypsum production
$RMC_{aluminium,y}$	kt	Quantity of aluminium powder consumed for producing AAC blocks in the year y
$COEF_{aluminium}$	tCO_2/kt	CO_2 emission factor of aluminium production

For the project activity:

Period	Freight Type	Raw Material consumed	Specific GHG Emissions	Leakage Emissions from Raw Material Production
25-Nov-2012 to 31-Dec-2012	**Raw Material**	**Tonnes**	**tCO_2/tonne of raw material**	**tCO_2**
	Cement	881.54	0.638	**563**
	Flyash	3753.60	0	**0**
	Lime	525.57	0.75	**395**
	Gypsum	81.46	0.01	**1**
	Al.Powder	2.99	1.7	**6**
01-Jan-2013 to 31-Dec-2013	**Cement**	14180.84	0.638	**9,048**
	Flyash	51058.62	0	**0**
	Lime	6563.73	0.75	**4,923**
	Gypsum	987.21	0.01	**10**
	Al. Powder	52.01	1.7	**89**
01-Jan-2014 to 31-Dec-2014	**Cement**	18632.35	0.638	**11,888**
	Flyash	90969.68	0	**0**
	Lime	9206.92	0.75	**6,906**
	Gypsum	939.58	0.01	**10**
	Al.Powder	76.44	1.7	**130**

Sample Leakage Emission Calculation (Raw Material Production) for the period 25-Nov-2012 to 31-Dec-2012

Using Equation 5

Leakage Emission calculation for Cement Production**=** 881.54*0.638=**563 tCO_2**
Leakage Emission calculation for Flyash Production**=** 3753.60*0**=0tCO_2**[25]
Leakage Emission calculation for Lime Production=525.57*0.75=**395tCO_2**
Leakage Emission calculation for Gypsum Production=81.46*0.01=**1tCO_2**
Leakage Emission calculation for Aluminium Production=2.99*1.7=**6tCO_2**

Note: The same calculation has been reproduced for the remainder of the monitoring period i.e. from 01-Jan-2013 to 31-Dec-2014

- **Leakage emissions due to raw material transportation**

Leakage emission due to raw material transportation has been calculated based on the formula

$$LE_{rm,trans,y} = \sum_{f} D_{f,y} * FR_{f,y} * EF_{CO2,f} * 10^{-6}$$ _____Equation no. 6

Where:

$LE_{rm,trans,y}$	tCO_2	Leakage emission from road transportation of freight in monitoring period m
$D_{f,y}$	km	Return trip road distance between the origin and destination of

[25] *Flyash being a byproduct of power plant hence no emissions can be attributed to the flyash production*

		freight transportation activity f in monitoring period m
$FR_{f,m}$	tonne	Total mass of freight transported in freight transportation activity f in monitoring period m
$EF_{CO2,f}$	gCO_2/t-km	Default CO_2 emission factor for freight transportation activity f
f		Freight transportation activities conducted in the project activity in monitoring period m

For the project activity

Period	Freight Type	Raw Material Transported	Total Roundtrip distance	Default CO_2 Emission Factor for Freight Transportation activity	Leakage Emissions from Raw Material Transportation
25-Nov-2012 to 31-Dec-2012	Raw Material	Tonnes	kms	gCO_2/t-km	tCO_2
	Cement	679.38	296	129	**26**
	Flyash	3767.60	60	129	**30**
	Lime	455.33	1946	129	**115**
	Gypsum	66.00	306	129	**3**
	Al.Powder	0.00	1672	129	**0**
01-Jan-2013 to 31-Dec-2013	Cement	15060.24	296	129	**576**
	Flyash	66275.31	60	129	**513**
	Lime	6522.36	1946	129	**1638**
	Gypsum	876.01	306	129	**35**
	Al. Powder	5050.15	1672	129	**1090**
01-Jan-2014 to 31-Dec-2014	Cement	19591.07	296	129	**749**
	Flyash	100669.46	60	129	**780**
	Lime	9101.41	1946	129	**2285**
	Gypsum	982.71	306	129	**39**
	Al.Powder	78.04	1672	129	**17**

Sample Leakage Emission Calculation (Raw Material Transportation) for the period 25-Nov-2012 to 31-Dec-2012

Using Equation 6

Leakage Emission calculation for Cement Transportation**=** 679*296*129*10^-6) =**26 tCO_2**
Leakage Emission calculation for Flyash Production**=** 3767.60*60*129*10^-6**=30tCO_2**[26]
Leakage Emission calculation for Lime Production=455.33*1946*129*10^-6=**115tCO_2**
Leakage Emission calculation for Gypsum Production=66*306*129*10^-6=**3tCO_2**
Leakage Emission calculation for Aluminium Production=0*1672*129*10^-6=**0tCO_2**

Note: The same calculation has been reproduced for the remainder of the monitoring period i.e. from 01-Jan-2013 to 31-Dec-2014

Total Leakage Emissions (LEy) for the monitoring period (25-November-2012 to 31-Dec-2014) has been tabulated below:

[26] *Flyash being a byproduct of power plant hence no emissions can be attributed to the flyash production*

Period	Leakage Emissions from Raw Material Production	Leakage Emissions from Raw Material Transportation	Total Leakage Emissions from the Project Activity
	tCO_2	tCO_2	tCO_2
25-Nov-2012 to 31-Dec-2012	965	174	1,139
01-Jan-2013 to 31-Dec-2013	14,070	3,852	17,922
01-Jan-2014 to 31-Dec-2014	18,934	3,870	22,804
Total for the monitoring period (25-Nov-2012 to 31-Dec-2014)			**41,865**

Leakage Emissions (LE_y) for the monitoring period (25-Nov-2012 to 31-Dec-2014) = 41,865 tCO_2e

4.4 Net GHG Emission Reductions and Removals

Period	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
25-Nov-2012 to 31-Dec-2012	**4,158**	**992**	**1,139**	**2,027**
01-Jan-2013 to 31-Dec-2013	**51,993**	**13,959**	**17,922**	**20,112**
01-Jan-2014 to 31-Dec-2014	**75,348**	**13,012**	**22,804**	**39,532**
Total	**131,499**	**27,963**	**41,865**	**61,671**

The estimated emission reductions for the monitoring period from 25/11/2012 to 31/12/2014 are 83,948 tCO_2e considering 767 days as per the registered PD. The actual emission reductions is 61,671 tCO_2e, which is 26.53% lower than the corresponding estimated emission reductions,

Year wise break up of Emission Reductions:

Period	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2012	**4,158**	**992**	**1,139**	**2,027**
2013	**51,993**	**13,959**	**17,922**	**20,112**

2014	**75,348**	**13,012**	**22,804**	**39,532**
Total	**131,499**	**27,963**	**41,865**	**61,671**

Vintage wise break up of Emission Reductions:

Period	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions or removals (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2012	**4,158**	**992**	**1,139**	**2,027**
Post 2012	**127,341**	**26,971**	**40,726**	**59,644**
Total	**131,499**	**27,963**	**41,865**	**61,671**