PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title	:	Energy Efficient AAC Block Manufacturing by Magicrete Building Solutions Pvt. Ltd (Navsari).
Version	:	1.0
PCN Date	:	30/06/2023
CoU Issuance Period	:	16 Years and 00 Months
Monitoring Duration	:	01/01/2013 to 31/12/2028

Universal Carbon Registry	**Project Concept Note (PCN)** **CARBON OFFSET UNIT (CoU) PROJECT**

BASIC INFORMATION	
Title of the project activity	Energy Efficient AAC Block Manufacturing by Magicrete Building Solutions Pvt. Ltd (Navsari).
Scale of the project activity	Small Scale
Completion date of the PCN	30/06/2023
Project participants	Creduce Technologies Private Limited (Project Aggregator) Magicrete Building Solutions Pvt. Ltd. (Project Owner)
Host Party	India
Applied methodologies and standardized baselines	Applied Baseline Methodology: AMS-III.Z.: "Fuel Switch, process improvement and energy efficiency in brick manufacture", Version 06.0
Sectoral scopes	04 Manufacturing industries
Estimated amount of total GHG emission reductions	To be estimated during monitoring [An ex-ante estimate is 13,745 CoUs per year]

SECTION A. Description of project activity

A.1 General description of Carbon offset Unit (CoU) project activity

Magicrete Building Solutions Pvt. Ltd. Is engaged in the production of high-quality grade I Aerated Autoclaved Concrete (herein after called as AAC) blocks as per IS 2185 Part 3 (Title : "CONCRETE MASONRY UNITS – AUTOCLAVED CELLULAR (AERATED) CONCRETE BLOCKS") and products. Magicrete is India's frontline producer of AAC blocks, wall panels, drymix Mortars & precast construction solutions, founded in 2008. Magicrete is a pioneer in green building materials, its vision is to help people build their homes better cheaper & faster by using innovative construction technologies. Magicrete has two state-of-the-art manufacturing facilities which are located at Navsari, near Surat on the Mumbai-Surat highway & in Jhajjar, Haryana near Gurgaon. Their plants are strategically located close to thermal power plants which ensure a smooth supply of raw materials. The plants are also within a 250 km radius of most urbanized regions of India like Delhi, Gurgaon in case of Jhajjar plant and Mumbai, Pune, Nasik, Surat, Vadodara, Bharuch, Ahmedabad in case of Navsari Plant.

The core of this technology is the AAC blocks composition and its chemistry, with fly ash from thermal plants mixed with Lime, Cement, Gypsum and Aluminium powder, which enable the blocks to acquire the mechanical properties required during the hydration and curing process without being sintered.

The main goal of this project is to create a high-quality walling material and a well-insulating building material by adopting an efficient, low-energy-intensive brick production process. This process aims to replace the use of high-energy-intensive methods like Clay Brick Bull's trench kilns (BTKs) and make a positive impact on energy consumption at both the brick production and building operation levels.

The project focuses on manufacturing Aerated Autoclaved Concrete (AAC) blocks, which offer numerous advantages. These blocks have impressive compressive strength, are lightweight, easy to construct, and economically viable for transportation. By employing this method as a substitute for traditional bricks produced in kilns, which are CO2-intensive, the project proponent aims to reduce greenhouse gas emissions. By adopting this low-carbon technology, the project contributes to decreasing emissions and promoting a cleaner environment.

While attaining the prime objective the project activity will also

a. Reduce GHG emissions associated to energy consumption (both fossil fuel and electricity) in the high energy intensive BTKs by an energy efficient brick making technology.

b. Reduce air pollution by introducing robust air treatment facilities in the project activity; the clay brick kiln technology is adopted by an unorganized sector with very poor air treatment facilities;

c. Enhance use of fly ash, an industrial -waste, as a major ingredient of building material.

Production process of AAC blocks does not involve sintering or kiln heating for blocks consolidation and thus eliminates the burning of fossil fuels as required in the clay brick production ultimately contributing to the reduction of greenhouse gas emissions. The estimated annual average and the total CO_2e emission reduction by the project activity over the crediting period of 9 years are expected to be1,23,705 tCO_2e.

These manufacturing processes of AAC require electricity and steam generation for operation. The consumption of such forms of energy electricity/fuel to generate steam is much lower compared to the thermal energy consumed for production of burnt clay bricks. Further AAC block technology needs cement and lime as process inputs, which are sources of emissions during their production.

The scenario existing prior to the implementation of the project activity and the baseline scenario:

This is a green field project. Prior to proposed project activity, there was no AAC block/brick manufacturing facility at the project location. The mostly the fly ash generated is dumped in the open and disposed of without using them at the thermal power station. In clay brick manufacturing, sintering process requires huge amount of thermal energy inputs, which is sourced majorly from the fossil fuel-coal combustion with a small quantum from combustion of biomass in the form of fuel wood. Production of AAC blocks and panels does not require any sintering process as the project activity eliminates the burning of fossil fuel as required in the clay brick production. So the amount of such energy, which is required in the project activity scenario, is much lower than the thermal energy required in clay brick manufacturing process. Therefore, the project activity enables total energy reduction and its associated GHG reduction due to change in brick production process. It may be worthwhile to note that there will be some emissions associated to production of raw materials (cement and lime) used in the project activity, which will be accounted for as leakages to project activity.

The spatial extent of project boundary is the NEWNE grid, manufacturing unit of the AAC and source of raw materials.

The date on which Factory license was issued is considered as the plant operation date or Commercial operation date.

Table -1- Details of the project activity is tabulated below;

Location	Magicrete Building Solutions Pvt. Ltd, Block No-188 B-190 192/1, 192/2, Post-Arak Tal-Jalalpore - 394315
Plant Capacity	30.000 m^3 per month
Autoclave	16 nos., Designed Pressure – 16 bar
DG Sets	2 nos; 400 kVA and 320 kVA
Boiler	Tag - GT 6391 Capacity - 8TPH Operating Pressure – 15 kg/cm^2 Operating Temperature 195 °C to 198 °C.
Operating days in a year	365
Raw Material	Flyash, Lime, Cement, POP, Aluminum
Standard Size of AAC Block	15 cm x 15 cm x 15 cm

Compressive Strength (MPa)	4.24
Density (kg/m^3)	550-600
Thermal Conductivity (W/m k)	0.20
Start Date of Project	05/10/2009

Dosing & Mixing of Raw Materials

Preparation of mould

Wire Cutting of processed semi-solid Mixture

Steam Curing Process (Autoclave Reactor)

Finished Product ready to be dispatched to the construction site

Figure-1- Photos of the project activity

A.2 Project's Contribution to Sustainable Development

India primarily uses coal to manufacture its brick, as this is the most common practice in the Indian sub-continent. Fixed Chimney Bull's Trench Kiln (FCBTK), Vertical Shaft Brick Kiln (VSBK), Zig-zag and Clamp are the most common practice to produce brick. GHG emission from coal burning has a major role in polluting environment. The traditional bricks are the main building materials that are used extensively in the construction and building industries in India. Due to the rapid urbanization and expanding interest for development materials, block furnaces have quickly developed which have legitimately or in a roundabout way caused a progression of ecological and medical issues.

Table-2- Comparison of baseline technologies[a]

Kiln Type	Region	Contribution	Fuel Used	Process
Fixed Chimney Bull's Trench Kiln (FCBTK)	Indo-Gangetic plains (North and East India) and several clusters in South and West India	More than 70%	Coal, wood logs, Biomass (Rice Husk, Bagasse), used rubber tyres	Sun-drying and manual moulding

a - http://dx.doi.org/10.17485/ijst/2017/v10i16/112396

Zig-zag	West Bengal, a few clusters in North India (Varanasi)	3-4%	Mixture of two types of coal (Mixture of high volatile and high calorific value and low volatile and medium calorific value)	Sun-drying and manual moulding
Vertical Shaft Brick Kiln (VSBK)	East and central India	>1%	Coal (Two types): Steam coal and Coal Slurry	Sun-drying and manual moulding
Clamp	Southern, west and central India	25%	Coal	Sun-drying and manual moulding

Magicrete is using the Aereated Autoclave Concrete technology for creating Concrete blocks, which is used as an alternative to the traditional red clay burnt bricks. AAC block is already very popular in the developed countries like Europe , Canada, U.S.A. etc. Raw content used for AAC manufacturing is a mixture of cement, fly ash, sand, water, lime and aluminum powder. AAC blocks are a result of productive use of recycled industrial waste i.e., fly ash from thermal power plant, hence this material can be classified as a sustainable building material.

This activity leads to reduction of coal consumption. In India use of coal in brick manufacturing is common practice, high usage of coal in brick manufacturing leads in shortage of coal for other industrial activity. It puts a lot of pressure on the nation to provide coal to meet its demand. This technology, if effectively utilized, could reduce environmental burden from fossil fuels and can help to achieve sustainable living standard.

With regards to ESG credentials:

At present specific ESG credentials have not been evaluated, however, the project essentially contributes to various indicators which can be considered under ESG credentials. Some of the examples are as follows:

Under Environment:

The following environmental benefits are derived from the utilization of AAC block technology:

- Reduction of energy resources consumption: this technology is more efficient in terms of energy consumption as compared to traditional bricks; this helps to ease some pressure on the already stressed resource management.
- Reduction of fossil fuels consumption: Red clay brick manufacturing process uses coal as main source for its production. By replacing red clay brick with AAC block, consumption of fossil fuels for building material manufacturing will be avoided, thus contributing to GHG emission reductions.

- Using waste material from other industries as raw material: Raw material for this project activity are waste material or by-products of other industries. Fly ash generated in thermal power plants causes several disposal-related problems, which can be avoided by using the waste material (fly ash) as the main raw material in the manufacturing process.
- Reduction of resources consumption: Using of fly ash as the main ingredient in block manufacturing process, provides an alternative for red clay brick. This step will contribute to saving in natural resources namely land, water, coal and limestone.

Under Social:

The social well-being is assessed by contribution to improvement in living standards of the local community. The implementation of the project activity would provide job opportunities to the local community; contribute in poverty alleviation of the local community and development of basic amenities to community, leading to improvement in living standards of the community.

Under Governance:

Governance criteria relates to overall operational practices and accounting procedure of the organization. With respect to this project activity, the PP practices a good governance practice with transparency, accountability and adherence to local and national rules & regulations etc. This can be further referred from the company’s annual report. The energy generated from the project can be accurately monitored, recorded and further verified under the existing management practice of the company. Thus, the project and the proponent ensure good credentials under ESG.

A.3 Do no harm or Impact test of the project activity

The project activity uses energy efficient technology for production of grade I blocks compared to red bricks. The AAC block is comparatively less carbon extensive as compared to red brick manufacturing process, thus net GHG emission to the environment is less severe. It has been envisaged that the project shall contribute to sustainable development using the following ways:

Social well-being: The project would help in generating direct and indirect employment benefits at plant site. Improvement of air quality in the nearby region: With the avoidance of fossil fuel combustion in the proposed project activity, the exhaust gas emissions and direct air pollution is being substantially reduced in the neighbouring region.

Economic well-being: Reduction of dependence from fossil fuels: The project activity reduces to the maximum the dependence of the brick manufacturing process from fossil fuels. This reduces the overall dependence of the whole region from the imports and availability of fossil fuels, thereby allowing other industries to use energy resources.

Technological well-being:

Benefits of using this technology is mentioned below:

- This process is energy efficient
- Lower energy consumption per cum for production process
- AAC blocks are better heat insulation properties
- This process is comparatively non-toxic and environment friendly
- AAC blocks are fire resistant

- Sound absorbent
- No waste of raw material
- AAC blocks are less reactive to natural climate conditions as compared to traditional bricks

Environmental well-being: The project activity utilizes fly ash, which is major waste material from thermal power plants and causes many risks if not disposed properly. The project activity will cause comparatively less air pollution, water pollution or solid waste to the environment which otherwise would have been generated if the traditional technology was used for brick manufacturing. Project activity helps in reduction of fossil fuel combustion, thus helping in keeping environment clean. Also, by using fly ash as the main ingredient for block production it helps reduce the environmental hazard caused due to improper disposal of fly ash and other thermal plant waste products, which are labeled as hazardous substance if not disposed properly. This substance if mixed with water bodies contaminate water and make it harmful for use.

SDG Goals	Description
13 CLIMATE ACTION	• The manufacturing processes of AAC blocks require electricity and steam generation for operation. • The consumption of such forms of energy (electricity/fuel) to generate steam is much lower compared to the thermal energy consumed for the production of burnt clay bricks and hence displaces the carbon-intensive coal/fuel oils. • The project activity will cause comparatively less air pollution, water pollution or solid waste to the environment which otherwise would have been generated if the traditional technology was used for brick manufacturing. Project activity helps in reduction of fossil fuel combustion, thus helping in keeping environment clean. Also, by using fly ash as the main ingredient for block production it helps reduce the environmental hazard caused due to improper disposal of fly ash and other thermal plant waste products, which are labeled as hazardous substance if not disposed properly.
8 DECENT WORK AND ECONOMIC GROWTH	• Since the proposed project activity is a green field project it has created employment opportunities for skilled-unskilled people in the entire project area.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	• Enhancement of the use of green building material: The following are the ecological green building quality and characteristics of AAC blocks: • Energy efficient • Lower energy consumption per cum in production process • Best thermal insulation, 6 to 10 times better than regular concrete • Un-suppressed fire resistance • Excellent sound absorption • No waste of raw materials
11 SUSTAINABLE CITIES AND COMMUNITIES	• Reduction of dependence from fossil fuels: The project activity reduces to the maximum the dependence of the brick manufacturing process from fossil fuels. • This reduces the overall dependence of the whole region from the imports and availability of fossil fuels, thereby allowing other industries to use energy resources.
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	• Reduction of energy resources consumption: Since there is no sintering or cooking in the project activity, this technology is more efficient in terms of energy consumption and results in lower energy consumption than the clay brick manufacturing. • Utilisation of a waste materials from other industries as raw materials: The raw materials used in the project activity are mostly (to the extent of 65-70%) waste materials or by products from other industries. • Reduction of resources consumption: fly ash utilisation in the proposed project activity will contribute to savings in natural resources, mainly the land (and top soil), water, coal and limestone. • The utilisation of fly ash in the manufacture of building blocks, as in the proposed project activity, releases considerable amounts of land. Also, water saved due to reduced fly ash disposal from thermal power plants. • Reduction of waste generation in the manufacturing process: No waste material is generated in the manufacturing process of

	AAC blocks. On the contrary, waste materials from other industries are used but no wastes are generated.

Location of project activity

Country	**:**	India
State	:	Gujarat
District	:	Navsari
Coordinates	:	21°02'38.6"N 72°59'10.5"E

The representative location map is shown below

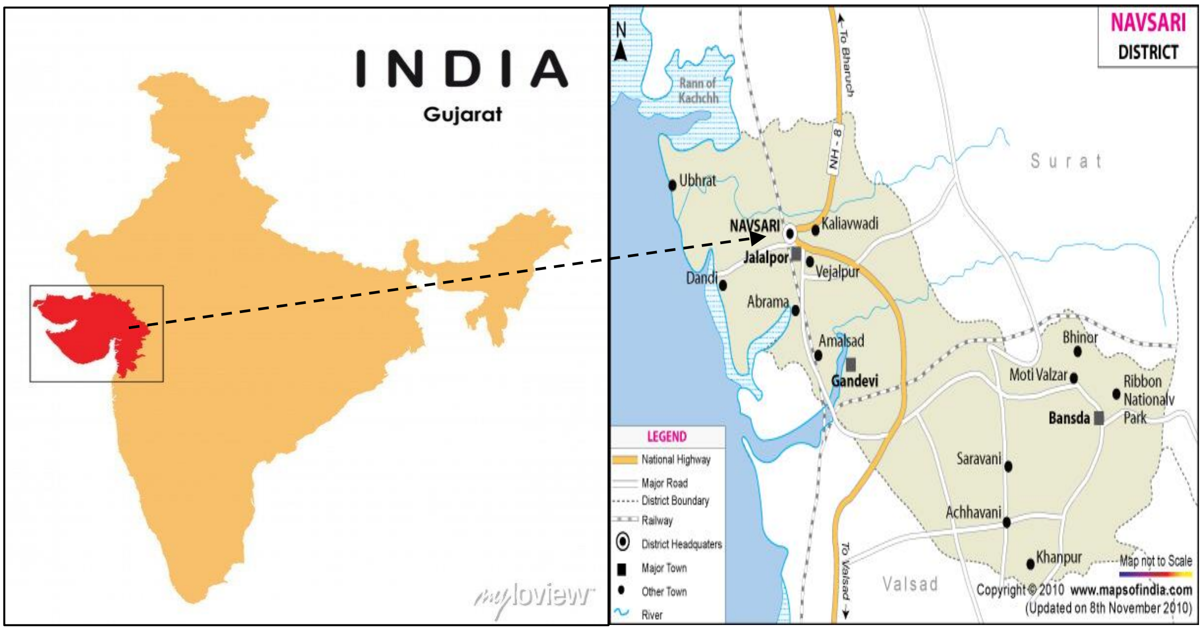


Figure-2- Location of the project activity (courtesy: google images and www.mapofindia.com)

A.4 Technologies/measures

AAC is a mixture of cement, fly ash, sand, water, limestone and aluminum powder. When the materials are proportionally weighed. AAC is using no aggregate larger than sand. Here, Aluminium powder reacts with calcium hydroxide and water to form H_2. The hydrogen gas foams and doubles the volume of the raw mix creating gas bubbles. At the end of the foaming process, the hydrogen escapes into the atmosphere and is replaced by air. When the air is removed from the material, it is solid but still soft. It is then cut into blocks and placed in a cylindrical chamber for 11-12 hours. During this steam pressure hardening process, when the temperature reaches 190° C (374° F) and the pressure reaches to a maximum limit of 12 bar, sand reacts with calcium hydroxide to form calcium silicate hydrate, which gives AAC its high strength and light weight properties, solid but soft in nature.

A.5 Parties and project participants

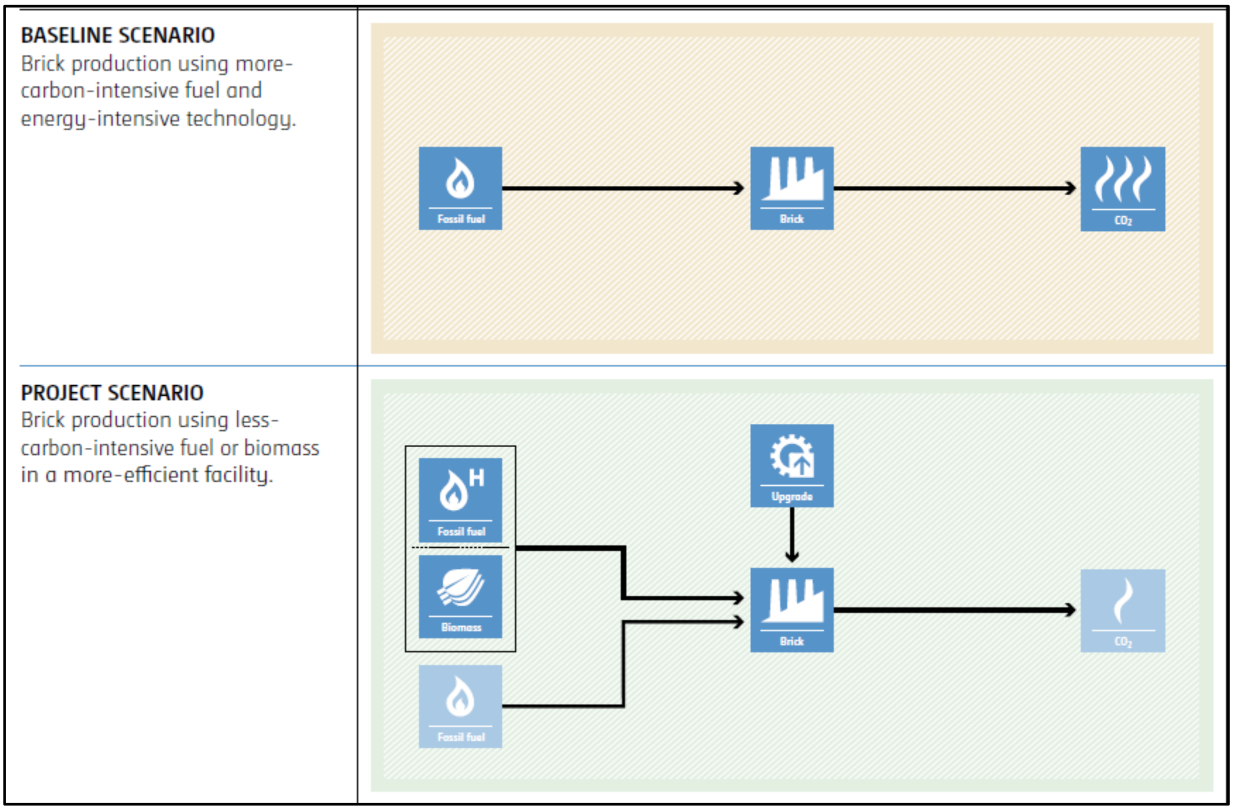
Party (Host)	Participants

India	**Creduce Technologies Private Limited (Aggregator)** **Contact person** : Shailendra Singh Rao **Mobile** : +91 9016850742, 9601378723 **Address** : 2-O-13,14 Housing Board Colony, Banswara, Rajasthan -327001, India **Magicrete Building Solutions Pvt. Ltd. (Project Owner)** Address: Unit No. 401, 4th Floor, Sunil Enclave, Pereira Hill Road, Andheri Kurla Road, Andheri East, Mumbai-400099, Maharashtra, India. Email : info@magicrete.in

A.6 Baseline Emissions

Baseline Scenario:

As per paragraph 20 of the approved consolidated methodology AMS-III.Z. Version 06.0, The baseline scenario identified at the PCN stage of the project activity is:



"The average annual baseline fossil fuel consumption value and the baseline brick production rate shall be determined as that which would have been consumed and produced, respectively, under an appropriate baseline scenario. If the baseline scenario identification as per paragraph 5 above results in more than one alternative technologies with different levels of energy consumption, the alternative with the least emissions intensity should be chosen for determining the baseline emissions of the facility. Schematic diagram below shows the baseline scenario and project scenario".

A.7 De-bundling

This project activity is not a de-bundled component of a larger project activity.

SECTION B. Application of methodologies and standardized baselines

B.1 References to methodologies and standardized baselines

Sectoral scope	:	04, Manufacturing industries
Type	:	III – other projects
Category	:	AMS-III.Z.. (Title: “Fuel Switch, process improvement and energy efficiency in brick manufacture”, Version 06.0)

B.2 Applicability of methodologies and standardized baselines

The project activity involves installation of a new technology for brick/block manufacturing which is not a traditional activity in India. This activity leads to reduction of burning of coal, which is a major contributor in Green House Gas (GHG) emission in the environment.

The project activity produces average 3,10,00 m^3 of AAC blocks. The emission reduction is below 60,000 tCO_2e and it will qualify as small-scale project activity under Type-III of the Small-Scale methodology. The project status is corresponding to the methodology AMS-III.Z., Version 06.0 and applicability of methodology is discussed below:

Applicability Criterion	Project Case
1. The measures may replace, modify, retrofit or add capacity to systems in existing facilities or be installed in a new facility.	The project activity is a green field project and no modification, retrofit or capacity addition was done. So, this criterion does not apply to this project activity.

2. The methodology is applicable for the production of: a. Bricks that are the same in the project and baseline cases; or b. Bricks that are different in the project case versus the baseline case due to a change(s) in raw materials, use of different additives, and/or production process changes resulting in reduced use or avoidance of fossil fuels for forming, sintering (firing) or drying or other applications in the facility as long as it can be demonstrated that the service level of the project brick is comparable to that of the baseline brick (see paragraph 11). Examples include pressed mud blocks (soil blocks) with cement or lime stabilization5 and other 'unburned' bricks that attain strength due to fly ash, lime/cement and gypsum chemistry.	Since this project activity uses completely different raw material and technology for the manufacturing of blocks, Criteria (b) of point 2 applies here.
3. New facilities (Greenfield projects) and project activities involving capacity additions are only eligible if they comply with the requirements for Greenfield projects and capacity increase projects specified in the "General guidelines for SSC CDM methodologies".	This is greenfield project activity complies with the requirements for greenfield project and capacity increase projects specified in the "General guidelines for SSC CDM methodologies".
4. The requirements concerning the demonstration of the remaining lifetime of the replaced equipment shall be met as described in the "General guidelines for SSC CDM methodologies". If the remaining lifetime of the affected systems increases due to the project activity, the crediting period shall be limited to the estimated remaining lifetime, i.e. the time when the affected systems would have been replaced in the absence of the project activity	No replacement of old equipment is done, so this criterion does not apply to the project activity.
5. For existing facilities, it shall be demonstrated, with historical data, that for at least three years immediately prior to the start date of the project implementation, only fossil fuels or NRB (non-renewable biomass) were used in the brick production systems that are being modified or retrofitted. In cases where small quantities of renewable biomass were used for experimental purposes this can be excluded.).	This is a Greenfield project activity, so this criterion does not apply.

6. The renewable biomass utilized by the project activity shall not be chemically processed (e.g. esterification to produce biodiesel, degumming and/or neutralization by chemical reagents) prior to the combustion but it may be processed mechanically (e.g. pressing, filtering) and/or thermally (e.g. gasification to produce syngas).	This criterion is not applicable as there was no biomass utilized by the project activity.
7. In cases where the project activity utilizes charcoal produced from renewable biomass as fuel, the methodology is applicable provided that: (a) Charcoal is produced in kilns equipped with a methane recovery and destruction facility; or (b) If charcoal is produced in kilns not equipped with a methane recovery and destruction facility, methane emissions from the production of charcoal shall be considered. A default value of 0.030 t CH4/t charcoal may be used in accordance with "AMS-III.BG.: Emission reduction through sustainable charcoal production and consumption"; (c) If charcoal is produced from other CDM project activities, it shall be ensured that no double counting of the emission reductions occurs.	The project activity utilizes the charcoal and it is of negligible quantity compared to coal used in the boiler hence this criterion is not applicable however methane emission generated from the combustion of charcoal is included in the project emission.

8. In the case of project activities involving changes in raw materials (including additives), it shall be demonstrated that additive materials are abundant in the country/region, according to the following procedures: (a) Step 1: using relevant literature and/or interviews with experts, a list of raw materials to be utilized is prepared based on the historic and/or present consumption of such raw materials; (b) Step 2: the current supply situation for each type of raw material to be utilized is assessed and their surplus availability is demonstrated using one of the approaches below: (i) Approach 1: demonstrate that the raw materials to be utilized, in the region of the project activity, are not fully utilized. For this purpose, demonstrate that the quantity of material is at least 25 per cent greater than the demand for such materials or the availability of alternative materials for at least one year prior to the project implementation; (ii) Approach 2: demonstrate that suppliers of the raw materials to be utilized, in the region of the project activity, are not able to sell all of their supply of these materials. For this purpose, project participants shall demonstrate that a representative sample of suppliers of the raw materials to be utilized, in the region, had a surplus of materials (e.g., at the end of the period during which the raw material is sold) that they could not sell and that is not utilized.	The project activity"s raw material requirements include Fly-ash, Lime, Gypsum, Cement and Aluminium. Fly ash is a waste product, gypsum is a by-product but used in very small quantities, whereas lime, cement and Aluminium are industrial products. The project activity uses around 70 wt.% of the fly ash. Being a byproduct of coal-based thermal power plants with annual generation of millions of tons, fly ash is abundantly available within a feasible distance from the plant. Step 2/Approach 1: As per the "REPORT ON FLY ASH GENERATION AT COAL / LIGNITE BASED THERMAL POWER STATIONS AND ITS UTILIZATION IN THE COUNTRY FOR THE YEAR 2021 – 22" (https://cea.nic.in/wp-content/uploads/tcd/2022/08/Fly_ash_Generation_and_utilisation_Report_2021_22-1.pdf) page 54, TABLE-XIX shows that in the year 2007-08 (one year prior to the project implementation) around 117 million tons of fly ash generated and only 53% were utilized. Thus, it may be concluded that fly ash is available in abundance and the project activity meets the applicability criterion.

<table>
<tr>
<td>9. This methodology is applicable under the following conditions:

(a) The service level of project brick shall be comparable to or better than the baseline brick, i.e., the bricks produced in the brick production facility during the crediting period shall meet or exceed the performance level of the baseline bricks (in terms of, for example dry compressive strength, wet compressive strength, density). An appropriate national standard shall be used to identify the strength class of the bricks; bricks that have compressive strengths lower than the lowest class bricks in the standard are not eligible under this methodology. Project bricks are tested in nationally approved laboratories at six-month intervals (at a minimum) and test certificates on compressive strength are made available for verification;

(b) The existing facilities involving modification and/or replacement shall not influence the production capacity beyond ±10 per cent of the baseline capacity unless it is demonstrated that the baseline for the added capacity is the same as that for the existing capacity in accordance with paragraph 5 above;

(c) Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO2 equivalent annually.</td>
<td>Since the AAC blocks are better than traditional red clay bricks (as shown above) and measures of CO_2 emission reduction is less than 60kt CO_2 and as no capacity addition is done to the plant and this a greenfield project.

<table>
<tr><th>Parameter</th><th>Baseline[b]</th><th>Project</th></tr>
<tr><td>Density (kg/m^3)</td><td>1600-1800</td><td>604</td></tr>
<tr><td>Dry Compressive Strength(Mpa)</td><td>3.5</td><td>4.26</td></tr>
</table>

(b- https://doi.org/10.1016/j.matpr.2021.06.061)

Therefore, only point (a) and point (c) are applicable to this criterion.

The project activity is not a replacement or retrofit to an existing facility. The project activity is being implemented as a new facility (Greenfield project). Thus, the criterion (b) is not applicable.</td>
</tr>
<tr>
<td>10. This methodology is not applicable if local regulations require the use of the proposed technologies or raw materials for the manufacturing of bricks unless widespread non-compliance (i.e., less than 50 per cent of brick production activities in the country comply) of the local regulation evidenced.</td>
<td>There are no such regulations which make it mandatory for the use of this technology in the region and Project proponent use this technology voluntary, therefor this criterion does not apply to the project activity.</td>
</tr>
</table>

11. In cases where the project activity utilizes biomass sourced from dedicated plantations, applicability conditions prescribed in the tool "Project emissions from cultivation of biomass" shall apply. If the project activity involves reducing the NRB consumption, project participants shall demonstrate that NRB has been used in the project region since 31 December 1989, using survey methods or referring to published literature, official reports or statistics.	This criterion is not applicable.
12. The following cases are exempted from 'determining the occurrence of debundling' as per the "Guidelines on assessment of debundling for SSC project activities": (a) Project activities that aggregate brick units with holistic production cycles i.e., from raw material procurement to finished product, where each unit is not larger than 5 per cent of the Type III small-scale CDM project activity thresholds i.e. 3,000 t CO2e; or (b) Project activities that aggregate brick units, where each unit qualifies as Type III microscale CDM project activity and the geographic location of the project activity is a least developed countries/small island developing states (LDC)/(SIDS) or special underdeveloped zone (SUZ) of the host country as identified by the government in accordance with the guideline on "Demonstrating additionality of microscale project activities".	This criterion is not applicable.

B.3 Applicability of double counting emission reductions

There is no double accounting of emission reductions in the project activity as the project is uniquely identifiable based on its location coordinates and it was not registered previously on other registry.

B.4 Project boundary, sources and greenhouse gases (GHGs)

The project boundary is the physical, geographical site where the brick production takes place during both the baseline and crediting periods, NEWNE grid and source of raw materials.

Table-3- Project and baseline emission

Source		Gas	Included?	Justification/Explanation
Baseline	Fossil fuel combustion in	CO_2	Yes	Main source of emission
		CH_4	No	Not considered which is conservative

Source		Gas	Included?	Justification/Explanation
	red clay brick kiln	N_2O	No	Not considered which is conservative
Project	Electricity consumption for operating plant machinery	CO_2	Yes	Main source of emission
		CH_4	Yes	Minor source of emission
		N_2O	No	Neglected for simplicity
Leakage	GHG emissions during raw material production	CO_2	Yes	Main source of emission
		CH_4	No	Neglected for simplicity
		N_2O	No	Neglected for simplicity
	GHG emissions during raw material transportation	CO_2	Yes	Main source of emission
		CH_4	No	Neglected for simplicity
		N_2O	No	Neglected for simplicity

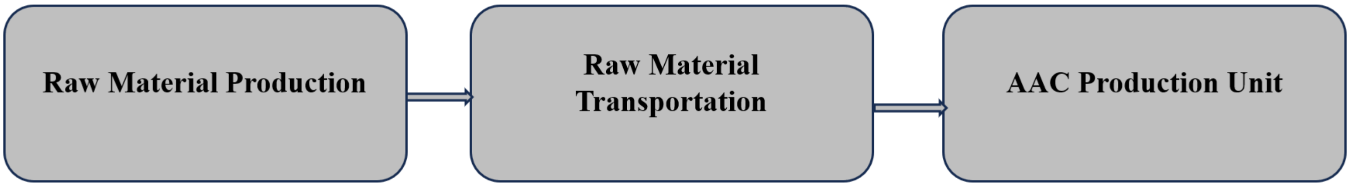


Figure -3 - Project Boundary

B.5 Establishment and description of baseline scenario

The Simplified baseline is the fuel consumption of the technologies that would have been used in the absence of the project activity times an emission factor for the fossil fuel displaced by process improvement and energy efficiency in brick manufacture.

B.5.1 Baseline Emissions

a) Baseline emissions for Fuel Switch, process improvement and energy efficiency in brick manufacture is calculated as below

The baseline emissions are the fossil fuel and NRB consumption related emissions associated with the system(s), which were or would have otherwise been used, in the brick production facility(ies) in the absence of the project activity:

$BE_y = SEC_{BL} \times EF_{BL} \times P_{PJ,y}$ **Equation (1)**

Where:

BE_y	=	The annual baseline emissions from fossil fuels or NRB displacedby the project activity in t CO_2e in year *y* (of the crediting period)
SEC_{BL}	=	Specific energy consumption of brick production in the baseline, TJ per unit volume or mass unit (kg or m^3)
EF_{BL}	=	The emission factor of baseline fuel(s), in t CO_2/TJ
$P_{PJ,y}$	=	The annual net production of the facility in year *y*, in kg or m^3

The specific energy consumption (SEC_{BL}) and the emission factor of the baseline fuel(s) (EF_{BL}) shall be calculated ex-ante for project activities that involve replacing, modifying or retrofitting systems in existing facilities as follows:

$$EF_{BL} = \frac{\sum_{j,i}\left(FC_{BL,i,j} \times NCV_j \times EF_{CO_2,j}\right)}{\sum_{j,i}\left(FC_{BL,i,j} \times NCV_j\right)}$$ **Equation (2)**

$$SEC_{BL} = \frac{\sum_{j,i}\left(FC_{BL,i,j} \times NCV_j\right)}{P_{Hy}}$$ **Equation (3)**

Where:

$FC_{BL,i,j}$	=	Average annual baseline fossil fuel or NRB consumption value for fuel type j combusted in the process i, using volume or weight units7 (kg or m3). In the case of NRB, it is determined by the total woody biomass consumption multiplied with the fraction of the NRB (fNRB)8.
NCV_j	=	Average net calorific value of fuel type j combusted, TJ per unit volume or mass unit (kg or m3). In the case of NRB, the IPCC default for wood fuel, 1.5x10-5 TJ/kg based on the gross weight of the wood that is 'air-dried', shall be used.
$EFCO_{2,j}$	=	CO_2 emission factor of fuel type j combusted in the process i in t CO_2/TJ. In the case of NRB, a default value of 81.6 t CO2/TJ is used, i.e. the emission factor for the fossil fuels projected to be used for substitution of NRB by similar consumers.
PH_y	=	Average annual historical baseline brick production rate in accordance with paragraph 19(a), in units of weight or volume, kg or m^3.

From the literature (https://doi.org/10.1016/j.enbuild.2014.10.042), the embodied energy associated with the fire brick is estimated at around 2.2 MJ/kg and considering the conservative density of 1600 kg/m^3 and coal emission factor of 96.1 tCO_2e/TJ, the emission factor of baseline brick is ;

$= 2.2 \times 1600 \times 10^{-6} \times 96.1$

$= 0.338272$ tCO_2e/m^3

Estimated annual baseline emission (BE) reductions BE_y = 3,10, 891 m^3 x 0.338272 tCO_2e/m^3

= 1,05,165 tCO_2e

B.5.2 Project Emissions

Project emissions shall be calculated using the following equation:

$$PE_y = PE_{elec,y} + PE_{fuel,y} + PE_{cultivation,y} + PE_{CH4,y}$$ **Equation (4)**

Where:

PE_y	=	Project emissions in year *y* (tCO_2e)
$PE_{elec,y}$	=	Project emissions due to electricity consumption in year *y* (tCO_2e)
$PE_{fuel,y}$	=	Project emissions due to fossil fuel or NRB consumption in year *y* (tCO_2e)
$PE_{cultivation,y}$	=	Project emissions from cultivation of biomass in a dedicated plantation in year *y* (tCO_2e)
$PE_{CH4,y}$	=	Project emissions due to the production of charcoal in kilns not equipped with a methane recovery and destruction facility in year *y* (tCO_2e)

Project emission for this activity can we calculated by calculating following steps.

a) Emissions from electricity consumption ($PE_{elec,y}$)

The emissions include electricity consumption (including auxiliary use) $PE_{elec,y}$ associated with the biomass treatment and processing, calculated as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".

Here the electricity is drawn from the national grid.

For the calculation of ex-ante ***PE**elec,* **recent 3 years average value is considered.**

$PE_{elec,y}$ = 2052.65 MWh x 0.9 tCO_2e/MWh = 1847 tCO_2e

b) Emissions from fossil fuel consumption ($PE_{fuel,y}$)

The emissions include fossil fuel or NRB consumption (including auxiliary use) $PE_{fuel,y}$ associated with the operation of the manufacturing process and the biomass treatment and processing. In the case of fossil fuels, it is calculated as per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion". In the case of NRB, it is calculated by multiplying the quantity of NRB consumption during the project with its NCV and EF, which are the same as in Equation (2) above.

The project activity operates coal-based boiler for the production of steam and consists of two DG sets of capacity 320 and 400 kVA.

Fossil Fuel	Average Ton	CV (MJ/kg)	TJ	EF	Unit	PE Fuel
Charcoal	3	29.5	0.0885	117.6	tCO_2/TJ	10.4076
Furnace Oil	100	40.4	4.04	77.4	tCO_2/TJ	312.696
Lignite	10449	11.9	124.3431	101	tCO_2/TJ	12558.653
Pet Coke	2286	32.5	74.295	97.5	tCO_2/TJ	7243.7625
Diesel	121	43	5.203	74.1	tCO_2/TJ	385.5423
					Total $\mathbf{PE_{fuel,y}}$	20511

c) Emissions associated with biomass and biomass residues cultivation ($PE_{cultivation,y}$)

In cases where the project activity utilizes biomass sourced from dedicated plantations, the project emissions from biomass cultivation shall be calculated according to the methodological tool “Project and leakage emissions from biomass”.

The project activity does not use biomass and hence $PE_{cultivation,y}$ = 0

d) Emissions from burning of charcoal ($PE_{CH4,y}$)

The methane emission associated with the burning of charcoal is already included in the project emission in tCO_2e

$PE_y = 1847 + 20511 = 22358$ tCO_2e

B.5.3 Leakage Emission

In the case of project activities involving a change in the production process or a change in the type or quantity of raw and/or additive materials as compared to the baseline, the incremental emissions associated with the production/consumption and transport of those raw and/or additive materials consumed as compared to baseline, shall be calculated as leakage.

As per the methodology, the project activity entails two types of leakage due to changes in the production process which leads to changes in the type and quantity of raw and/or additive materials as compared to the baseline

Emissions associated with the consumption of raw and/or additive materials.

Emissions associated with the transportation of raw and/or additive materials.

$LE_y = LE_{rm,prod,y} + LE_{TR,m}$

Where,

LEy: Leakage emissions associated with consumption and transport of raw and/or additive materials in the year y.

$LE_{rm,prod,y}$: Leakage emissions associated with consumption of raw and/or additive materials in the year y

$LE_{TR,m}$: Leakage emission associated with transportation of raw and/or additive materials in the year y

Leakage emission associated with consumption of raw and/or additive materials:

Aluminum Powder & Gypsum are used to produce AAC block in very lower amounts. In this project cement and lime are two major inputs with significant emissions during their production; the fraction of the contribution of Aluminum Powder & Gypsum in per Cum AAC Block production is very lower. However the Leakage due to the Aluminum Powder production has been considered as a conservative approach

$LE_{rm,prod,y} = Q_{cement,y} \times EF_{cement} + Q_{lime,y} \times EF_{lime} + Q_{Aluminium,y} \times EF_{Aluminium}$

Where,

$LE_{rm,prod,y}$ = Leakage emissions associated with consumption of raw and/or additive materials in the year y

$Q_{cement,y}$ = Quantity of cement consumed for the production of AAC blocks/panels in the year y

EF_{cement} = CO_2 emission factor of the cement production

$Q_{lime,y}$ = Quantity of lime consumed for the production of AAC blocks/panels in the year y

EF_{lime} = CO_2 emission factor of the lime production

$Q_{Aluminium,y}$ = Quantity of Aluminium Powder consumed for the production of AAC blocks/panels in the year y.

$EF_{Aluminium}$ = CO_2 emission factor of the Aluminium production.

Raw Material	Amount(ton)	EF	Unit	PE
Aluminium Powder	220	1.89	tCO_2/ton	415.8
Cement	36913	0.67	tCO_2/ton	24731.71
Lime	32272	0.75	tCO_2/ton	24204
Gypsum	18	0.01	tCO_2/ton	0.18
POP	1793	0.05	tCO_2/ton	89.65
Ash	283489	0	tCO_2/ton	0
			$LE_{rm,prod,y}$	49441

Leakage emission due to raw material transportation:

As per the methodological tool “Project and leakage emissions from the road transportation of freight” Version 01 the emissions due to the raw material transportation can be calculated as below:

$LE_{TR,m} = \Sigma D_{fm} \times FR_{f,m} \times EF_{CO2,f} \times 10^{-6}$

Where,

$LE_{TR,m}$ = Leakage emission from road transportation of freight monitoring period m (tCO_2)

D_{fm} = Return trip road distance between the origin and destination of freight transportation activity f in monitoring period m (km)

$FR_{f,m}$ = Total mass of freight transported in freight transportation activity f in monitoring period m (t)

$EF_{CO2,f}$ = Default CO2 emission factor for freight transportation activity f (gCO_2 / t km)

For the calculation of the leakage emission, the farthest supplier is the conservative choice for determining the round trip distance.

Material	Amount (ton)	Distance (km)	EF (gCO_2/t km)	LE (tCO_2)
Aluminium	220	1698	129	48.18924
Ash	283489	156.8	129	5734.189
lime	32272	1648	129	6860.769
Cement	36913	1374	129	6542.682
POP & Gypsum	1815	1990	129	465.9287
			$LE_{TR,m}$	19651

LE_y = 49411 + 19651 = 69062 tCO_2e

B.5.4 Emission reductions

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y	=	Emission reductions in year y (t CO_2e)
BE_y	=	Baseline emissions in year y (tCO_2e)
PE_y	=	Project emissions in year y (tCO_2e)
LE_y	=	Leakage emissions in year y (tCO_2e)

ER_y = 105165-22358-69062 =13,745 tCO_2e

Thus, as per the ex-ante calculations the project will displace heat generation from coal consumption leading to an emission reduction of 13,745 tCO_2e equivalent every year. In the absence of the proposed project activity, the steam demand would have been supplied to the processing plants by the coal-based boiler.

B.6 Prior History

The project activity is a small-scale was not applied under any other GHG mechanism prior to this registration with UCR. Also, the project has not been applied for any other environmental crediting or certification mechanism. Hence project will not cause double accounting of carbon credits (i.e., CoUs).

B.7 Changes to start date of crediting period

The start date of crediting under UCR is 01/01/2013. Monitoring period number and duration

First Monitoring Period: 16 Years and 00 Months

01/01/2013 to 31/12/2028 (inclusive of both dates)

B.8 Monitoring plan

Tests will be conducted to validate that the project bricks meet the performance requirements and specifications in line with the following sampling plan which includes the following information:

To validate that the level of the manufactured product is better than that of the baseline product, PP will check the lab testing report having the mean value of the dry compressive strength of the project activity output at six-month intervals during the crediting period and with a 90/10 confidence. The product that does not match the necessary compressive strength requirements will be excluded from production.

The simple random sampling method will be used during site monitoring. Simple random sampling is suited to populations that are homogeneous. Since the AAC Blocks are manufactured through a fixed composition the output is homogenous in nature. The sample size calculations are based on a proportion (or percentage) of interest being the objective of the project, under Simple random sampling method.

Data and parameter to be monitored is given in below tables:

Data / Parameter	EF_{grid}
Data unit	tCO_2/MWh

Description	UCR recommended emission factor
Source of data	*UCR CoU Standard Aug 2022 (Updated Ver.6)*
Value applied	0.9
Justification of choice of data or description of measurement methods and procedures applied	The UCR suggested emission factor is a conservative choice.
Purpose of Data	Calculation of project emissions associated with utilization of electricity
Comments	The value is fixed ex-ante

Data / Parameter	$\mathbf{EF_{grid,CM,y}}$
Data unit	tCO_2/MWh
Description	Combined Margin CO_2 emission factor for the India Grid in year y
Source of data	Central Electricity Authority(CEA) of India Database*Version 18.0; https://cea.nic.in/wp-content/uploads/baseline/2023/01/Approved_report_emission__2021_22.pdf*
Value applied	0.932
Justification of choice of data or description of measurement methods and procedures applied	This has been calculated based on Operating Margin (OM) and Build Margin (BM) published by Central Electricity Authority (CEA) of India.
Purpose of Data	Calculation of project emissions
Comments	The value is fixed ex-ante

Data / Parameter	$\mathbf{EF_{BL}}$

Data unit	tCO_2e/m^3
Description	The parameter is Annual production specific emission factor for manufacturing the product derived in the baseline scenario to project activity product.
Source of data	The calculation of baseline emission of fire bricks is derived from the literature considering the embodied energy associated with red brick manufacturing and conservative density. Reference; 1. Praseeda, K. I., BV Venkatarama Reddy, and Monto Mani. "Embodied energy assessment of building materials in India using process and input–output analysis." *Energy and Buildings* 86 (2015): 677-686. 2. Levi, K. Paul, and Ashwin Raut. "Embodied energy analysis to understand environmental impact of brick industry in West Godavari region." Materials Today: Proceedings 47 (2021): 5338-5344.
Value applied	0.338272
Justification of choice of data or description of measurement methods and procedures applied	The baseline annual production specific emission factor considers only the energy component associated to coal consumption.
Purpose of Data	Calculation of baseline emissions
Comments	The value is fixed ex-ante

Data / Parameter	$\mathbf{EF_{cement}}$
Data unit	tCO_2e/Ton of cement
Description	Carbon emission factor of Cement production
Source of data	0.67
Value applied	https://www.wbcsd.org/Sector-Projects/Cement-Sustainability-Initiative/News/Indian-cement-industry-on-track-to-meet-2030-carbon-emissions-intensity-reduction-objectives

Justification of choice of data or description of measurement methods and procedures applied	CSI Protocol is an authentic source of data.
Purpose of Data	Calculation of leakage emissions
Comments	The value is fixed ex-ante

Data / Parameter	$\mathbf{EF_{Aluminium}}$
Data unit	tCO_2e/Ton of Aluminium
Description	Carbon emission factor of Aluminium powder production
Source of data	Table 17: Industrial processes-emission factors and activity data
Value applied	1.89
Justification of choice of data or description of measurement methods and procedures applied	IPCC 2006 refers to emission factor of 1.7 tCO2/t of Aluminium; However National Greenhouse Accounts (NGA) Factors, Table 17: Industrial processes- emission factors and activity data takes into consideration CO2 emissions and CF4 and C2F6 emissions due to production of aluminium. The NGA factors have been taken to be on a conservative side.
Purpose of Data	Calculation of leakage emissions
Comments	The value is fixed ex-ante

Data / Parameter	$\mathbf{EF_{Lime}}$
Data unit	tCO_2e/Ton of Lime
Description	Carbon emission factor of Lime ($CaCO_3$) production
Source of data	2006 IPCC, Volume 3 Chapter 2: MINERAL INDUSTRY EMISSIONS, Equation 2.8
Value applied	0.7

Justification of choice of data or description of measurement methods and procedures applied	
Purpose of Data	Calculation of leakage emissions
Comments	The value is fixed ex-ante

Data / Parameter	**$EF_{CO_2,t}$**
Data unit	g tCO_2e/Ton Km
Description	Default carbon di-oxide emission factor for freight transport activity f
Source of data	Based on the methodological tool "Project and leakage emissions from road transportation of freight."(Version 01.0.0)
Value applied	<table><tr><th>Vehicle Class</th><th>Emission factor (gCO_2/t Km)</th></tr><tr><td>Light vehicle</td><td>245</td></tr><tr><td>Heavy vehicle</td><td>129</td></tr></table>For raw material (Fly ash, Gypsum, Cement, Lime, Aluminium Powder) transportation generally heavy vehicles are being used. So PP has considered the values for emission factor of Heavy vehicles.
Justification of choice of data or description of measurement methods and procedures applied	The choice of heavy vehicle emission factor is fixed ex-ante as per the weighbridge receipt of each transportation vehicle weighed more than 26 ton.
Purpose of Data	Calculation of leakage emissions
Comments	The value is fixed ex-ante

Data / Parameter	**NCV_{Diesel}**
Data unit	TJ/Ton
Description	Net calorific value of fossil fuel used in year y

Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories,
Value applied	0.043
Justification of choice of data or description of measurement methods and procedures applied	Default value from IPCC has been considered.
Purpose of Data	Calculation of project emissions
Comments	The value is fixed ex-ante.

Data / Parameter	**$Density_{,diesel}$**
Data unit	Kg/Liter
Description	Density of fuel (diesel) in year y
Source of data	http://www.siamindia.com/scripts/Diesel.aspx
Value applied	0.845
Justification of choice of data or description of measurement methods and procedures applied	Default value from the Indian auto industry has been considered.
Purpose of Data	Calculation of project emissions
Comments	The value is fixed ex-ante.

Data / Parameter	**$EF_{CO2,diesel}$**
Data unit	tCO_2/TJ
Description	Diesel emission factor
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories,
Value applied	74.8

Justification of choice of data or description of measurement methods and procedures applied	Default value from IPCC has been considered.
Purpose of Data	Calculation of project emissions
Comments	The value is fixed ex-ante.
Data / Parameter	EF_{Coal}
Data unit	tCO_2/TJ
Description	Emission factor of lignite
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories,
Value applied	101
Justification of choice of data or description of measurement methods and procedures applied	Default value from IPCC has been considered
Purpose of Data	Calculation of project emissions
Comments	The value is fixed ex-ante

Data and parameters to be monitored;

Data / Parameter	$P_{PJ, y}$
Data unit	m^3
Description	Monthly production capacity
Source of data	Monthly production report
Value applied	30,000

Justification of choice of data or description of measurement methods and procedures applied	Project proponent record the production of blocks as follows: Number of pouring at mixing tower per cycle which are recorded digitally and manually Continuous monitoring, monthly recording
Purpose of Data	Calculation of baseline and project emission
Comments	All the data will be archived till a period of two years from the end of the crediting period or last issuance whichever is later.

Data / Parameter	Q_{cement}
Data unit	Ton/year
Description	Ton of cement used during the monitoring period
Source of data	Purchase invoice and weighbridge receipts
Value applied	To be monitored
Justification of choice of data or description of measurement methods and procedures applied	Continuous monitoring, monthly recording
Purpose of Data	Calculation of leakage and project emission
Comments	All the data will be archived till a period of two years from the end of the crediting period or last issuance whichever is later.

Data / Parameter	Q_{lime}
Data unit	Ton/year
Description	Ton of lime used during the monitoring period
Source of data	Purchase invoice and weighbridge receipts

Value applied	To be monitored
Justification of choice of data or description of measurement methods and procedures applied	Continuous monitoring, monthly recording
Purpose of Data	Calculation of leakage and project emission
Comments	All the data will be archived till a period of two years from the end of the crediting period or last issuance whichever is later.

Data / Parameter	$Q_{aluminium}$
Data unit	Ton/year
Description	Ton of aluminium used during the monitoring period
Source of data	Purchase invoice and weighbridge receipts
Value applied	To be monitored
Justification of choice of data or description of measurement methods and procedures applied	Continuous monitoring, monthly recording
Purpose of Data	Calculation of leakage and project emission
Comments	All the data will be archived till a period of two years from the end of the crediting period or last issuance whichever is later.

Data / Parameter	Q_{POP}
Data unit	Ton/year

Description	Ton of POP used during the monitoring period
Source of data	Purchase invoice and weighbridge receipts
Value applied	To be monitored
Justification of choice of data or description of measurement methods and procedures applied	Continuous monitoring, monthly recording
Purpose of Data	Calculation of leakage and project emission
Comments	All the data will be archived till a period of two years from the end of the crediting period or last issuance whichever is later.

Data / Parameter	Q_{gypsum}
Data unit	Ton/year
Description	Ton of gypsum used during the monitoring period
Source of data	Purchase invoice and weighbridge receipts
Value applied	To be monitored
Justification of choice of data or description of measurement methods and procedures applied	Continuous monitoring, monthly recording
Purpose of Data	Calculation of leakage and project emission
Comments	All the data will be archived till a period of two years from the end of the crediting period or last issuance whichever is later.

Data / Parameter	Q_{flyash}
Data unit	Ton/year
Description	Ton of flyash used during the monitoring period
Source of data	Purchase invoice and weighbridge receipts
Value applied	To be monitored
Justification of choice of data or description of measurement methods and procedures applied	Continuous monitoring, monthly recording
Purpose of Data	Calculation of leakage and project emission
Comments	All the data will be archived till a period of two years from the end of the crediting period or last issuance whichever is later.

Data / Parameter	Q_{lime}
Data unit	Ton/year
Description	Ton of lime used during the monitoring period
Source of data	Purchase invoice and weighbridge receipts
Value applied	To be monitored
Justification of choice of data or description of measurement methods and procedures applied	Continuous monitoring, monthly recording
QA/QC procedures to be applied	Purchase invoice bills and weighbridge calibration.

Purpose of Data	Calculation of leakage and project emission
Comments	All the data will be archived till a period of two years from the end of the crediting period or last issuance whichever is later.

Data / Parameter	Q_{lime}
Data unit	Ton/year
Description	Ton of lime used during the monitoring period
Source of data	Purchase invoice and weighbridge receipts
Value applied	To be monitored
Justification of choice of data or description of measurement methods and procedures applied	Continuous monitoring, monthly recording
QA/QC procedures to be applied	Purchase invoice bills and weighbridge calibration.
Purpose of Data	Calculation of leakage and project emission
Comments	All the data will be archived till a period of two years from the end of the crediting period or last issuance whichever is later.

Data / Parameter	Q_{coal}
Data unit	Ton/year
Description	Ton of coal used during the monitoring period
Source of data	Purchase invoice and weighbridge receipts

Value applied	To be monitored
Justification of choice of data or description of measurement methods and procedures applied	Continuous monitoring, monthly recording
QA/QC procedures to be applied	Purchase invoice bills and weighbridge calibration.
Purpose of Data	Calculation of project emission
Comments	All the data will be archived till a period of two years from the end of the crediting period or last issuance whichever is later.

Data / Parameter	$D_{f,m, flyash}$
Data unit	Km
Description	Return trip road distance between the origin and destination of fly ash transportation activity f in monitoring period m
Source of data	Records of vehicle operator or records by project participants, Purchase invoice and weighbridge receipts
Value applied	The PP has monitored distance from origin to factory using odometer. The calibration is not required as vendor is same during current monitoring period.
Justification of choice of data or description of measurement methods and procedures applied	Number of trips aggregated monthly
QA/QC procedures to be applied	156.8

Purpose of Data	Calculation of leakage emission
Comments	All the data will be archived till a period of two years from the end of the crediting period or last issuance whichever is later.

Data / Parameter	$D_{f,m,\ gypsm\ \&\ POP}$
Data unit	Km
Description	Return trip road distance between the origin and destination of gypsum and POP transportation activity f in monitoring period m
Source of data	Records of vehicle operator or records by project participants, Purchase invoice and weighbridge receipts
Value applied	The PP has monitored distance from origin to factory using odometer. The calibration is not required as vendor is same during current monitoring period.
Justification of choice of data or description of measurement methods and procedures applied	Number of trips aggregated monthly
QA/QC procedures to be applied	1990
Purpose of Data	Calculation of leakage emission
Comments	All the data will be archived till a period of two years from the end of the crediting period or last issuance whichever is later.

Data / Parameter	$D_{f,m}$ **cement**
Data unit	Km
Description	Return trip road distance between the origin and destination of cement transportation activity f in monitoring period m

Source of data	Records of vehicle operator or records by project participants, Purchase invoice and weighbridge receipts
Value applied	The PP has monitored distance from origin to factory using odometer. The calibration is not required as vendor is same during current monitoring period.
Justification of choice of data or description of measurement methods and procedures applied	Number of trips aggregated monthly
QA/QC procedures to be applied	1374
Purpose of Data	Calculation of leakage emission
Comments	All the data will be archived till a period of two years from the end of the crediting period or last issuance whichever is later.

Data / Parameter	$D_{f,m}$ **lime**
Data unit	Km
Description	Return trip road distance between the origin and destination of lime transportation activity f in monitoring period m
Source of data	Records of the vehicle operator or records by project participants, Purchase invoice and weighbridge receipts
Value applied	The PP has monitored distance from origin to factory using odometer. The calibration is not required as vendor is same during current monitoring period.
Justification of choice of data or description of measurement methods and procedures applied	Number of trips aggregated monthly

QA/QC procedures to be applied	1648
Purpose of Data	Calculation of leakage emission
Comments	All the data will be archived till a period of two years from the end of the crediting period or last issuance whichever is later.

Data / Parameter	$D_{f,m\ Aluminium}$
Data unit	Km
Description	Return trip road distance between the origin and destination of aluminium transportation activity f in monitoring period m
Source of data	Records of the vehicle operator or records by project participants, Purchase invoice and weighbridge receipts
Value applied	The PP has monitored distance from origin to factory using odometer. The calibration is not required as vendor is same during current monitoring period.
Justification of choice of data or description of measurement methods and procedures applied	Number of trips aggregated monthly
QA/QC procedures to be applied	1698
Purpose of Data	Calculation of leakage emission
Comments	All the data will be archived till a period of two years from the end of the crediting period or last issuance whichever is later.

Data / Parameter	FC_{diesel}
Data unit	L
Description	Quantity of fuel type (diesel) combusted in DG sets during the monitoring period

Source of data	Fuel purchase invoices and logbook
Value applied	The consumption of diesel is monitored using volume meters on a continuous basis and aggregated monthly.
Justification of choice of data or description of measurement methods and procedures applied	The data is recorded in Logbook for each fill & aggregated on a monthly basis. The same is cross-checked through the invoiced/purchase receipts and opening and closing stocks of diesel.
QA/QC procedures to be applied	-
Purpose of Data	Calculation of the project emission
Comments	All the data will be archived till a period of two years from the end of the crediting period or last issuance whichever is later.