AAC BLOCK PROJECT BY AEROCON BUILDWELL PVT. LTD. (EKIESL- JUNE 2016-02)

Document Prepared By

EPIC Sustainability Services Private Limited

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Summary:

EKI Energy Services Private Ltd has appointed EPIC Sustainability Services Private Limited to perform the validation and first periodic verification of the emission reductions reported for the project titled "AAC Block Project By Aerocon Buildwell Pvt. Ltd. (EKIESL- June 2016-02)" (Project ID: PL1549) for the period from 15th July 2014 to 30th June 2016. The verification was based on the Joint project design document and monitoring report version 1.0 dated 17th June 2016 other supporting documents made available to the verification team by the client.

The proposed project activity involves construction of project brick types such as Autoclaved Aerated Concrete (AAC) blocks (annual installed capacity = 150,000 m^3, Date of commissioning = 15th July 2014) and flyash bricks (annual installed capacity = 90,000 m^3, Date of commissioning = 15th April 2015) replacing Clay Brick Bull‟s trench kilns (BTK) based bricks (baseline bricks) as construction material. The proposed VCS project activity has applied the baseline and monitoring methodology (AMS.III.Z Version 6.0). Coal used in the baseline scenario is replaced by briquettes and grid electriicty in the project activity, which is related to the emission reductions. In summary, it is the opinion of EPIC that the proposed VCS project activity meets the relevant VCS Version 3 requirements and the estimated GHG reductions from the project would be real, measurable, permanent and additional.

The verification team identified, through the verification process, 15 CARs and 9 CLs. The PP has taken actions and submitted to EPIC the revised monitoring report and supporting evidence. In summary, it is the opinion of EPIC that the proposed VCS project activity has correctly applied the baseline and monitoring methodology (Methodology Applied: AMS.III.Z Version 6.0 for the project activity and meets the relevant VCS requirements. The estimated GHG reductions from the project would be real, measurable, permanent and additional. The verification team, through the verification process, confirmed that the emission reductions achieved by the project activity during the monitoring period are correctly calculated in the Joint PD and MR, Version 2.0, dated 9th July 2016 based on the approved monitoring methodology. Therefore, EPIC certifies the emission reductions amounting to 40,695 tCO2e during the monitoring period.

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1 INTRODUCTION

1.1 Objective

EPIC Sustainability Services Private Limited (hereinafter referred to as EPIC) has been contracted by EKI Energy Services Private Ltd to undertake the validation and first periodic independent verification of the project activity titled "AAC Block Project By Aerocon Buildwell Pvt. Ltd. (EKIESL- June 2016-02" (hereinafter referred to as project activity)

- The purpose of the validation is to perform an independent, third party assessment of whether the project activity confirms to the qualification criteria set in the VCS standard to attain real, measurable, additional and permanent emission reduction. The validation statement / opinion is a written assurance that the project complies with all the applicable VCS requirements and has the ability to generate the emission reductions stated over the projects crediting period.

- To verify that the actual monitoring system and procedures are in full compliance with the system and procedures described in the Joint PD and MR, version 1.0 dated 17th June 2016 (hereinafter referred to as Initial PD/MR) as well as with the applicable methodology;

- To verify that the data reported were accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation; and

- To verify and certify GHG emission reduction reported for the project for the period from 15th July 2014 to 30th June 2016 (hereinafter referred to as current monitoring period).

1.2 Scope and Criteria

The validation scope includes an independent and objective review of the Project VCS project description (PD), the project's baseline study, monitoring plan and other relevant documents. Specifically, the objectives of the validation work involve:

- To verify whether the project activity meets the requirements of VCS standard[/1/] including additionality, proof of title and compliance with local laws.
- To assess whether the baseline and monitoring plan are in conformance with the methodology applied from the VCS approved GHG program.
- To certify that the information presented are complete, consistent, transparent and free of material error.

The Project Description was reviewed against VCS standard and the VCS program guidelines and the applied CDM methodology[/2/]. EPIC has performed the validation based on a risk based approach focusing mainly on the significant risks to meet the qualification criteria and the ability to generate VCUs. The work carried out by EPIC is free from any conflict of interest.

The scope of the verification was the independent and objective review and ex-post determination of the monitored reductions in GHG emissions from the project activity. The verification of this CDM project was based on the initial PD/MR and supporting documents made available to the verification team. These documents were reviewed against the requirements of the VCS standard[/1/] version 3.6, VCS guidelines, the CDM Modalities and Procedures, related rules and guidance, and the Validation and Verification standard[/2/] Version 9.0. The verification is not meant to provide any consulting towards the client. However, stated request for clarifications and/or corrective actions may provide input for improvement of the project design.

1.3 Level of Assurance

In line with VCS 2007.1 requirements and as per ISO 14064-3:2006 Para A.2.3.2, a reasonable level of assurance has been followed for the validation of the project. Based on the desired level of accuracy EPIC has established an internal quality control process and assures that the information given in the initial PD/MR is materially correct and is a fair representation of the of the actual project details, and is prepared in accordance with the VCS requirements and the applied CDM methodology for information pertaining to additionality, GHG quantification, monitoring and reporting. The validation report is carried out as per this requirement and details are presented in the validation statement in section 4 below.

1.4 Summary Description of the Project

The proposed project activity involves construction of project brick types such as Autoclaved Aerated Concrete (AAC) blocks (annual installed capacity =150,000 m^3, Date of commissioning =15th July 2014) and flyash bricks (annual installed capacity= 90,000 m^3, Date of commissioning = 15th April 2015) replacing Clay Brick Bull‟s trench kilns based bricks (baseline bricks) as construction material. The proposed VCS project activity has applied the baseline and monitoring methodology (AMS.III.Z Version 6.0). Coal used in the baseline scenario is replaced by briquettes and grid electricity in the project activity, which is related to the emission reductions.

2 VALIDATION AND VERIFICATION PROCESS

2.1 Method and Criteria

The EPIC validation process consists of the following phases:

- a document review of the project description and preparation of validation protocol;
- on-site visit to the project activity and interviews with project developer, project consultant; and relevant stakeholders
- resolution of outstanding issues and the issuance of final validation report and opinion

In order to ensure transparency, a validation protocol was customised for the project according to the VCS guidelines. The protocol describes the findings, criteria (requirements), means of verification, results from the validating and how the identified criteria, have been met in a transparent manner. The validation protocol serves the following purposes:

- it organizes, details and clarifies the requirements of a VCS project is expected to meet;
- it ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of Appendix, where findings established during the validation were classified as non-fulfilment of validation protocol criteria or where risks to the fulfilment of project objectives were identified. Corrective Action Request (CAR) was issued, where:

- mistakes have been made that directly impact on the project results; or
- validation protocol requirements have not been met; or
- there was a risk that the project would not be accepted as a VCS project or that emission reductions will not be certified.

The validation team has also raised “Clarification” (CL), where additional information is needed to fully clarify an issue.

APPENDIX : RESOLUTION OF CORRECTIVE ACTION AND CLARIFICATION REQUESTS			
Draft report clarifications and corrective action requests by validation team	Ref. to Section of the PD	Summary of project owner response	Validation team conclusion
If the conclusions from the draft Validation are either a CAR or CL, these should be listed in this section.	Reference to the Section of the PD where the relevant CAR or CL is raised.	The responses given by the project participants during the communications with the validation team should be summarized in this section.	This section should summarise the validation team’s responses and final conclusions.

The following team members from EPIC are involved in identifying the following:

Name	**Role**	**Components reviewed**
Mr. R. Vijayaraghavan	Lead Auditor	Completeness check, desk review, onsite inspection, Interview with project representatives, issuance of findings, report preparation
Mr. G. Subramanyam	Technical expert	Technical inputs to the lead auditor
Mr. A. Prabu Das	Technical Reviewer	Technical Issues related to project

2.2 Document Review

The initial PD/MR[/3/] version 1.0 submitted by the client and additional backgrounds documents related to the project design and baseline were reviewed as an initial step of the validation process. As a result of review and findings, PP had submitted the final PD/MR version 2.0[/4/]
A desk review was further done to assess the following parameters:

1. Project details as per VCS PD/MR template

2. Applicability and Appropriateness of methodology used
3. Compliance with relevance laws and regulation
4. Correctness of application of baseline and monitoring methodology
5. Demonstration of additionality
6. Monitoring Plan
7. Stakeholders' comment
8. Proof of title
9. Supporting documents mentioned in the PD (DPR, approvals)

2.3 Interviews

After the review of the Project description and documents a site visit was carried out from 5th July 2016. During the site visit physical inspection of the project components followed by interviews with the on-site personnel was carried out to verify the project details. A follow-up meeting was also conducted with the project representatives. The following persons were interviewed.

Name & Designation	Company	Details of Interview
Mr. Annesh Kemkar Director	Aerocon	Completeness check, desk review, onsite inspection, Interview with project representatives & stakeholders, issuance of findings, report preparation. Baseline, monitoring plan. Proof of title.
Mr. Bhaskar Dutta – Manager- Operations	EKI Energy	Technical Details, Monitoring system, calibration frequency, Infrastructure. Loan Sanction Documents, Power Purchase Agreement, Land Ownership details, Purchase Order details, Overall Project management. Baseline, Additionality, Barrier analysis, CER calculations, Financial calculations.

2.4 Site Inspections

During the site visit, the actual on-site practices adopted and followed for the operation of the project were compared with the description given in the monitoring report. The technical details, brick manufacturing system, environmental impact aspects, calibration and level of accuracy were examined. The archived data of the energy generated was also reviewed.

An on-site assessment was conducted as a part of verification activity and involved:

1) an assessment of the implementation and operation of the project activity as per the PD/MR

2) a review of information flows for generating, aggregating and reporting of the monitoring parameters

3) interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the PD/MR

4) a cross-check between information provided in the PD/MR and data from other sources

5) a check of the monitoring equipment including calibration performance, and observations of monitoring practices against the requirements of the PD/MR and the applied methodology

6) A review of calculations and assumptions made in determining the GHG data and ERs, and

7) An identification of QA/QC procedures in place to prevent, or identify and correct, any errors or omissions in the reported monitoring parameters.

2.5 Resolution of Findings

Resolution of Clarification and Corrective Action Requests
The objective of this phase of the verification was to resolve the corrective action requests and clarifications and any other outstanding issues which needed to be clarified prior to EPIC positive conclusion on the monitoring report and the project design. During the validation process three CARs were raised.

All the CARs and CRs were resolved during this phase. In order to ensure the transparency of the validation process, the concerns raised and responses that were given are summarized in Appendix 1 of this report and documented in more detail in the Verification in Appendix 1. All the corrective actions have been incorporated into the monitoring report.

2.5.1 Forward Action Requests

There is no FAR raised during this verification process.

3 VALIDATION FINDINGS

3.1 Project Details

The proposed project activity involves construction of project brick types such as Autoclaved Aerated Concrete (AAC) blocks (annual installed capacity =150,000 m^3, Date of commissioning =15th July 2014) and flyash bricks (annual installed capacity= 90,000 m^3, Date of commissioning = 15th April 2015) replacing Clay Brick Bull‟s trench kilns based bricks (baseline bricks) as construction material. The proposed VCS project activity has applied the baseline and monitoring methodology (AMS.III.Z Version 6.0). Coal used in the baseline scenario is replaced by briquettes and grid electriicty in the project activity, which is related to the emission reductions. The verification team has reviewed the commissioning certificates and accepted the same as correct. These were found to be correct and consistent. The location of the project activity was physically verified during validation site visit. The geographical coordinates of the project activity as mentioned in the PD were crosschecked with globally accessible satellite based imagery data software and found to be consistent. The validation team has reviewed the commissioning certificates and found commercial operation date to be 15th July 2014 which is taken as start date of the project activity.

PP has chosen a renewable crediting period of 10 years starting from 15th July 2014 to 14th July 2024 which can be renewed twice. The validation team has accepted this considering the technical life of the project activity is 25 years. In line with the VCS requirements, proof of title of the individual investors was verified with the equipment DPR, licence, Commissioning Certificate[/6/].

The project so far has not created any other form of environmental credit. But, the project will not seek for registration under CDM separately.

To ensure that the environmental credits generated by the project are not double counted under VCS, an undertaking letter[/8/] was provided by PP indicating that the project activity is not claiming other forms of GHG program. The project has not been rejected under other GHG programme. The project has not been rejected under other GHG programme. The project meets the general requirements of VCS Version 3 with respect to project start date, project scope and crediting period according to clause 5.1, 5.2 and 5.3. The validation team has also checked the VCS website[/1/] and found that the project was listed in the VCS pipeline on 1st July 2016 (Project ID: PL1549). The project status at the time of writing this report is 'Under development'.

3.2 Participation under Other GHG Programs

The project was not registered under CDM.

3.3 Application of Methodology

3.3.1 Title and Reference

AMS III.Z - "Fuel Switch, process improvement and energy efficiency in brick manufacture Version 6.0" (hereinafter referred to as applied meth)

3.3.2 Applicability

The below section details how the project activity fulfills the criteria of applied methodology.

Applicability Criteria of the applied meth	Conclusion by the verification team
1) The methodology comprises one or more technology/measures listed below in brick production facilities: a.Shift to an alternative brick production technology/process or installation of a new brick production technology/process; b.Complete/partial substitution of fossil fuels or non-renewable biomass (NRB) with renewable biomass (including biomass from dedicated plantations or solid biomass residues such as sawdust and food industry organic liquid residues); c.Complete/partial substitution of high carbon fossil fuels with low carbon fossil fuels; d.Reduce the consumption of fossil fuels or NRB due to improvement of the production process	The project activity involves construction of Autoclaved Aerated Concrete (AAC) block manufacturing unit and flyash brick as construction material. Condition 'a' is complied with. Since AAC block/flyash brick can also be considered as brick in the context of the applied meth, the verification team has accepted. The compressive strength of the AAC block (5.2 N/mm^2) and fly ash brick (9.46 N/mm^2) is higher than that of baseline brick (3 N/mm^2). Furthermore, it is confirmed that in the project region the most commonly used fuel in baseline brick manufacturing is fossil fuel (coal). Primarily, the project activity consists of process improvement. The validation team has understood that coal used in the baseline scenario wherein briquette and electricity is used in the project activity. Hence it need not be considred as substitution of fossil fuels in the project activity, condition b or c are not relevant.
2) 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 constructed in the greenfield facility where there is no existing brick manufacturing facility.

3)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 stabilization and other 'unburned' bricks that attain strength due to fly ash, lime/cement and gypsum chemistry	Projects bricks are different versus the baseline case due to a changes in raw materials, use of different additives, and production process changes resulting in reduced use or avoidance of fossil fuels. Moreover, it can be demonstrated that the service level of the project brick is comparable improved as the compressive strength of the AAC block (5.2 N/mm^2) and fly ash brick (9.46 N/mm^2) is higher than that of baseline brick (3 N/mm^2).
4) 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	General Guidelines for SSC CDM methodologies[/9/] version 22.1 (para 11) refers to the Project Standard[/9/] (version 9.0) requirement (Para 99). The annual estimated emission reductions (35,541.46 tCO2e per year when fully implemented) from the project activity are less than 60 kt every year in the crediting period. Hence the necessary condition of the Project Standard (para 99) is satisfied. The project falls under the Type III Greenfield projects (new facilities) and the most plausible baseline scenario for this project activity is "the burnt clay brick manufacturing using conventional technologies".
5)The requirements concerning 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	The project activity is constructed in the greenfield facility where there is no existing brick manufacturing facility and the project activity does not replacing any equipments. Hence this condition is not relevant.
6)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.	The project activity is constructed in the greenfield facility where there is no existing brick manufacturing facility. Hence this condition is not relevant.
7) 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).	Briquettes are used for boiler for generation of steam but it is not chemically processed prior to combustion. Hence this condition is satisfied.

8) 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 CH_4/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.	No charcoal is required for the operation of the project activity and as observed at the onsite, no charcoal is used in the project activity. Hence this condition is not relevant.
9)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: **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; **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: 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; 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.	Step 1: From the review of the process at the onsite, it is inferred that raw material used are fly ash, cement, Lime, Gypsum, Aluminium powder. Referring the clarification response[/10/] (SSC_518), the validation team has understood that the underlying rationale regarding the requirement on demonstration of the availability abundance of the raw materials is that the alternative raw materials used in the manufacturing of alternative bricks are waste products. The assessment of these applicable criteria of the methodology is not intended for industrial products with commercial value used as raw materials or additives. Hence the validation team has accepted the argument of PP that surplus availability of raw materials which is waste products (flyash alone) and not which is having commercial value is required to be demonstrated. Step 2: Approach 1: As per the DST report[/11/], fly ash production in 2013-2014 is 2.25 Million Tonnes per Annum (7500 Million per day at 300 days a year at Mundi thermal power plant) whereas the fly ash demand is only 72,000 Million tonnes per annum (as per manufacturer's data). Hence surplus availability of flyash (more than 30 times the flyash demand) is established and accepted by the verification team.
10)This methodology is applicable under the following conditions: a)The service level of project brick shall be	The compressive strength of the AAC block (5.2 N/mm^2) and fly ash brick (9.46 N/mm^2) is higher than that of baseline brick (3 N/mm^2).

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;	As per the monitoring plan, the Compressive strength test is proposed to be carried in line with IS code: 6441 Part V every 6 months interval and test certificates on compressive strength will be made available for verification through the crediting period. Hence accepted by the verification team.
10 b) The existing facilities involving modification and/or replacement shall not influence the production capacity beyond ±10% 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 4 of the methodology.	The project activity is constructed in the greenfield facility where there is no existing brick manufacturing facility and the project activity does not replacing any equipments. Hence this condition is not relevant.
10 c) Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO2 equivalent annually.	The annual emission reductions (35,541.46 tCO2e per year when fully implemented) from the project activity are less than 60 kt every year in the crediting period. Hence this condition is satisfied.
11. 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.	Based on the review of MoEF notifications[/11/], there is no regulation that mandates the use of any proposed AAC technology for brick manufacturing and there is widespread non-compliance of the regulation to use 50% of fly-ash for brick manufacturing within 100 km of a thermal power plant.
12)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	The proposed project activity does utilize biomass (Briquette) but it is procured from biomass sellers and not cultivated in dedicated plantations as observed at the onsite. Thus the criterion under discussion is not applicable.

13)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 CO_2e; 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 is the first project for the service recipient; the project activity is not a debundled component from a large scale project activity. Hence these special cases are not required by the project activity to demonstrate that it is not a part of large sale project activity.

3.3.3 Project Boundary

As per para 19 of the applied methodology[/2/], the project boundary is the physical, geographical site where the brick production takes place during both the baseline and crediting periods. It also includes all installations, processes or equipment affected by the switching. In cases where the renewable biomass is sourced from dedicated plantations it also includes the area of the plantations. In cases involving thermo-mechanical processing of the biomass (e.g. charcoal; briquettes; syngas) the sites where these processes are carried out shall be within the project boundary.

The project boundary includes AAC block installation, fly ash brick installation, processes, boiler that uses renewable briquette, Briquette production site, NEWNE grid from where electricity is received by the project activity. Briquette is sourced from a biomass seller and not cultivated. Briquette is not processed prior to combustion. Baseline emissions include emission due to combustion of coal. Project emission includes emission due to electricity consumption in the AAC/flyash and briquette production. Leakage emission includes emission due to emissions occur 1) due to production of raw materials/additives 2) during consumption of raw materials/additives at the project site 3) during transportation of raw materials/additives to the site.

3.3.4 Baseline Scenario

As the project activity is of Type III and Greenfield, the verification team has checked whether PP has identified baseline in line with the "General guidelines for SSC CDM methodologies" version 22.1[/9/] (hereinafter referred to as SSC guideline). The validation team checked if all the assumptions and data used by the project participants are listed in the PD, including their references and sources, all documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PD, assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable, the SSC guideline has been correctly applied to identify the most plausible baseline scenario and the identified baseline scenario reasonably represents what would occur in the absence of the proposed project activity. The identification and validation of the baseline consists of four steps (para 37 to 42 of SSC guideline) which are demonstrated as below.

Step 1: **Identification of various alternatives (including that of project activity without CDM) available to the project proponent**

The verification team has crosschecked the document[/11/] titled "Strategies for Cleaner Walling Material in India" prepared by Enzen Global Solutions, supported by Shakti Sustainable Energy Foundation and coordinated by Ellen Baum, Clean Air Task Force, Boston, MA in November 2011. By reviewing the document, the alternatives for the project activity are identified as 1) Project activity without CDM 2) baked Clay Bricks 3) Burnt clay Fly-ash bricks where coal is used as fuel 4) Cement Stabilized Soil Blocks (CSSB) 5) Concrete blocks 6) Fly Ash-Lime Gypsum (FaL-G) bricks. The verification team has accepted the alternatives as correctly identified by the project proponent.

Alternatives	Alternative description
AAC Blocks bricks (Project activity without VCS benefit)	The project activity undertaken without being registered as a VCS project activity.
Baked Clay Bricks	The verification team has reviewed the document[/11/] titled "Strategies for Cleaner Walling Material in India", and accepted that prevailing alternative for walling material manufacturing in India is baked (fired) clay brick manufacturing through the application of various technologies (as VSBK, Fixed Chimney BTK, Moveable Chimney BTK, Tunnel Kiln, Clamp and other Batch Kilns). As these bricks have comparable properties such as compressive strength, bulk density and application (construction purpose) with those of the AAC blocks and fly ash cricks, the verification team has accepted the same as alternatives. As per the document reviewed, the production of burnt clay bricks is to the tune of 140 billion out of total 151.83 billion brick equivalent. Hence Baked Clay Bricks is considered to be an alternative.
Fly-ash bricks (Project activity without VCS benefit)	The verification team has reviewed the MOEF Notification (http://envfor.nic.in/legis/hsm/flyash.html) dated 14th September 1999 and its amendments dated 27th August 2003 and 3rd November 2009 and observed that use of 50% fly ash in brick manufacturing units set up within 100 km of a coal or lignite based thermal power plant is mandatory in India. However, by reviewing the document titled "International Journal of Waste Resources"(http://www.omicsonline.com/open-access/indian-flyash-production-and-consumption-scenario-2252-5211.1000118.pdf), an article on Indian fly ash production and consumption scenario dated 2010-2011, of the 55.79% utilization of fly ash generated annually, that consumed in bricks manufacturing is a meager 6.30% only. As per the report (*http://moef.nic.in/downloads/public-information/MoEF-IIFM-thermal-power-plants.pdf)* submitted jointly by Akanksha

	Tiwari and Anubhav Sogani to the regional MoEF office of the Western Region of India, reasons behind the noncompliance vary from inappropriate quality of the fly ash available, to high transportation costs and lack of adequate technological and financial support from the regulatory or funding institutions. Hence fly-ash bricks without VCS benefit can be considered as an alternative.
Cement stabilized soil blocks	The verification team has reviewed the document[/11/] titled "Strategies for Cleaner Walling Material in India", and accepted that the penetration of this technology is to the tune of only 0.1%. Hence Cement stabilized soil blocks cannot be considered as an alternative.
Concrete Blocks	The verification team has reviewed the document[/11/] titled "Strategies for Cleaner Walling Material in India", and accepted that the penetration of this technology is to the tune of only 5.9%. Hence Concrete Blocks cannot be considered as an alternative.
FAL-G Bricks	The verification team has reviewed the document[/11/] titled "Strategies for Cleaner Walling Material in India", and accepted that the penetration of this technology is to the tune of only 1.6%. Hence FAL-G bricks cannot be considered as an alternative.

Step 2: **Listing of the alternatives identified that are in compliance with local regulations**

Alternatives	**Alternative description**
AAC Blocks (Project activity without VCS benefit)	The verification team has reviewed the document[/11/] titled "Strategies for Cleaner Walling Material in India", and accepted that the penetration of this technology is to the tune of only 0.2%. Hence production of AAC block complies with the local regulations.
Baked Clay Bricks	The verification team has reviewed the document[/11/] titled "Strategies for Cleaner Walling Material in India", and accepted that prevailing alternative for walling material manufacturing in India is baked (fired) clay brick manufacturing through the application of various technologies (as VSBK, Fixed Chimney BTK, Moveable Chimney BTK, Tunnel Kiln, Clamp and other Batch Kilns). As these bricks have comparable properties such as compressive strength, bulk density and application (construction purpose) with those of the AAC blocks and fly ash cricks, the verification team has accepted the same as alternatives. As per the document reviewed, the production of burnt clay bricks is to the tune of 140 billion out of total 151.83 billion brick equivalent. Hence production of Baked Clay Bricks complies with the local regulations.
Fly-ash bricks (Project activity without VCS benefit)	The verification team has reviewed the MOEF Notification (http://envfor.nic.in/legis/hsm/flyash.html) dated 14th September 1999 and its amendments dated 27th August 2003 and 3rd November 2009 and observed that use of 50% fly ash in brick manufacturing units set up within 100 km of a coal or lignite based thermal power plant is mandatory in India. However, by reviewing the document titled "International Journal of Waste Resources"(http://www.omicsonline.com/open-access/indian-flyash-production-and-consumption-scenario-2252-5211.1000118.pdf), an article on Indian fly ash production and consumption scenario dated 2010-2011, of the 55.79% utilization of fly ash generated annually, that consumed in bricks manufacturing is a meager 6.30% only. As per the report (*http://moef.nic.in/downloads/public-information/MoEF-IIFM-thermal-power-plants.pdf)* submitted jointly by Akanksha Tiwari and Anubhav Sogani to the regional MoEF office of the Western Region of India, reasons behind the noncompliance vary from inappropriate quality of the fly ash available, to high transportation costs and lack of adequate technological and financial support from the regulatory or funding institutions. Hence production of Baked Clay Bricks complies with the local regulations.

Step 3: Barrier analysis

As per the SSC guideline, the remaining alternatives are subjected to barrier tests specified in the "Guidelines on the demonstration of additionality of small-scale project activities". This guideline is changed into "Tool for Demonstration of additionality of small scale project activities"[/12/] version 10.0. PP has used Barrier due to prevailing practice. The verification of the barrier analysis is reported below.

<table>
<tr>
<td>AAC Blocks (Project activity without VCS benefit)

Barrier 1, 2,3 exists. Hence AAC blocks cannot be alternative</td>
<td>Barrier 1: Barrier due to prevailing practice (low penetration rate)

By reviewing the document[/11/] titled "Strategies for Cleaner Walling Material in India", the validation team has found that AAC blocks have low penetration in India which is to the tune of only 0.2%. Moreover, AAC block project activity technology requires recipe control of several main ingredients namely fly ash, cement, lime and water etc. at the mixing step. In case there are changes to the sources of the raw materials, the chemistry and hence the recipe needs to be reworked. Hence it requires the intervention of advanced technologies leading to much higher investments. Further it is a newer technology; skilled operators are required for operation of AAC block manufacturing unit and wherein the choice of AAC block as construction material is found to be negligible compared to clay bricks. The negative perception about the durability and quality of AAC blocks arises from low consumer awareness about the product.

Barrier 2: Low Market Acceptability

By reviewing the document[/11/] titled "Strategies for Cleaner Walling Material in India", the validation team has found that AAC blocks have low penetration in India which is to the tune of only 0.2%. The verification team has verified that the plant has been operating at a lower capacity due to lower demand of the AAC blocks due to low market acceptance of the product and poses additional risk to PP, in terms of reduced demand and corresponding underutilization of the plant. The verification team has reviewed the study on "Cost Effective Building Materials & Technologies" undertaken by Holtec Consulting Private Limited dated 2004 and observed the market share of AAC block is almost negligible.

Barrier 3: Investment barrier – financially unattractive

<table>
<tr><td>Size of one AAC block</td><td>1779.57 inch^3</td></tr>
<tr><td>Cost of one AAC block</td><td>INR 90.9</td></tr>
<tr><td>Cost of 1779.57 inch^3 AAC block</td><td>INR 90.9</td></tr>
<tr><td>Cost of 100 ft^2 area and 4 inch wall AAC blocks</td><td>INR 2,942</td></tr>
</table>

The verification team has reviewed the technical specifications and cost sheet and accepted the same.</td>
</tr>
<tr>
<td>Baked Clay Bricks

Barrier 1, 2, 3 does not exist. Hence baked clay bricks remains at the end of step 3.</td>
<td>Barrier 1: Barrier due to prevailing practice-

The verification team reviewed the TERI status report on vertical shaft brick kiln dated 2003 (http://www.cosmile.org/papers/brick_statuspaperVSBKsindia2003.pdf) and observed that there are more than 100,000 fired clay brick kilns in India, manufacturing more than 140 billion bricks per year. The same can be crosschecked with "Strategies for cleaner walling material in India" which estimates that out of burnt clay cricks contribute to the tune of 92% to the total of 151.83 billion brick equivalent produced in India. The verification team has accepted that there is an overwhelming prevalence of burnt clay bricks in walling materials used in India. Moreover, there is much easier availability of skilled operators for successfully running a clay bricks manufacturing unit. Raw material is clay which is</td>
</tr>
</table>

<table>
<tr>
<td></td>
<td>available to the brick manufacturer from his surroundings. Manufacturing of burnt clay bricks does not require very sophisticated technology and the technique used is proven and widely practiced for many decades.

Barrier 2: Market Acceptability barrier

Clay brick production is a simple commonly used technological practice and is practiced at the cottage industry level. The document referred above indicates that fired clay bricks dominate current use of walling material and account for 92.2% of 151.83 billion brick equivalent masonry units produced annually in the country in the year 2011. Small fired clay brick producers have no incentives to introduce alternate technologies, which require new investments, training to stabilize the operation, and a different business practice in long-term perspective. Burnt clay bricks are therefore the most prevalent technology which has no barriers. The verification team has reviewed the study on “Cost Effective Building Materials & Technologies” undertaken by Holtec Consulting Private Limited dated 2004 and observed the market share of AAC block is 95.3%. Hence clay bricks has high acceptance rate among other bricks in India.

Barrier 3: Investment barrier- financially attractive

<table>
<tr><td>Size of one clay brick</td><td>139 $inch^3$</td></tr>
<tr><td>Cost of one clay brick</td><td>INR 4</td></tr>
<tr><td>Cost of 1779.57 $inch^3$ one clay brick</td><td>INR 4</td></tr>
<tr><td>Cost of 100 ft^2 area and 4 inch wall clay bricks</td><td>INR 1,657</td></tr>
</table>

The verification team has reviewed the technical specifications and cost sheet and accepted the same.</td>
</tr>
<tr>
<td>Fly-ash bricks (Project activity without VCS benefit)

Barrier 1, 2, 3 exists. Hence fly ash bricks cannot be alternative</td>
<td>Barrier 1: Barrier due to prevailing practice –Low penetration rate

The penetration rate of flyash brick as a walling material is less in India. Fly ash bricks making requires proper technological know-how to maintain recipe control of several main ingredients namely fly ash, cement water etc. at the mixing step, which is not prevalent in India as indicted by the low the penetration rate.

Barrier 2: Low Market Acceptability barrier
Similar to AAC Blocks, fly ash bricks also face barriers in term of market acceptability and mind-set of people, considering fly ash bricks not strong enough as compared to conventional clay bricks. The verification team has reviewed the study on “Cost Effective Building Materials & Technologies” undertaken by Holtec Consulting Private Limited dated 2004 and observed the market share of AAC block is 3.3% only.

Barrier 3: Investment barrier- financially unattractive

<table>
<tr><td>Size of one fly ash brick</td><td>112.6 $inch^3$</td></tr>
<tr><td>Cost of one fly ash brick</td><td>INR 5.5</td></tr>
<tr><td>Cost of 1779.57 $inch^3$ one fly ash brick</td><td>INR 5.5</td></tr>
<tr><td>Cost of 100 ft^2 area and 4 inch wall one fly ash bricks</td><td>INR 2,815</td></tr>
</table>

The verification team has reviewed the technical specifications and cost sheet and accepted the same.</td>
</tr>
</table>

Step 4: Identification of baseline

<table>
<tr>
<td>Baked Clay Bricks

Baseline manufacturing process = Baked Clay Bricks

Baseline fuel= Coal

Baseline technology = FC-BTK</td>
<td>At the end of step 3, baked clay bricks remains as alternative. Since the remaining one is not the proposed project activity, the project activity is eligible to apply this applied methodology and baked clay bricks processes is the baseline scenario.
The verification has checked the specific coal consumption under these technologies to find the conservative baseline.
<table>
<tr>
<td>Production rate
<table>
<tr><td>Clamps technology</td><td>8.8%</td></tr>
<tr><td>FC-BTK technology</td><td>90.9%</td></tr>
</table>
</td>
<td>The validation team by reviewing the document titled “Comprehensive Industry Document with Emission Standards, Guidelines and Stack Height regulation for Vertical Shaft Brick Kilns(VSBK) vis-à-vis Pollution Control Measures" by Central Pollution Control Board minister of Environment & Forest at May 2007, letter written by Indian brick association to finance minister (www.brick- india.com/images/finace-minister.jpg), CDCF Project: Vertical Shaft Brick Kiln Cluster Project, accepted the value as correct.</td>
</tr>
<tr>
<td>Energy consumption
<table>
<tr><td>Clamps technology</td><td>3.25 MJ/kg of brick</td></tr>
<tr><td>FC-BTK technology</td><td>1.55 MJ/kg of brick</td></tr>
</table>
</td>
<td>The verification team has reviewed the document referred above and accepted</td>
</tr>
<tr>
<td>Net calorific value of coal = 25.8 MJ/tonne of coal</td>
<td>The verification team has reviewed the IPCC data for 2006 and accepted the value.</td>
</tr>
<tr>
<td>Volume of brick =190 mm x 90 mm x 90 mm = 0.001539 m^3</td>
<td>The verification team has reviewed the Indian Standard for Specification for Heavy duty Burnt clay Building Bricks and accepted the value.</td>
</tr>
<tr>
<td>Specific coal consumption
<table>
<tr><td>Clamps technology</td><td>314.92 kg of coal/m^3 of brick</td></tr>
<tr><td>FC-BTK technology</td><td>150.19 kg of coal/m^3 of brick</td></tr>
</table>
</td>
<td>The verification team has reviewed the document referred above and accepted.</td>
</tr>
<tr>
<td>Specific heat consumption
<table>
<tr><td>Clamps technology</td><td>8,124.93 MJ/m^3 of brick</td></tr>
<tr><td>FC-BTK technology</td><td>3,875 MJ/m^3 of brick</td></tr>
</table>
</td>
<td>Specific heat consumption = NCV x Specific coal consumption.
The verification team has accepted the formula as correct.</td>
</tr>
<tr>
<td>Emission factor of coal =94.6 tCO2e/TJ</td>
<td>The verification team has reviewed the IPCC data for 2006 and accepted the value.</td>
</tr>
<tr>
<td>CO2 emission per m^3 of brick
<table>
<tr><td>Clamps technology</td><td>0.7686 tCO2e/ m^3 of brick</td></tr>
</table>
</td>
<td>CO2 emission per m^3 of brick = Emission factor of coal x Specific heat consumption</td>
</tr>
</table>
</td>
</tr>
</table>

	FC-BTK technology: 0.366575 tCO_2e/m^3 of brick	
	Biomass adjustment factor =2%	Coal is the main source of energy used for manufacturing burnt clay bricks in India. However the second choice of fuel is biomass, including fuel wood but one of the studies by the FAO the annual use of fuel wood in the entire brick industry in the country is reported to be only 300,000 tonnes, while the use of coal is reported to be about 14,000,000 tonne. Thus use of fuel wood represents less than 2% in terms of energy inputs of the total energy requirement of the brick industry in all of India.
	CO2 emission per m^3 of brick with biomass adjustment factor accounted Clamps technology: 0.7532 tCO_2e/m^3 of brick FC-BTK technology: 0.3592435 tCO_2e/m^3 of brick	CO2 emission per m^3 of brick = Emission factor of coal x Specific heat consumption As FC-BTK technology has lower emissions, thus forms the baseline.

3.3.5 *Additionality*

The validation team has assessed the suitability of investment analysis approach being selected by the PP to prove that the project is additionality, choice of benchmark and its input value. Table below provides the explanation and justification for the applied values for the project activity.

Choice of approach selected for proving the proposed project is additional= Investment analysis.	PP has selected investment analysis to prove that the project is not financially feasible. The project participant has chosen to demonstrate additionality through application of latest version of "Guidelines on the demonstration of additionality of small-scale project activities" version 10.0[/15/] (Previously known as Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities) and Guidelines on the assessment of investment analysis version 5.0[/16/]. As the proposed project activity is of small scale in nature, the verification team has accepted the approach.

Appropriate analysis method = benchmark analysis	PP had the option of choosing simple cost analysis, investment comparison analysis or benchmark analysis. The verification team found that the PP has selected benchmark analysis. The validation team has assesses the rationale behind choosing benchmark analysis method as the appropriate analysis method to prove additionality. Simple cost analysis method is appropriate if the proposed project activity generate no financial benefits other than VCS related income. As the project activity generates revenue by selling the bricks to the market, the rationale behind opting out of simple cost analysis is accepted by the verification team. Investment comparison analysis method is appropriate if the proposed baseline scenario leaves the PP no other choice than to make an investment to supply the same (or substitute) products or services. As the baseline identified for the project activity is production FC-BTK based bricks are available to all the potential project owners, the rationale behind the opting out of investment comparison analysis method is accepted by the verification team. Hence benchmark analysis is appropriate.

<table>
<tr>
<td>Real cost of equity= 12.75% for both AAC Block and fly ash brick

Source : “Guidelines on the assessment of investment analysis” Version 5

(hereinafter Investment guideline)</td>
<td>As per para 12 of the Investment guideline, for equity IRR, required or expected returns of equity are appropriate benchmark. Hence the validation team accepted the chosen benchmark since PP has considered expected return of equity as the benchmark. As per para 13 of the investment guideline, for a project which could be developed by entities other than the PP, (as in the case of the project activity), the benchmark shall be based on the parameters that are standard in the market. Further, as per para 15 of the same guideline, if the benchmark is based on the standard values, cost of equity may be determined by selecting the values provided in the Appendix A of that guideline. It is found that as per appendix A of the guideline, the default value against the type of project (Group 2-Manufacturing industries) and host country (India) is 12.75%. It is specified in the guideline that the values are expressed in real terms and the same can be converted into the nominal terms by adding the inflation rate.</td>
</tr>
<tr>
<td>Date of investment decision

<table>
<tr><td></td><td>Date of investment decision</td></tr>
<tr><td>AAC Block</td><td>10th May 2013</td></tr>
<tr><td>Flyash brick</td><td>10th May 2014</td></tr>
</table>
</td>
<td>The board decisions to invest in the project are based on offer letter sent by supplier.</td>
</tr>
<tr>
<td>Inflation

<table>
<tr><td></td><td>Inflation</td><td>Date of RBI source</td></tr>
<tr><td>AAC Block</td><td>5.9%</td><td>2nd May 2013</td></tr>
<tr><td>Flyash brick</td><td>5.4%</td><td>1st April 2014</td></tr>
</table>

Source: RBI website[/34/]</td>
<td>PP has obtained the inflation rate chosen from the inflation forecast of the central bank (for Indian projects, the central bank being Reserve Bank of India). The verification team found that RBI published RBI survey which is the basis of selecting the inflation. PP has chosen an inflation value available at the time of investment decision. PP has chosen the minimum WPI inflation which is found to be conservative hence accepted.</td>
</tr>
</table>

<table>
<tr>
<td>Nominal cost of equity
<table>
<tr><td></td><td>Nominal cost of equity</td></tr>
<tr><td>AAC Block</td><td>19.40%</td></tr>
<tr><td>Flyash brick</td><td>18.84%</td></tr>
</table>
</td>
<td>Nominal benchmark is then calculated by adding real term cost of equity with the inflation which is as per the para 7 of Appendix of the investment guideline.

Nominal cost of equity =(100%+real cost of equity) x (100%+inflation) -1</td>
</tr>
<tr>
<td>Choice of financial Indicator = Equity IRR</td>
<td>As per the investment guideline, equity IRR or project IRR can be selected by the PP. Hence accepted by the verification.</td>
</tr>
<tr>
<td>Period of assessment = 25 years</td>
<td>The validation team checked the input value against the requirement of paragraph 3 of investment guideline which stipulates that the period of assessment shall at least be in tune with the life time of the project activity. PP has taken the period of assessment of financial indicator (i.e post-tax equity IRR) in tune with the life of the project. By considering the period of assessment of 25 years, the input value is satisfying the requirement of para 3 of investment guideline. The verification team accepted the input value as appropriate.</td>
</tr>
<tr>
<td>Capacity of bricks
<table>
<tr><td>Type of bricks</td><td>Capacity of bricks</td></tr>
<tr><td>AAC block</td><td>500 m^3 per day for 300 days in a year or 150,000 m^3 per year</td></tr>
<tr><td>Flyash brick</td><td>300 m^3 per day for 300 days in a year or 90,000 m^3 per year</td></tr>
</table>
Source: Respective Offer letters[/14/]</td>
<td>The validation team reviewed Techno commercial offer, purchase orders in which capacity of each bricks is indicated. PP considered the capacity from the techno commercial letters offered by the supplier which is available at the time of investment decision and is found to be matching with the respective project cost sheet [/9/] and cross verification during the onsite visit. Hence capacity of the bricks is confirmed by the verification team as correct.</td>
</tr>
</table>

<table>
<tr><td>Capacity utilisation

<table><tr><td></td><td colspan="2">Capacity utilisation</td></tr><tr><td rowspan="5">AAC block</td><td>1st year</td><td>55%</td></tr><tr><td>2nd year</td><td>60%</td></tr><tr><td>3rd year</td><td>65%</td></tr><tr><td>4th year</td><td>70%</td></tr><tr><td>5th year onwards</td><td>75%</td></tr><tr><td rowspan="6">Flyash brick</td><td>1st year</td><td>30%</td></tr><tr><td>2nd year</td><td>35%</td></tr><tr><td>3rd year</td><td>40%</td></tr><tr><td>4th year</td><td>45%</td></tr><tr><td>5th year onwards</td><td>50%</td></tr><tr><td>6th year onwards</td><td>60%</td></tr></table></td><td>The verification team has reviewed the DPR and accepted the value. The verification team verified the document and found to be in line with the requirements of paragraph 3 (b) of “Guidelines on Reporting and Validation of Plant Load Factors” EB 48 Annex 11[/30/].</td></tr>
<tr><td>Capital cost

<table><tr><td></td><td>Capital cost</td></tr><tr><td>AAC block</td><td>INR 219.4 Million</td></tr><tr><td>Fly ash brick</td><td>INR 143. 60 Million</td></tr></table>
Source: Respective offer letters[/14/]</td><td>The offered price of the project was found to be readily available at the time the investment decision was taken by the investors. The validation team verified the offer letter and found it to be in accordance with paragraph 6 of Guideline EB 62 Annex 5[/16/]. The verification team crosschecked the input values with the project cost sheet and accepted the value as correct. The verification team accepted the input values as reasonable.</td></tr>
<tr><td>Debt : Equity =70%:30% for both products

Source: As per board decision [/28/]</td><td>The validation team has reviewed the loan sanction letters[/28/] and found that the value is matching. It was verified the actual interest payable to be considered in the calculation of income tax. As post-tax benchmark is applied by the PP to demonstrate additionality, actual debt amount to be applied which as per paragraph 11 of</td></tr>
</table>

<table>
<tr><td></td><td>Investment guideline[16] (EB 62 Annex 5). Hence the validation team has accepted the value as correct.</td></tr>
<tr><td>Annual O & M Charges
<table>
<tr><th></th><th>O & M Charges</th><th>Free service if any</th><th>% annual escalation</th></tr>
<tr><td>AAC block</td><td>INR 8.2 Million</td><td>2 years</td><td>5%</td></tr>
<tr><td>Fly ash brick</td><td>INR 8.2 Million</td><td>2 years</td><td>5%</td></tr>
</table>
Source: Respective offer letters[14]</td><td>The O&M charges were mentioned in the offer letter[14] provided by the equipment supplier. The validation team verified the document and found it to be in accordance with paragraph 6 of Guideline EB 62 Annex 5. The validation team has crosschecked with the actual values by reviewing the project cost sheet[31] and accepted the value as correct.</td></tr>
<tr><td>Annual Manpower and Admin cost
<table>
<tr><th></th><th>Manpower and Admin cost</th><th>% annual escalation</th></tr>
<tr><td>AAC block</td><td>INR 1.6 Million</td><td>10%</td></tr>
<tr><td>Fly ash brick</td><td>INR 2 Million</td><td>10%</td></tr>
</table>
Source: As per board decision[14]</td><td>The O&M charges were mentioned in the board decision[14]. The validation team verified the document and found it to be in accordance with paragraph 6 of Guideline EB 62 Annex 5. The validation team has crosschecked with the actual values by reviewing the project cost sheet[31] and accepted the value as correct.</td></tr>
<tr><td>Annual insurance =0.15% on capital cost

Source: TAC order</td><td>The annual insurance charges were sourced from the TAC order[27]. The validation team verified the document and found it to be in accordance with paragraph 6 of Guideline EB 62 Annex 5.

The verification assessed the financial indicator with zero premium and found the following during verification
<table>
<tr><th></th><th>Resultant equity IRR</th></tr>
</table></td></tr>
</table>

<table>
<tr>
<td></td>
<td>
<table>
<tr><th></th><th>at zero premium</th></tr>
<tr><td>AAC block</td><td>8.29%</td></tr>
<tr><td>Fly ash brick</td><td>11.65%</td></tr>
</table>
The resultant equity IRR is not crossing the benchmark hence the input values are acceptable.
</td>
</tr>
<tr>
<td>Selling rate
<table>
<tr><th></th><th>Selling rate</th></tr>
<tr><td>AAC block</td><td>INR 2,200/m^3</td></tr>
<tr><td>Fly ash brick</td><td>INR 1,100/m^3</td></tr>
</table>
</td>
<td>The validation team has reviewed the DPR and found that the applied rate was found to be correct which is in accordance with paragraph 6 of EB 62 Annex 5.

The validation team also cross-checked the input values with project cost sheet and accepted the value as correct.</td>
</tr>
<tr>
<td>Interest rate =14.5% for both the products

Source: Respective board decisions[/28/]</td>
<td>The validation team has reviewed the respective board decisions[/28/] and found that the value is matching. It was verified the actual interest payable is taken into account in the calculation of income tax. As post-tax benchmark is applied by the PP to demonstrate additionality, actual interest rate to be applied which as per paragraph 11 of Investment guideline (EB 62 Annex 5). Hence the validation team has accepted the value as correct. Similarly, repayment period and moratorium period were sourced from the referred document.</td>
</tr>
<tr>
<td>Salvage value =10%

Source: As per section 205 of the Companies Act 1956[/33/]</td>
<td>As per Companies Act[/33/] 1956, this was verified and accepted by the validation team. The validation team also found that the fair value of the project cost at the end of the assessment period is included as a cash inflow in the final year which is in line with para 4 of latest version of Investment guideline[/16/]. The validation team also found that the book depreciation which is deducted in estimating profit before tax on which tax is calculated, is added back to profit after tax for the purpose of calculation of equity IRR.</td>
</tr>
<tr>
<td>Corporate Tax = 33.99% for the bricks

Source: Income Tax Act 1961[/34/]</td>
<td>The applicable corporate tax is sourced from Income Tax Act[/34/] and the calculation is correctly implemented. Hence considered reasonable.</td>
</tr>
</table>

<table>
<tr><td>Minimum Alternate Tax (MAT) =21%

Source: Income Tax Act [/34/]</td><td>The applicable MAT is sourced from Income Tax Act[/34/] and the calculation is correctly implemented. Hence considered reasonable.</td></tr>
<tr><td>Equity IRR
<table><tr><td></td><td>Post tax Equity IRR</td></tr><tr><td>AAC block</td><td>8.12%</td></tr><tr><td>Fly ash brick</td><td>11.48%</td></tr></table></td><td>The equity IRR of the project activity is calculated correctly and hence accepted. Based on the evaluation it was evidenced that returns from the project without the revenue from VCS are less than the benchmark. Hence, it is confirmed that revenue from VCS was considered essential for the project activity. In this context, the project activity is considered additional</td></tr>
<tr><td>Sensitivity analysis
<table><tr><td></td><td colspan="3">Post Tax equity IRR</td></tr><tr><td rowspan="5">AAC block</td><td>Base value</td><td></td><td>8.12%</td></tr><tr><td>Capital cost</td><td>-10%</td><td>9.59%</td></tr><tr><td>Capacity utilisation rate</td><td>+10%</td><td>18.76%</td></tr><tr><td>O&M cost</td><td>-10%</td><td>8.59%</td></tr><tr><td>Selling rate</td><td>+10%</td><td>18.76%</td></tr><tr><td rowspan="4">Fly ash brick</td><td>Base value</td><td></td><td>11.48%</td></tr><tr><td>Capital cost</td><td>-10%</td><td>13.53%</td></tr><tr><td>Capacity utilisation rate</td><td>+10%</td><td>15.32%</td></tr><tr><td>O&M cost</td><td>-10%</td><td>12.26%</td></tr></table></td><td>As per para 20 and 21 of the investment guideline, the variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation. The departure variations in the sensitivity analysis should at least cover a range of +10% and -10%. A sensitivity analysis is conducted on variables that constitute more than 20% of either project costs or project revenues. The capital cost, capacity utilisation rate, O&M cost and selling rates of bricks are the parameters that were subjected to reasonable variation and the results are documented in the PD and found to be reproducible in the financial sheets. Variations in the sensitivity analysis cover a range of +10% and -10%, and results show that the project activity in any of the scenarios does not cross the benchmark. These results of sensitivity analysis were evaluated and were found to be correct.

Based on the above evaluation it was evidenced that returns from the project without the revenue from VCS are less than the benchmark. Hence, it is confirmed that proposed VCS project activity would not be economically feasible, without the revenue from the sale of VCUs. In this context, the project activity is considered additional.</td></tr>
</table>

	Selling rate	+10%	15.32%	

3.3.6 *Quantification of GHG Emission Reductions and Removals*

Parameter	Justification by the verification team
Emission reduction by the project activity (ER_y)	The project activity uses the latest approved monitoring methodology AMS.III.Z Version 06[/2/], which is applicable to the project. The validation team has reviewed based on the onsite assessment the requirements of monitoring plan including the responsibility, authority, monitoring, measurement, reporting, archiving, the QA / QC procedures such as calibration, meter testing, internal audits, maintenance of monitoring equipment and monitoring plan implementation and able to confirm that all the requirements are complied with the methodology. Further to assessment of the monitoring plan indicated in the PD, the validation team is of the opinion that the project participant will be able to implement the monitoring plan as the monitoring plan is in line with the requirements of the methodology and the monitoring arrangements described in the monitoring plan are feasible within the project design. The detailed validation of monitoring plan including ex-ante and ex-post parameters is given below. As per para 31 of the applied meth, emission reduction achieved by the project activity shall be calculated as below $ER_y = BE_y - PE_y - LE_y$ Where ER_y – Emission reductions BE_y-Baseline emissions PE_y- Project emissions LE_y-Leakage emissions
Baseline emissions (BE_y)	As per para 20 Clause b, for projects involving the installation of systems in a new facility or a capacity addition in an existing system, 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 above results in more than one alternative technology with different levels of energy consumption, the alternative with the least emissions intensity should be chosen for determining the baseline emissions of the facility. As demonstrated above, the project is constructed in the greenfield facility and baseline would be FC-BTK with coal as baseline fuel.

<table>
<tr><td></td><td>As per para 21 of the applied meth, Baseline emissions is calculated as below.
$BE_y = SEC_{BL} \times EF_{BL} \times P_{PJ,y}$

Where
SEC_{BL} - Specific energy consumption of brick production in the baseline
EF_{BL} – Emission factor of baseline fuel
$P_{PJ,y}$ – Annual net production of the facility in year *y*</td></tr>
<tr><td>Specific energy consumption of brick production in the baseline (SEC_{BL}) =3,797.5 MJ/m^3 of brick
(ex-ante parameter)</td><td>It is already validated in section 3.3.4 of this report. Biomass adjustment factor of 2% is accounted for.</td></tr>
<tr><td>Emission factor of coal = 94.6 tCO2e/TJ
(ex-ante parameter)</td><td>The verification team has reviewed the IPCC data for 2006 and accepted the value.</td></tr>
<tr><td>Annual net production of the facility in year *y*</td><td>Ex-ante estimation:
Annual net production of the facility in year *y* = Installed capacity of bricks x Capacity utilisation</td></tr>
<tr><td>Installed capacity of bricks

<table>
<tr><td>Type of bricks</td><td>Installed Capacity of bricks</td></tr>
<tr><td>AAC block</td><td>500 m^3 per day for 300 days in a year or 150,000 m^3 per year</td></tr>
<tr><td>Flyash brick</td><td>300 m^3 per day for 300 days in a year or 90,000 m^3 per year</td></tr>
</table></td><td>It is already validated in section 3.3.5 of this report.</td></tr>
<tr><td>Capacity utilisation
<table>
<tr><td></td><td>Capacity utilisation</td></tr>
<tr><td>AAC block</td><td><table>
<tr><td>1st year</td><td>55%</td></tr>
<tr><td>2nd year</td><td>60%</td></tr>
<tr><td>3rd year</td><td>65%</td></tr>
<tr><td>4th year</td><td>70%</td></tr>
<tr><td>5th year onwards</td><td>75%</td></tr>
</table></td></tr>
<tr><td>Flyash brick</td><td><table>
<tr><td>1st year</td><td>30%</td></tr>
<tr><td>2nd year</td><td>35%</td></tr>
<tr><td>3rd year</td><td>40%</td></tr>
<tr><td>4th year</td><td>45%</td></tr>
<tr><td>5th year</td><td>50%</td></tr>
<tr><td>6th year onwards</td><td>60%</td></tr>
</table></td></tr>
</table></td><td>It is already validated in section 3.3.5 of this report.</td></tr>
<tr><td>No of operational days</td><td>It is derived from the DPR.</td></tr>
</table>

Year	AAC block in days	Fly ash brick in days
1	260	225
2	300	300
3	300	300
4	300	300
5	300	300
6	300	300
7	300	300
8	300	300
9	300	300
10	300	300
11	40	75

Annual net production of the facility in year *y*

Year	AAC block in m^3	Fly ash brick in m^3
1	71,500	20,250
2	90,000	31,500
3	97,500	36,000
4	105,000	40,500
5	112,500	45,000
6	112,500	54,000
7	112,500	54,000
8	112,500	54,000
9	112,500	54,000
10	112,500	54,000
11	15,000	13,500

Ex-ante estimation:
Annual net production of the facility in year *y* = Installed capacity of bricks x Capacity utilisation

Ex-post monitoring:
It will be monitored continuously and recorded in production log sheets.

QA/QC procedure:
It can be crosschecked with sales invoices.

Baseline emissions (BE_y)

Year	AAC block in tCO2e	Fly ash brick in tCO2e	Total in tCO2e
1	25,685.91	7,274.681	32,960.59
2	32,331.92	11,316.17	43,648.09
3	35,026.24	12,932.77	47,959.01
4	37,720.57	14,549.36	52,269.93
5	40,414.89	16,165.96	56,580.85
6	40,414.89	19,399.15	59,814.04
7	40,414.89	19,399.15	59,814.04
8	40,414.89	19,399.15	59,814.04
9	40,414.89	19,399.15	59,814.04
10	40,414.89	19,399.15	59,814.04
11	5,388.653	4,849.787	10,238.44

As per para 21 of the applied meth, Baseline emissions is calculated as below.
$BE_y = SEC_{BL} \times EF_{BL} \times P_{PJ,y}$

Project emissions (PE_y)

As per para 24 of the applied meth, project emissions includes
1) emissions due to electricity consumption in year *y* ($PE_{elec,y}$)
2) emissions due to fossil fuel or NRB consumption in year *y* ($PE_{fuel,y}$)
3) emissions from cultivation of biomass in a dedicated plantation in year *y* ($PE_{cultivation,y}$)
4) emissions due to the production of charcoal in kilns not equipped with a methane recovery and destruction facility

<table>
<tr><td></td><td>in year y ($PE_{CH4,y}$)</td></tr>
<tr><td>Emissions due to electricity consumption in year y ($PE_{elec,y}$)</td><td>As per para 25 of the applied meth, this emission calculated as per “Tool for calculate baseline, project and or leakage emissions from electricity consumption” /13/
As per the tool referred emission due to consumption of grid electricity = EC_y x EF_{EL} x (1+TDL)
Where
EC_y –Electricity consumption in the year y
EF_{EL}- Grid Emission factor
TDL-Technical transmission and distribution losses</td></tr>
<tr><td>Electricity consumption in the year y</td><td>The verification team has observed that electricity consumed in the process of AAC block production & Fly ash brick production and production of briquettes.

Electricity consumption by the project = Electricity consumption in the process in the year y + Electricity consumption in the briquette production in the year y

The validation of the same is detailed below.</td></tr>
<tr><td>Electricity consumption in the process in the year y</td><td>Ex-ante estimation:
It is calculated as below
Electricity consumption in the process in the year y = Specific electricity consumption per cubic metre x Annual net production of the facility in year y</td></tr>
<tr><td>Specific electricity consumption per cubic metre =16 kWh/m^3</td><td>It is considered from the DPR which is accepted by the validation team.</td></tr>
<tr><td>Annual total production of the facility (AAC +flyash brick) in year y

<table>
<tr><td>Year</td><td>Total production in m^3</td></tr>
<tr><td>1</td><td>91,750</td></tr>
<tr><td>2</td><td>121,500</td></tr>
<tr><td>3</td><td>133,500</td></tr>
<tr><td>4</td><td>145,500</td></tr>
<tr><td>5</td><td>157,500</td></tr>
<tr><td>6</td><td>166,500</td></tr>
<tr><td>7</td><td>166,500</td></tr>
<tr><td>8</td><td>166,500</td></tr>
<tr><td>9</td><td>166,500</td></tr>
<tr><td>10</td><td>166,500</td></tr>
<tr><td>11</td><td>28,500</td></tr>
</table>
</td><td>The verification of this parameter is detailed above.</td></tr>
<tr><td>Electricity consumption in the process in the year y
<table>
<tr><td>Year</td><td>Electricity consumption in the process in MWh</td></tr>
<tr><td>1</td><td>1144</td></tr>
<tr><td>2</td><td>1440</td></tr>
<tr><td>3</td><td>1560</td></tr>
<tr><td>4</td><td>1680</td></tr>
<tr><td>5</td><td>1800</td></tr>
<tr><td>6</td><td>1800</td></tr>
<tr><td>7</td><td>1800</td></tr>
<tr><td>8</td><td>1800</td></tr>
</table>
</td><td>Ex-ante estimation:
It is calculated as below
Electricity consumption in the process in the year y = Specific electricity consumption per cubic metre x Annual net production of the facility in year y

Ex-post calculation:
It will be calculated continuously and recorded every month in the electricity bills.

QA/QC procedure:
The Internal meter reading is cross checked through meter reading at meter room on monthly recording basis for correctness. As per the onsite observation, the meter</td></tr>
</table>

<table>
<tr><td><table><tr><td>9</td><td>1800</td></tr><tr><td>10</td><td>1800</td></tr><tr><td>11</td><td>240</td></tr></table></td><td>is in the control of state electricity board and not with the PP. Hence calibration procedure of the meter is not defined in the PD which is accepted by the validation team.</td></tr>
<tr><td>Electricity consumption in the briquette production in the year y</td><td>It is calculated as below
Electricity consumption in the briquette production in the year y = Specific electricity consumption per MT x Annual net production of the briquette in year y</td></tr>
<tr><td>Annual briquette production of the facility in year y =2000 MT /year

(monitored parameter)</td><td>Ex-ante estimation:
It is considered from the DPR which is accepted by the validation team. Since briquette is used in steam boiler for process, but since it is procured not more than 200 km, the leakage emissions due to briquette usage are neglected.

Ex-post monitoring:
It is monitored continuously and recorded in log sheets monthly.

QA/QC procedure:
It can be crosschecked with purchase invoices.</td></tr>
<tr><td>Specific electricity consumption per MT =38 kWh/MT of briquette
(ex-ante parameter)</td><td>It is considered from the DPR which is accepted by the validation team. The verification team has accepted this parameter as ex-ante parameter as briquette is procured from outside control of PP.</td></tr>
<tr><td>Electricity consumption in the briquette production in the year y = 76 MWh/year

(calculated value)</td><td>It is calculated as below
Electricity consumption in the briquette production in the year y = Specific electricity consumption per MT x Annual net production of the briquette in year y</td></tr>
<tr><td>Electricity consumption in the year y
<table><tr><th>Year</th><th>Electricity consumption by the project in the year y</th></tr><tr><td>1</td><td>1220</td></tr><tr><td>2</td><td>1516</td></tr><tr><td>3</td><td>1636</td></tr><tr><td>4</td><td>1756</td></tr><tr><td>5</td><td>1876</td></tr><tr><td>6</td><td>1876</td></tr><tr><td>7</td><td>1876</td></tr><tr><td>8</td><td>1876</td></tr><tr><td>9</td><td>1876</td></tr><tr><td>10</td><td>1876</td></tr><tr><td>11</td><td>316</td></tr></table></td><td>The verification team has observed that electricity consumed in the process of AAC block production & Fly ash brick production and production of briquettes.

Electricity consumption by the project = Electricity consumption in the process in the year y + Electricity consumption in the briquette production in the year y</td></tr>
<tr><td>Grid Emission factor (EF_{EL}) = 0.9613 tCO2e/MWh

(ex-ante parameter)</td><td>As per the “Tool for calculate baseline, project and or leakage emissions from electricity consumption[/12/]” version 1.0, emission factor for electricity generation is the combined margin emission factor calculated as per latest version of “Tool to calculate the emission factor for an electricity system”[/12/] version 5.0 (emission tool). CEA database version 11.0 is based on emission tool hence accepted by the validation team.

The grid emission factor (EF_{grid}) was calculated from the</td></tr>
</table>

	operating margin (OM) CO_2 emission factor and build margin (BM) CO_2 emission factor, referenced from "CO_2 Baseline Database for Indian Power Sector" Version 11 by Central Electricity Authority (CEA)[/35/]. The weighting of operating margin emission factor and weighting of build margin emission factor are 50% and 50%, respectively. The calculation of OM and BM is as per the version 5.0 of "Tool to calculate Emission Factor for an Electricity System"[/36/]. The grid emission factor (combined margin) was verified and found to be correct.
Technical transmission and distribution losses (TDL) =10% (ex-ante parameter)	As per the "Tool for calculate baseline, project and or leakage emissions from electricity consumption"[/12/], version 1.0, TDL is taken as 10% which is accepted by the validation team
Emissions due to electricity consumption in year *y* ($PE_{elec,y}$) Year / Emissions due to electricity consumption: 1: 1290.065 2: 1603.064 3: 1729.955 4: 1856.847 5: 1983.739 6: 1983.739 7: 1983.739 8: 1983.739 9: 1983.739 10: 1983.739 11: 334.1479 (calculated)	As per para 25 of the applied meth, this emission calculated as per "Tool for calculate baseline, project and or leakage emissions from electricity consumption" [/13/] As per the tool referred emission due to consumption of grid electricity = EC_y x EF_{EL} x (1+TDL)
Project emissions due to fossil fuel or NRB consumption in year y ($PE_{fuel,y}$)	As per para 26 of the applied meth, 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. The verification team has observed that furnace oil is consumed in the process. DG set (1 x 250 kVA) is available at the site for standby purpose. As per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" $PE_{fuel,y} = FC_{i,j}$ x NCV_j x EF_j Where $FC_{i,j}$ – Yearly Furnace oil consumption NCV_j-Net Calorific value of furnace oil EF_j –CO2 emission factor of furnace oil The verification of the same is detailed below.
Yearly Furnace oil consumption	It is calculated as below Furnace oil consumption = Specific furnace oil consumption/m^3 of AAC block x Density of furnace oil x no of operational days
Specific furnace oil consumption = 0.336	It is derived from DPR

<table>
<tr><td>litre/m^3 of AAC block</td><td></td></tr>
<tr><td>Density of furnace oil=0.98 litre/kg
(ex-ante parameter)</td><td>It is taken from IOCL website</td></tr>
<tr><td>Annual production of AAC block</td><td>It is already verified as above.</td></tr>
<tr><td>Yearly Furnace oil consumption
<table>
<tr><th>Year</th><th>Furnace oil consumption in 1000 tonnes/ year</th></tr>
<tr><td>1</td><td>0.024</td></tr>
<tr><td>2</td><td>0.03</td></tr>
<tr><td>3</td><td>0.032</td></tr>
<tr><td>4</td><td>0.035</td></tr>
<tr><td>5</td><td>0.037</td></tr>
<tr><td>6</td><td>0.037</td></tr>
<tr><td>7</td><td>0.037</td></tr>
<tr><td>8</td><td>0.037</td></tr>
<tr><td>9</td><td>0.037</td></tr>
<tr><td>10</td><td>0.037</td></tr>
<tr><td>11</td><td>0.005</td></tr>
</table>
</td><td>Ex-ante estimation:
It is calculated as below
Furnace oil consumption = Specific furnace oil consumption/m^3 of AAC block x Density of furnace oil x AAC block production

Ex-post monitoring:
It will be monitored continuously and recorded in the log sheets.

QA/QC procedure:
It will be crosschecked with purchase invoices.</td></tr>
<tr><td>Net Calorific value of furnace oil = 41.7 TJ/1000 tonnes
(ex-ante parameter)</td><td>It is taken from IPCC 2006 data</td></tr>
<tr><td>CO2 emission factor of furnace oil =78.8 tCO2/TJ
(ex-ante parameter)</td><td>It is taken from IPCC 2006 data</td></tr>
<tr><td>Project emissions due to fossil fuel or NRB consumption in year y ($PE_{fuel,y}$)
<table>
<tr><th>Year</th><th>Project emissions due to fossil fuel or NRB consumption in year y in tCO2e</th></tr>
<tr><td>1</td><td>78.863</td></tr>
<tr><td>2</td><td>98.579</td></tr>
<tr><td>3</td><td>105.151</td></tr>
<tr><td>4</td><td>115.009</td></tr>
<tr><td>5</td><td>121.581</td></tr>
<tr><td>6</td><td>121.581</td></tr>
<tr><td>7</td><td>121.581</td></tr>
<tr><td>8</td><td>121.581</td></tr>
<tr><td>9</td><td>121.581</td></tr>
<tr><td>10</td><td>121.581</td></tr>
<tr><td>11</td><td>16.43</td></tr>
</table>
(calculated)</td><td>The verification team has observed that furnace oil is consumed in the process. DG set (1 x 250 kVA) is available at the site for standby purpose.
$PE_{fuel,y} = FC_{i,j} \times NCV_j \times EF_j$</td></tr>
<tr><td>Emissions from cultivation of biomass in a dedicated plantation in year *y* ($PE_{cultivation,y}$) =0 tCO2e</td><td>Since briquette is procured and not cultivated in dedicated plantations, this emission is zero.</td></tr>
<tr><td>Project emissions due to the production of charcoal in kilns not equipped with a methane recovery and destruction facility in year *y* ($PE_{CH4,y}$) =0 tCO2e/year</td><td>Since there is no charcoal produced inside the project activity, these emissions is zero.</td></tr>
<tr><td>Project emissions (PE_y)</td><td>As per para 24 of the applied meth, project emissions</td></tr>
</table>

<table>
<tr><td>
<table>
<tr><th>Year</th><th>Project emissions</th></tr>
<tr><td>1</td><td>1368.928</td></tr>
<tr><td>2</td><td>1701.643</td></tr>
<tr><td>3</td><td>1835.106</td></tr>
<tr><td>4</td><td>1971.856</td></tr>
<tr><td>5</td><td>2105.32</td></tr>
<tr><td>6</td><td>2105.32</td></tr>
<tr><td>7</td><td>2105.32</td></tr>
<tr><td>8</td><td>2105.32</td></tr>
<tr><td>9</td><td>2105.32</td></tr>
<tr><td>10</td><td>2105.32</td></tr>
<tr><td>11</td><td>350.5779</td></tr>
</table>
</td><td>includes
1) emissions due to electricity consumption in year *y* ($PE_{elec,y}$)
2) emissions due to fossil fuel or NRB consumption in year *y* ($PE_{fuel,y}$)
3) emissions from cultivation of biomass in a dedicated plantation in year *y* ($PE_{cultivation,y}$)
4) emissions due to the production of charcoal in kilns not equipped with a methane recovery and destruction facility in year *y* ($PE_{CH4,y}$)</td></tr>
<tr><td>Leakage emissions (LE_y)</td><td>Leakage emissions due to the project activity consists of leakage during AAC block production and leakage during fly ash brick production. The verification of the same is detailed below.</td></tr>
<tr><td>Leakage emissions (LE_y) –AAC block</td><td>As per para 29 and 30 of the applied meth, Leakage emission during AAC block production consists of 1) Leakage emissions on account of the diversion of biomass residues from other uses (competing uses) 2) the incremental emissions associated with the production/consumption and transport of those raw and/or additive materials consumed.</td></tr>
<tr><td>Emissions on account of the diversion of biomass residues from other uses (competing uses) =0 tCO2e/year</td><td>Leakage emissions on account of the diversion of biomass residues from other uses (competing uses) shall be calculated as per the “General guidance on leakage in biomass project activities”. Specifically, where NRB is involved, the leakage specified in leakage section of AMS-II.G shall also be considered. As per the “Tool Leakage in biomass small-scale project activities”[/12/] version 4.0 if PP is able to demonstrate via DPR[/13/] that quantity of available biomass in the region, is 25% larger than the quantity of biomass that is utilised including the project activity, this emission can be considered as zero. Since PP has demonstrated that quantity of available biomass in the region is 25% larger than the quantity of biomass that is utilised including the project activity, this emission is zero.</td></tr>
<tr><td>Incremental emissions associated with the production/consumption and transport of those raw and/or additive materials consumed as compared to baseline 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</td><td>By reviewing the process at the onsite, the production process involves the use of aerated concrete which is made by introducing air or other gas to a slurry of fly ash, lime, cement and Aluminium powder so that when the mixture is set hard after autoclaving, a uniform cellular structure is obtained.
As per para 31 of the applied meth, leakage emissions due to
1) Production of these raw materials and additives
2) Consumption of these raw materials and additives
3) Transportation of these raw materials and additives to the project site.</td></tr>
<tr><td>Leakage emissions due to production of these raw materials and additives</td><td>Raw material used is fly ash, cement, lime and Aluminium powder in the production of AAC block. Leakage emissions due to production of these raw materials and additives are summation of leakage due to production of flyash, cement, lime and Aluminium. The</td></tr>
</table>

	verification of the same is detailed below.
Leakage due to production of fly ash	Leakage due to production of fly ash = specific fly ash consumption x annual AAC production x Emission factor for fly ash production
Quantity of fly ash consumed	Quantity of fly ash consumed = Specific fly ash consumption x annual AAC production
Specific fly ash consumption = 370 kg of fly ash/m^3	It is assumed from the historical data
Quantity of fly ash consumed <table><tr><td>Year</td><td>Quantity of fly ash consumed (1000 tonnes)</td></tr><tr><td>1</td><td>26.455</td></tr><tr><td>2</td><td>33.3</td></tr><tr><td>3</td><td>36.075</td></tr><tr><td>4</td><td>38.85</td></tr><tr><td>5</td><td>41.625</td></tr><tr><td>6</td><td>41.625</td></tr><tr><td>7</td><td>41.625</td></tr><tr><td>8</td><td>41.625</td></tr><tr><td>9</td><td>41.625</td></tr><tr><td>10</td><td>41.625</td></tr><tr><td>11</td><td>5.55</td></tr></table> (monitored parameter)	Ex-ante estimation: Quantity of fly ash consumed = Specific fly ash consumption x annual AAC production Ex-post calculation: It will be monitored every purchase and recorded at the site. QA/QC procedure: It can be crosschecked using purchase bills.
Emission factor for fly ash production = 0 tCO2e/tonne of fly ash (ex-ante parameter)	As per SSC_518[/10/] clarification, leakage emission due to waste material is not required to be considered, hence this emission is zero.
Leakage due to production of fly ash =0 tCO2e/year (calculated)	Leakage due to production of fly ash = Quantity of fly ash consumed x Emission factor for fly ash production
Leakage due to production of lime	Leakage due to production of lime = Quantity of lime consumed x Emission factor for lime production
Quantity of lime consumed	Ex-ante estimation: Quantity of lime consumed = Specific lime consumption x annual AAC production
Specific lime consumption =68 kg of lime/m^3 of AAC block	It is assumed from the historical data
Annual AAC production (monitored parameter)	The validation of this parameter is already detailed above.
Quantity of lime consumed <table><tr><td>Year</td><td>Quantity of lime consumed (1000 tonnes)</td></tr><tr><td>1</td><td>4.862</td></tr><tr><td>2</td><td>6.120</td></tr><tr><td>3</td><td>6.630</td></tr><tr><td>4</td><td>7.140</td></tr><tr><td>5</td><td>7.650</td></tr><tr><td>6</td><td>7.650</td></tr><tr><td>7</td><td>7.650</td></tr><tr><td>8</td><td>7.650</td></tr></table>	Ex-ante estimation: Quantity of lime consumed = Specific lime consumption x annual AAC production Ex-post calculation: It will be monitored during every purchase and recorded at the site QA/QC procedure: It can be crosschecked with using purchase bills.

<table>
<tr><td><table><tr><td>9</td><td>7.650</td></tr><tr><td>10</td><td>7.650</td></tr><tr><td>11</td><td>1.020</td></tr></table>
(monitored parameter)</td><td></td></tr>
<tr><td>Emission factor for lime production =0.75 tCO2e/tonne of lime

(Ex-ante parameter)</td><td>The validation team has reviewed the IPCC 2006/14/ database and accepted the value as correct.</td></tr>
<tr><td>Leakage due to production of lime<table><tr><td>Year</td><td>Leakage due to production of lime in tCO2e</td></tr><tr><td>1</td><td>3646.5</td></tr><tr><td>2</td><td>4590</td></tr><tr><td>3</td><td>4972.5</td></tr><tr><td>4</td><td>5355</td></tr><tr><td>5</td><td>5737.5</td></tr><tr><td>6</td><td>5737.5</td></tr><tr><td>7</td><td>5737.5</td></tr><tr><td>8</td><td>5737.5</td></tr><tr><td>9</td><td>5737.5</td></tr><tr><td>10</td><td>5737.5</td></tr><tr><td>11</td><td>765</td></tr></table>(calculated)</td><td>Leakage due to production of lime = Quantity of lime consumed x Emission factor for lime production</td></tr>
<tr><td>Leakage due to production of cement</td><td>Leakage due to production of cement = specific cement consumption x annual AAC production x Emission factor for cement production</td></tr>
<tr><td>Specific cement consumption = 100.8 kg of cement /m^3 of AAC block</td><td>It is based on the historical data</td></tr>
<tr><td>Annual AAC production
(monitored parameter)</td><td>The verification of this parameter is already detailed above.</td></tr>
<tr><td>Quantity of cement consumed
<table><tr><td>Year</td><td>Quantity of cement consumed in 1000 tonnes</td></tr><tr><td>1</td><td>7.207</td></tr><tr><td>2</td><td>9.072</td></tr><tr><td>3</td><td>9.828</td></tr><tr><td>4</td><td>10.584</td></tr><tr><td>5</td><td>11.340</td></tr><tr><td>6</td><td>11.34</td></tr><tr><td>7</td><td>11.34</td></tr><tr><td>8</td><td>11.34</td></tr><tr><td>9</td><td>11.34</td></tr><tr><td>10</td><td>11.34</td></tr><tr><td>11</td><td>1.512</td></tr></table>
(monitored parameter)</td><td>Ex-ante estimation:
Quantity of cement consumed = Specific cement consumption x annual AAC production

Ex-post calculation:
It will be monitored during every purchase and recorded at the site

QA/QC procedure: It can be crosschecked with using purchase bills.</td></tr>
<tr><td>Emission factor for cement production =0.638 tCO2e/tonne of cement

(Ex-ante parameter)</td><td>The validation team has reviewed the CSI Protocol/14/ default emission factor of cement production for India and China and accepted the value as correct.</td></tr>
</table>

<table>
<tr><td>Leakage due to production of cement
<table>
<tr><th>Year</th><th>Leakage due to production of cement in tCO2e</th></tr>
<tr><td>1</td><td>4598.066</td></tr>
<tr><td>2</td><td>5787.936</td></tr>
<tr><td>3</td><td>6270.264</td></tr>
<tr><td>4</td><td>6752.592</td></tr>
<tr><td>5</td><td>7234.92</td></tr>
<tr><td>6</td><td>7234.92</td></tr>
<tr><td>7</td><td>7234.92</td></tr>
<tr><td>8</td><td>7234.92</td></tr>
<tr><td>9</td><td>7234.92</td></tr>
<tr><td>10</td><td>7234.92</td></tr>
<tr><td>11</td><td>964.656</td></tr>
</table>
(calculated)</td><td>Leakage due to production of cement = Specific cement consumption x annual AAC production x Emission factor for cement production</td></tr>
<tr><td>Leakage due to production of Aluminium</td><td>Leakage due to production of Aluminium = Quantity of Aluminium consumed x Emission factor for Aluminium production</td></tr>
<tr><td>Quantity of Aluminium</td><td>Ex-ante estimation:
Quantity of Aluminium = Specific Aluminium consumption x annual AAC production</td></tr>
<tr><td>Specific Aluminium consumption =0.336 tonne of Aluminium /m^3 of AAC block</td><td>It is based on the historical data</td></tr>
<tr><td>Annual AAC production
(monitored parameter)</td><td>The validation of this parameter is already detailed above.</td></tr>
<tr><td>Quantity of Aluminium consumed
<table>
<tr><th>Year</th><th>Quantity of Aluminium consumed
in 1000 tonnes</th></tr>
<tr><td>1</td><td>0.024</td></tr>
<tr><td>2</td><td>0.030</td></tr>
<tr><td>3</td><td>0.033</td></tr>
<tr><td>4</td><td>0.035</td></tr>
<tr><td>5</td><td>0.038</td></tr>
<tr><td>6</td><td>0.038</td></tr>
<tr><td>7</td><td>0.038</td></tr>
<tr><td>8</td><td>0.038</td></tr>
<tr><td>9</td><td>0.038</td></tr>
<tr><td>10</td><td>0.038</td></tr>
<tr><td>11</td><td>0.005</td></tr>
</table>
(monitored parameter)</td><td>Ex-ante estimation:
Quantity of Aluminium = Specific Aluminium consumption x annual AAC production

Ex-post calculation:
It will be monitored during every purchase and recorded at the site

QA/QC procedure: It can be crosschecked with using purchase bills.</td></tr>
<tr><td>Emission factor for Aluminium production =1.7 tCO2e/tonne of Aluminium

(Ex-ante parameter)</td><td>The validation team has reviewed the IPCC 2006[/14/] database and accepted the value as correct.</td></tr>
</table>

<table>
<tr><td>Leakage due to production of Aluminium
<table>
<tr><th>Year</th><th>Leakage due to production of Aluminium in tCO2e</th></tr>
<tr><td>1</td><td>40.8</td></tr>
<tr><td>2</td><td>51</td></tr>
<tr><td>3</td><td>56.1</td></tr>
<tr><td>4</td><td>59.5</td></tr>
<tr><td>5</td><td>64.6</td></tr>
<tr><td>6</td><td>64.6</td></tr>
<tr><td>7</td><td>64.6</td></tr>
<tr><td>8</td><td>64.6</td></tr>
<tr><td>9</td><td>64.6</td></tr>
<tr><td>10</td><td>64.6</td></tr>
<tr><td>11</td><td>8.5</td></tr>
</table>
(calculated)</td><td>Leakage due to production of Aluminium = Specific Aluminium consumption x annual AAC production x Emission factor for Aluminium production</td></tr>
<tr><td>Leakage due to production of raw material during AAC block production
<table>
<tr><th>Year</th><th>Leakage due to production of raw material in tCO2e</th></tr>
<tr><td>1</td><td>8285.366</td></tr>
<tr><td>2</td><td>10428.94</td></tr>
<tr><td>3</td><td>11298.86</td></tr>
<tr><td>4</td><td>12167.09</td></tr>
<tr><td>5</td><td>13037.02</td></tr>
<tr><td>6</td><td>13037.02</td></tr>
<tr><td>7</td><td>13037.02</td></tr>
<tr><td>8</td><td>13037.02</td></tr>
<tr><td>9</td><td>13037.02</td></tr>
<tr><td>10</td><td>13037.02</td></tr>
<tr><td>11</td><td>1738.156</td></tr>
</table></td><td>Raw material used is fly ash, cement, lime and Aluminium powder in the production of AAC block. Leakage emissions due to production of these raw materials and additives are summation of leakage due to production of flyash, cement, lime and Aluminium.</td></tr>
<tr><td>Leakage emissions due to consumption of the raw materials and additives during AAC block production =0 tCO2e/year</td><td>It is observed at the onsite that there is no processing of raw materials or additives before using it production of AAC block, hence Leakage emissions due to consumption of the raw materials and additives is zero.</td></tr>
<tr><td>Leakage emissions due to transportation of the raw materials and additives to the project site during AAC block production.</td><td>As per the tool for “Project and leakage emissions from transportation of freight[/12/]” version 1.1.0,
Leakage emissions due to transportation of raw materials = Quantity of each raw material per year x Return trip distance between the origin and destination of freight transportation activity x Default CO2 emission factor for freight transportation activity</td></tr>
<tr><td>Quantity of each raw material
(monitored parameter)</td><td>The validation of the same is detailed above.</td></tr>
</table>

<table>
<tr>
<td>Return trip distance between the origin and destination of freight transportation activity

<table>
<tr><td>Flyash</td><td>400 km</td></tr>
<tr><td>Lime</td><td>1200 km</td></tr>
<tr><td>Cement</td><td>500 km</td></tr>
<tr><td>Aluminium</td><td>3600 km</td></tr>
</table>

(monitored parameter)</td>
<td>Ex-ante estimation:
As per the PP’s recent experience, it is considered for the calculation which is accepted by the validation team.

Ex-post calculation:
It will be recorded for every trip. It will be determined once ex-ante for each freight transportation activity for a reference trip (actual purchase invoices) and using online map sources in the trip sheet

QA/QC procedure:
It can be crosschecked with purchase bills.</td>
</tr>
<tr>
<td>Default CO2 emission factor for freight transportation activity = 0.000245 tCO2e/tonne-km

(ex-ante parameter)</td>
<td>The validation team has reviewed the tool for “Project and leakage emissions from transportation of freight[/12/]” version 1.1.0 and accepted the value.</td>
</tr>
<tr>
<td>Leakage emissions due to transportation of the raw materials and additives to the project site

<table>
<tr><td>Year</td><td>Leakage emissions due to transportation in tCO2e</td></tr>
<tr><td>1</td><td>4926.044</td></tr>
<tr><td>2</td><td>6200.46</td></tr>
<tr><td>3</td><td>6717.606</td></tr>
<tr><td>4</td><td>7233.87</td></tr>
<tr><td>5</td><td>7751.016</td></tr>
<tr><td>6</td><td>7751.016</td></tr>
<tr><td>7</td><td>7751.016</td></tr>
<tr><td>8</td><td>7751.016</td></tr>
<tr><td>9</td><td>7751.016</td></tr>
<tr><td>10</td><td>7751.016</td></tr>
<tr><td>11</td><td>1033.41</td></tr>
</table>

(calculated)</td>
<td>Leakage emissions due to transportation of raw materials = Quantity of each raw material per year x Return trip distance between the origin and destination of freight transportation activity x Default CO2 emission factor for freight transportation activity</td>
</tr>
<tr>
<td>Leakage (LEy) during AAC block production

<table>
<tr><td>Year</td><td>Leakage emissions in tCO2e</td></tr>
<tr><td>1</td><td>13211.41</td></tr>
<tr><td>2</td><td>16629.4</td></tr>
<tr><td>3</td><td>18016.47</td></tr>
<tr><td>4</td><td>19400.96</td></tr>
<tr><td>5</td><td>20788.04</td></tr>
<tr><td>6</td><td>20788.04</td></tr>
<tr><td>7</td><td>20788.04</td></tr>
<tr><td>8</td><td>20788.04</td></tr>
<tr><td>9</td><td>20788.04</td></tr>
<tr><td>10</td><td>20788.04</td></tr>
<tr><td>11</td><td>2771.566</td></tr>
</table></td>
<td>By reviewing the process at the onsite, the production process involves the use of aerated concrete which is made by introducing air or other gas to a slurry of fly ash, lime, cement and Aluminium powder so that when the mixture is set hard after autoclaving, a uniform cellular structure is obtained.
As per para 31 of the applied meth, leakage emissions due to
1) Production of these raw materials and additives
2) Consumption of these raw materials and additives
3) Transportation of these raw materials and additives to the project site.</td>
</tr>
</table>

Leakage emissions (LE_y) –flyash brick	As per para 29 and 30 of the applied meth, Leakage emission during flyash brick production consists of 1) Leakage emissions on account of the diversion of biomass residues from other uses (competing uses) 2) the incremental emissions associated with the production/consumption and transport of those raw and/or additive materials consumed.
Emissions on account of the diversion of biomass residues from other uses (competing uses) =0 tCO2e/year	Leakage emissions on account of the diversion of biomass residues from other uses (competing uses) shall be calculated as per the “General guidance on leakage in biomass project activities”. Specifically, where NRB is involved, the leakage specified in leakage section of AMS-II.G. shall also be considered. As per the “Tool Leakage in biomass small-scale project activities”[/12/] version 4.0 if PP is able to demonstrate via DPR[/13/] that quantity of available biomass in the region, is 25% larger than the quantity of biomass that is utilised including the project activity, this emission can be considered as zero. Since PP has demonstrated that quantity of available biomass in the region is 25% larger than the quantity of biomass that is utilised including the project activity, this emission is zero.
Incremental emissions associated with the production/consumption and transport of those raw and/or additive materials consumed as compared to baseline 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	By reviewing the process at the onsite, the production process of flyash brick involves the use of flyash and cement. As per para 31 of the applied meth, leakage emissions due to 1) Production of these raw materials and additives 2) Consumption of these raw materials and additives 3) Transportation of these raw materials and additives to the project site.
Leakage emissions due to production of these raw materials and additives	Raw material used is cement and fly ash in the production of flyash brick. Leakage emissions due to production of these raw materials and additives are summation of leakage due to production of cement and flyash. The verification of the same is detailed below.
Leakage due to production of cement	Leakage due to production of cement = specific cement consumption x annual fly ash brick production x Emission factor for cement production
Specific cement consumption = 40 kg of cement /m^3 of fly ash block	It is based on the historical data
Annual fly ash brick production (monitored parameter)	It is already verified as above.
Quantity of cement consumed <table><tr><td>Year</td><td>Quantity of cement consumed in 1000 tonnes</td></tr><tr><td>1</td><td>0.81</td></tr><tr><td>2</td><td>1.26</td></tr><tr><td>3</td><td>1.44</td></tr><tr><td>4</td><td>1.62</td></tr><tr><td>5</td><td>1.8</td></tr><tr><td>6</td><td>2.16</td></tr><tr><td>7</td><td>2.16</td></tr></table>	Quantity of cement consumed = specific cement consumption x annual fly ash brick production

<table>
<tr><td><table><tr><td>8</td><td>2.16</td></tr><tr><td>9</td><td>2.16</td></tr><tr><td>10</td><td>2.16</td></tr><tr><td>11</td><td>0.54</td></tr></table>
(monitored parameter)</td><td></td></tr>
<tr><td>Emission factor for cement production =0.638 tCO2e/tonne of cement

(Ex-ante parameter)</td><td>The validation team has reviewed the CSI Protocol/14/ default emission factor of cement production for India and China and accepted the value as correct.</td></tr>
<tr><td>Leakage due to production of cement<table><tr><td>Year</td><td>Leakage due to production of cement in tCO2e</td></tr><tr><td>1</td><td>516.78</td></tr><tr><td>2</td><td>803.88</td></tr><tr><td>3</td><td>918.72</td></tr><tr><td>4</td><td>1033.56</td></tr><tr><td>5</td><td>1148.4</td></tr><tr><td>6</td><td>1378.08</td></tr><tr><td>7</td><td>1378.08</td></tr><tr><td>8</td><td>1378.08</td></tr><tr><td>9</td><td>1378.08</td></tr><tr><td>10</td><td>1378.08</td></tr><tr><td>11</td><td>344.52</td></tr></table>(calculated parameter)</td><td>Leakage due to production of cement = specific cement consumption x annual fly ash brick production x Emission factor for cement production</td></tr>
<tr><td>Leakage due to production of fly ash</td><td>Leakage due to production of fly ash = specific fly ash consumption x annual fly ash brick production x Emission factor for fly ash production</td></tr>
<tr><td>Quantity of fly ash consumed
(monitored parameter)</td><td>Ex-ante estimation:
Quantity of fly ash consumed = Specific fly ash consumption x annual AAC production</td></tr>
<tr><td>Specific fly ash consumption = 166.6 kg of fly ash/m^3 of fly ash brick</td><td>It is assumed from the historical data</td></tr>
<tr><td>Quantity of fly ash consumed<table><tr><td>Year</td><td>Quantity of fly ash consumed (1000 tonnes)</td></tr><tr><td>1</td><td>3.374</td></tr><tr><td>2</td><td>5.248</td></tr><tr><td>3</td><td>5.998</td></tr><tr><td>4</td><td>6.747</td></tr><tr><td>5</td><td>7.497</td></tr><tr><td>6</td><td>8.996</td></tr><tr><td>7</td><td>8.996</td></tr><tr><td>8</td><td>8.996</td></tr><tr><td>9</td><td>8.996</td></tr><tr><td>10</td><td>8.996</td></tr><tr><td>11</td><td>2.249</td></tr></table>(monitored parameter)</td><td>Ex-ante estimation:
Quantity of fly ash consumed = Specific fly ash consumption x annual fly ash brick production

Ex-post calculation:
It will be monitored during every purchase and recorded at the site

QA/QC procedure: It can be crosschecked with using purchase bills.</td></tr>
<tr><td>Emission factor for fly ash production = 0 tCO2e/tonne of fly ash
(ex-ante parameter)</td><td>As per SSC_518/10/ clarification, leakage emission due to waste material is not required to be considered, hence this emission is zero.</td></tr>
<tr><td>Leakage due to production of fly ash =0</td><td>Leakage due to production of fly ash = Quantity of fly ash</td></tr>
</table>

<table>
<tr><td>tCO2e/year
(calculated)</td><td>consumed x Emission factor for fly ash production</td></tr>
<tr><td>Leakage due to production of raw materials during fly ash production

<table>
<tr><td>Year</td><td>Leakage due to production of raw materials during fly ash production
in tCO2e</td></tr>
<tr><td>1</td><td>516.78</td></tr>
<tr><td>2</td><td>803.88</td></tr>
<tr><td>3</td><td>918.72</td></tr>
<tr><td>4</td><td>1033.56</td></tr>
<tr><td>5</td><td>1148.4</td></tr>
<tr><td>6</td><td>1378.08</td></tr>
<tr><td>7</td><td>1378.08</td></tr>
<tr><td>8</td><td>1378.08</td></tr>
<tr><td>9</td><td>1378.08</td></tr>
<tr><td>10</td><td>1378.08</td></tr>
<tr><td>11</td><td>344.52</td></tr>
</table></td><td>Raw material used is cement and fly ash in the production of flyash brick. Leakage emissions due to production of these raw materials and additives are summation of leakage due to production of cement and flyash.</td></tr>
<tr><td>Leakage emissions due to consumption of the raw materials and additives =0 tCO2e/year</td><td>It is observed at the onsite that there is no processing of raw materials or additives before using it production of fly ash brick, hence Leakage emissions due to consumption of the raw materials and additives is zero.</td></tr>
<tr><td>Leakage emissions due to transportation of the raw materials and additives to the project site.</td><td>As per the tool for “Project and leakage emissions from transportation of freight[/12/]” version 1.1.0,
Leakage emissions due to transportation of raw materials = Quantity of each raw material per year x Return trip distance between the origin and destination of freight transportation activity x Default CO2 emission factor for freight transportation activity</td></tr>
<tr><td>Quantity of each raw material
(monitored parameter)</td><td>The verification of the same is detailed above.</td></tr>
<tr><td>Return trip distance between the origin and destination of freight transportation activity

<table>
<tr><td>Flyash</td><td>400 km</td></tr>
<tr><td>Cement</td><td>500 km</td></tr>
</table>
(monitored parameter)</td><td>Ex-ante estimation:
As per the PP’s recent experience, it is considered for the calculation which is accepted by the validation team.

Ex-post calculation:
It will be recorded for every trip. It will be determined once ex-ante for each freight transportation activity for a reference trip (actual purchase invoices) and using online map sources in the trip sheet

QA/QC procedure:
It can be crosschecked with purchase bills.</td></tr>
<tr><td>Default CO2 emission factor for freight transportation activity =0.000245 tCO2e/tonne-km

(ex-ante parameter)</td><td>The validation team has reviewed the tool for “Project and leakage emissions from transportation of freight[/12/]” version 1.1.0 and accepted the value.</td></tr>
</table>

<table>
<tr><td>Leakage emissions due to transportation of the raw materials and additives to the project site

<table><tr><td>Year</td><td>Leakage emissions due to transportation in tCO2e</td></tr><tr><td>1</td><td>0.429877</td></tr><tr><td>2</td><td>0.668654</td></tr><tr><td>3</td><td>0.764204</td></tr><tr><td>4</td><td>0.859656</td></tr><tr><td>5</td><td>0.955206</td></tr><tr><td>6</td><td>1.146208</td></tr><tr><td>7</td><td>1.146208</td></tr><tr><td>8</td><td>1.146208</td></tr><tr><td>9</td><td>1.146208</td></tr><tr><td>10</td><td>1.146208</td></tr><tr><td>11</td><td>0.286552</td></tr></table>
(calculated)</td><td>Leakage emissions due to transportation of raw materials = Quantity of each raw material per year x Return trip distance between the origin and destination of freight transportation activity x Default CO2 emission factor for freight transportation activity</td></tr>
<tr><td>Leakage during fly ash brick production

<table><tr><td>Year</td><td>Leakage emissions in tCO2e</td></tr><tr><td>1</td><td>517.2099</td></tr><tr><td>2</td><td>804.5487</td></tr><tr><td>3</td><td>919.4842</td></tr><tr><td>4</td><td>1034.42</td></tr><tr><td>5</td><td>1149.355</td></tr><tr><td>6</td><td>1379.226</td></tr><tr><td>7</td><td>1379.226</td></tr><tr><td>8</td><td>1379.226</td></tr><tr><td>9</td><td>1379.226</td></tr><tr><td>10</td><td>1379.226</td></tr><tr><td>11</td><td>344.8066</td></tr></table></td><td>As per para 29 and 30 of the applied meth, Leakage emission during flyash brick production consists of 1) Leakage emissions on account of the diversion of biomass residues from other uses (competing uses) 2) the incremental emissions associated with the production/consumption and transport of those raw and/or additive materials consumed.</td></tr>
<tr><td>Leakage emission in the project

<table><tr><td>Year</td><td>Leakage emissions in tCO2e</td></tr><tr><td>1</td><td>13728.62</td></tr><tr><td>2</td><td>17433.94</td></tr><tr><td>3</td><td>18935.95</td></tr><tr><td>4</td><td>20435.38</td></tr><tr><td>5</td><td>21937.39</td></tr><tr><td>6</td><td>22167.26</td></tr><tr><td>7</td><td>22167.26</td></tr><tr><td>8</td><td>22167.26</td></tr><tr><td>9</td><td>22167.26</td></tr><tr><td>10</td><td>22167.26</td></tr><tr><td>11</td><td>3116.373</td></tr></table></td><td>Leakage emissions due to the project activity consists of leakage during AAC block production and leakage during fly ash brick production.</td></tr>
</table>

<table>
<tr>
<td>Emission reduction (ER_y)

<table>
<tr><td>Year</td><td>Emission reduction in tCO_2e</td></tr>
<tr><td>1</td><td>17,863.04</td></tr>
<tr><td>2</td><td>23,010.49</td></tr>
<tr><td>3</td><td>27,187.95</td></tr>
<tr><td>4</td><td>29,862.69</td></tr>
<tr><td>5</td><td>30,921.55</td></tr>
<tr><td>6</td><td>35,541.46</td></tr>
<tr><td>7</td><td>35,541.46</td></tr>
<tr><td>8</td><td>35,541.46</td></tr>
<tr><td>9</td><td>35,541.46</td></tr>
<tr><td>10</td><td>35,541.46</td></tr>
<tr><td>11</td><td>6,771.49</td></tr>
</table>
</td>
<td>As per para 33 of the applied meth, emission reduction achieved by the project activity shall be calculated as below
$ER_y = BE_y - PE_y - LE_y$

Where
ER_y – Emission reductions
BE_y-Baseline emissions
PE_y- Project emissions
LE_y-Leakage emissions</td>
</tr>
<tr>
<td>Compressive strength of AAC block=5.2 N/mm2

Compressive strength of flyash brick=9.46 N/mm2

(monitored parameter)</td>
<td>Ex-ante estimation:
It is taken from DPR which is accepted by the validation team.

Ex-post calculation:
As per para 11 of the applied meth, service level of project bricks to be tested in lab at six month intervals. PP have proposed to test the service level at an accredited lab with time interval of 6 months. Hence accepted by the verification team.

QA/QC procedure:
It will be under taken by third party hence accepted.</td>
</tr>
</table>

3.3.7 Methodology Deviations

There is no methodology deviation involved.

3.3.8 Monitoring Plan

Please refer section 3.3.6 of this report.

3.4 Non-Permanence Risk Analysis

Not applicable to the non AFOLU project.

3.5 Environmental Impact

The validation team has reviewed MoEF notification[/11/] dated 1st Dec 2009 and observed that the project activity does not fall under positive list of projects for which Environment Impact Assessment (EIA) is required. Hence, the project activity does not require Environment Impact Assessment to be conducted. The validation team has reviewed the approvals[/7/] given by State Pollution Control Board dated 26th September 2014 and licence to establish the plant given by Inspector of Factories dated 27th February 2015. Based on the above findings, the validation team has concluded that the project activity satisfies the requirements related to Environment impact.

3.6 Stakeholder Comments

A formal consultation process with the local stakeholders was carried out on 16th May 2014 at the project site. The identified stakeholders included villagers, officers from the Municipal Corporation, farmers around the project area, and representatives of project developers. All the identified stakeholders were communicated by written invitation before the meeting.

The meeting discussed the environmental benefits of the project activity and the stakeholders were provided with an interactive presentation on the project activity, its local and global benefits to the environment, the process, and how the project would lead to sustainable development. The Queries / comments were summarized and adequately addressed / accounted for as evident from the minutes of the stakeholder meeting and the description provided in the PD. The validation team was able to confirm that PP had conducted the local stakeholder consultation process by reviewing the local stakeholder documents[/15] details.

4 VERIFICATION FINDINGS

4.1 Accuracy of GHG Emission Reduction and Removal Calculations

The verification of all the data ex-ante and data ex-post (monitoring parameters) used for the calculation of baseline emissions, project emissions and leakage emissions are tabulated below.

Parameter	Justification by the verification team
Emission reduction by the project activity (ER_y)	The project activity uses the latest approved monitoring methodology AMS.III.Z Version 06[/2/], which is applicable to the project. The verification team has reviewed based on the onsite assessment the requirements of monitoring plan including the responsibility, authority, monitoring, measurement, reporting, archiving, the QA / QC procedures such as calibration, meter testing, internal audits, maintenance of monitoring equipment and monitoring plan implementation and able to confirm that all the requirements are complied with the methodology. Further to assessment of the monitoring plan indicated in the PD, the validation team is of the opinion that the project participant will be able to implement the monitoring plan as the monitoring plan is in line with the requirements of the methodology and the monitoring arrangements described in the monitoring plan are feasible within the project design. The detailed verification of monitoring plan including ex-ante and ex-post parameters is given below. As per para 31 of the applied meth, emission reduction achieved by the project activity shall be calculated as below $ER_y = BE_y - PE_y - LE_y$ Where ER_y – Emission reductions BE_y-Baseline emissions PE_y- Project emissions LE_y-Leakage emissions
Baseline emissions (BE_y)	As per para 20 Clause b, for projects involving the installation of systems in a new facility or a capacity addition in an existing system, the average annual

<table>
<tr><td></td><td>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 above results in more than one alternative technology with different levels of energy consumption, the alternative with the least emissions intensity should be chosen for determining the baseline emissions of the facility.

As demonstrated above, the project is constructed in the greenfield facility and baseline would be FC-BTK with coal as baseline fuel.

As per para 21 of the applied meth, Baseline emissions is calculated as below.
$BE_y = SEC_{BL} \times EF_{BL} \times P_{PJ,y}$

Where
SEC_{BL} - Specific energy consumption of brick production in the baseline
EF_{BL} – Emission factor of baseline fuel
$P_{PJ,y}$ – Annual net production of the facility in year *y*</td></tr>
<tr><td>Specific energy consumption of brick production in the baseline (SEC_{BL}) =3,797.5 MJ/m^3 of brick
(ex-ante parameter)</td><td>It is already validated in section 3.3.4 of this report. Biomass adjustment factor of 2% is accounted for.</td></tr>
<tr><td>Emission factor of coal = 94.6 tCO2e/TJ
(ex-ante parameter)</td><td>The verification team has reviewed the IPCC data for 2006 and accepted the value.</td></tr>
<tr><td>Annual net production of the facility in year *y*
<table><tr><td>Year</td><td>AAC block in m^3</td><td>Fly ash brick in m^3</td></tr><tr><td>2014</td><td>46,734.54</td><td>0</td></tr><tr><td>2015</td><td>97,238.76</td><td>18,303.60</td></tr><tr><td>2016</td><td>55,372.26</td><td>10,781.40</td></tr></table></td><td>Ex-post monitoring:
The verification team has checked the logsheets and accepted the values as correct..

QA/QC procedure:
It can be crosschecked with sales invoices.</td></tr>
<tr><td>Baseline emissions (BE_y)
<table><tr><td>Year</td><td>AAC block in tCO2e</td><td>Fly ash brick in tCO2e</td><td>Total in tCO2e</td></tr><tr><td>2014</td><td>16789.08</td><td>0</td><td>16789.08</td></tr><tr><td>2015</td><td>34932.392</td><td>6575.449</td><td>41507.84</td></tr><tr><td>2016</td><td>19892.124</td><td>3873.148</td><td>23765.27</td></tr></table></td><td>As per para 21 of the applied meth, Baseline emissions is calculated as below.
$BE_y = SEC_{BL} \times EF_{BL} \times P_{PJ,y}$</td></tr>
<tr><td>Project emissions (PE_y)</td><td>As per para 24 of the applied meth, project emissions includes
1) emissions due to electricity consumption in year *y* ($PE_{elec,y}$)
2) emissions due to fossil fuel or NRB consumption in year *y* ($PE_{fuel,y}$)
3) emissions from cultivation of biomass in a dedicated plantation in year *y* ($PE_{cultivation,y}$)
4) emissions due to the production of charcoal in kilns not equipped with a methane recovery and destruction facility in year *y* ($PE_{CH4,y}$)</td></tr>
<tr><td>Emissions due to electricity consumption in</td><td>As per para 25 of the applied meth, this emission</td></tr>
</table>

<table>
<tr><td>year y ($PE_{elec,y}$)</td><td>calculated as per “Tool for calculate baseline, project and or leakage emissions from electricity consumption” [/13/]
As per the tool referred emission due to consumption of grid electricity = EC_y x EF_{EL} x (1+TDL)
Where
EC_y –Electricity consumption in the year y
EF_{EL}- Grid Emission factor
TDL-Technical transmission and distribution losses</td></tr>
<tr><td>Electricity consumption in the year y</td><td>The verification team has observed that electricity consumed in the process of AAC block production & Fly ash brick production and production of briquettes.

Electricity consumption by the project = Electricity consumption in the process in the year y + Electricity consumption in the briquette production in the year y

The verification of the same is detailed below.</td></tr>
<tr><td>Electricity consumption in the process in the year y<table><tr><td>Year</td><td>Electricity consumption in the process in MWh</td></tr><tr><td>2014</td><td>747.75</td></tr><tr><td>2015</td><td>1555.82</td></tr><tr><td>2016</td><td>885.95</td></tr></table></td><td>Ex-post calculation:
The verification team has reviewed he monthly electricity invoices and accepted the value as correct.

QA/QC procedure:
The Internal meter reading is cross checked through meter reading at meter room on monthly recording basis for correctness. As per the onsite observation, the meter is in the control of state electricity board and not with the PP. Hence calibration procedure of the meter is not defined in the PD which is accepted by the verification team.</td></tr>
<tr><td>Electricity consumption in the briquette production in the year y</td><td>It is calculated as below
Electricity consumption in the briquette production in the year y = Specific electricity consumption per MT x Annual net production of the briquette in year y</td></tr>
<tr><td>Briquette production of the facility<table><tr><td>Year</td><td>Briquette production of the facility in MT</td></tr><tr><td>2014</td><td>1195.5</td></tr><tr><td>2015</td><td>2631</td></tr><tr><td>2016</td><td>1167</td></tr></table>(monitored parameter)</td><td>Ex-post monitoring:
The verification team has reviewed the log sheets monthly and accepted the value as correct. Since briquette is used in steam boiler for process, but since it is procured not more than 200 km, the leakage emissions due to briquette usage are neglected

QA/QC procedure:
It is crosschecked with purchase invoices and the value matches with the log sheets.</td></tr>
<tr><td>Specific electricity consumption per MT =38 kWh/MT of briquette
(ex-ante parameter)</td><td>It is considered from the DPR which is accepted by the validation team. The verification team has accepted this parameter as ex-ante parameter as briquette is procured from outside control of PP.</td></tr>
<tr><td>Electricity consumption in the briquette production<table><tr><td>Year</td><td>Electricity consumption in the briquette production in MWh</td></tr><tr><td>2014</td><td>45.429</td></tr><tr><td>2015</td><td>99.978</td></tr><tr><td>2016</td><td>44.346</td></tr></table></td><td>It is calculated as below
Electricity consumption in the briquette production in the year y = Specific electricity consumption per MT x production of the briquette</td></tr>
</table>

<table>
<tr><td>(calculated value)</td><td></td></tr>
<tr><td>Electricity consumption in the year y
<table><tr><td>Year</td><td>Electricity consumption by the project</td></tr><tr><td>2014</td><td>793.18</td></tr><tr><td>2015</td><td>1655.79</td></tr><tr><td>2016</td><td>930.30</td></tr></table></td><td>The verification team has observed that electricity consumed in the process of AAC block production & Fly ash brick production and production of briquettes.

Electricity consumption by the project = Electricity consumption in the process in the year y + Electricity consumption in the briquette production in the year y</td></tr>
<tr><td>Grid Emission factor (EF_{EL}) = 0.9613 tCO2e/MWh

(ex-ante parameter)</td><td>It is ex-ante parameter hence accepted by the verification team.</td></tr>
<tr><td>Technical transmission and distribution losses (TDL) =10%

(ex-ante parameter)</td><td>It is ex-ante parameter hence accepted by the verification team.</td></tr>
<tr><td>Emissions due to electricity consumption in year *y* ($PE_{elec,y}$)
<table><tr><td>Year</td><td>Emissions due to electricity consumption in tCO2e</td></tr><tr><td>2014</td><td>838.73</td></tr><tr><td>2015</td><td>1750.89</td></tr><tr><td>2016</td><td>983.72</td></tr></table>
(calculated)</td><td>As per para 25 of the applied meth, this emission calculated as per “Tool for calculate baseline, project and or leakage emissions from electricity consumption” [/13/]
As per the tool referred emission due to consumption of grid electricity = EC_y x EF_{EL} x (1+TDL)</td></tr>
<tr><td>Project emissions due to fossil fuel or NRB consumption in year y ($PE_{fuel,y}$)</td><td>As per para 26 of the applied meth, 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. The verification team has observed that furnace oil is consumed in the process. DG set (1 x 250 kVA) is available at the site for standby purpose. But no diesel was consumed in the DG set.
As per the “Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion”
$PE_{fuel,y} = FC_{i,j} \times NCV_j \times EF_j$
Where
$FC_{i,j}$ – Yearly Furnace oil consumption
NCV_j-Net Calorific value of furnace oil
EF_j –CO2 emission factor of furnace oil
The verification of the same is detailed below.</td></tr>
<tr><td>Density of furnace oil=0.98 litre/kg
(ex-ante parameter)</td><td>It is taken from IOCL website. It is ex-ante parameter hence accepted by the verification team.</td></tr>
</table>

<table>
<tr>
<td>Yearly Furnace oil consumption
<table>
<tr><td>Year</td><td>Furnace oil consumption in 1000 tonnes/ year</td></tr>
<tr><td>2014</td><td>0.015</td></tr>
<tr><td>2015</td><td>0.032</td></tr>
<tr><td>2016</td><td>0.018</td></tr>
</table>
</td>
<td>Ex-post monitoring:
It is sourced from the log sheets and accepted by the verification team.

QA/QC procedure:
It is crosschecked with purchase invoices.</td>
</tr>
<tr>
<td>Net Calorific value of furnace oil = 41.7 TJ/1000 tonnes
(ex-ante parameter)</td>
<td>It is taken from IPCC 2006 data. It is ex-ante parameter hence accepted by the verification team.</td>
</tr>
<tr>
<td>CO2 emission factor of furnace oil =78.8 tCO2/TJ
(ex-ante parameter)</td>
<td>It is taken from IPCC 2006 data. It is ex-ante parameter hence accepted by the verification team.</td>
</tr>
<tr>
<td>Project emissions due to fossil fuel or NRB consumption in year y ($PE_{fuel,y}$)
<table>
<tr><td>Year</td><td>Project emissions due to fossil fuel or NRB consumption in year y in tCO2e</td></tr>
<tr><td>2014</td><td>49.29</td></tr>
<tr><td>2015</td><td>105.151</td></tr>
<tr><td>2016</td><td>59.147</td></tr>
</table>
(calculated)</td>
<td>The verification team has observed that furnace oil is consumed in the process. DG set (1 x 250 kVA) is available at the site for standby purpose.
$PE_{fuel,y} = FC_{i,j} \times NCV_j \times EF_j$</td>
</tr>
<tr>
<td>Emissions from cultivation of biomass in a dedicated plantation in year *y* ($PE_{cultivation,y}$) =0 tCO2e</td>
<td>Since briquette is procured and not cultivated in dedicated plantations, this emission is zero.</td>
</tr>
<tr>
<td>Project emissions due to the production of charcoal in kilns not equipped with a methane recovery and destruction facility in year *y* ($PE_{CH4,y}$) =0 tCO2e/year</td>
<td>Since there is no charcoal produced inside the project activity, these emissions is zero.</td>
</tr>
<tr>
<td>Project emissions (PE_y)
<table>
<tr><td>Year</td><td>Project emissions in tCO2e</td></tr>
<tr><td>2014</td><td>888.02</td></tr>
<tr><td>2015</td><td>1856.04</td></tr>
<tr><td>2016</td><td>1042.87</td></tr>
</table>
</td>
<td>As per para 24 of the applied meth, project emissions includes
1) emissions due to electricity consumption in year *y* ($PE_{elec,y}$)
2) emissions due to fossil fuel or NRB consumption in year *y* ($PE_{fuel,y}$)
3) emissions from cultivation of biomass in a dedicated plantation in year *y* ($PE_{cultivation,y}$)
4) emissions due to the production of charcoal in kilns not equipped with a methane recovery and destruction facility in year *y* ($PE_{CH4,y}$)</td>
</tr>
<tr>
<td>Leakage emissions (LE_y)</td>
<td>Leakage emissions due to the project activity consists of leakage during AAC block production and leakage during fly ash brick production. The verification of the same is detailed below.</td>
</tr>
<tr>
<td>Leakage emissions (LE_y) –AAC block</td>
<td>As per para 29 and 30 of the applied meth, Leakage emission during AAC block production consists of 1) Leakage emissions on account of the diversion of biomass residues from other uses (competing uses) 2) the incremental emissions associated with the production/consumption and transport of those raw</td>
</tr>
</table>

<table>
<tr><td></td><td>and/or additive materials consumed.</td></tr>
<tr><td>Emissions on account of the diversion of biomass residues from other uses (competing uses)

<table><tr><td>Year</td><td>Emissions on account of the diversion of biomass residues from other uses in tCO2e</td></tr><tr><td>2014</td><td>0</td></tr><tr><td>2015</td><td>0</td></tr><tr><td>2016</td><td>0</td></tr></table></td><td>Leakage emissions on account of the diversion of biomass residues from other uses (competing uses) shall be calculated as per the “General guidance on leakage in biomass project activities”. Specifically, where NRB is involved, the leakage specified in leakage section of AMS-II.G. shall also be considered. As per the “Tool Leakage in biomass small-scale project activities”[/12/] version 4.0 if PP is able to demonstrate via DPR[/13/] that quantity of available biomass in the region, is 25% larger than the quantity of biomass that is utilised including the project activity, this emission can be considered as zero. Since PP has demonstrated that quantity of available biomass in the region is 25% larger than the quantity of biomass that is utilised including the project activity, this emission is zero.</td></tr>
<tr><td>Incremental emissions associated with the production/consumption and transport of those raw and/or additive materials consumed as compared to baseline 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</td><td>By reviewing the process at the onsite, the production process involves the use of aerated concrete which is made by introducing air or other gas to a slurry of fly ash, lime, cement and Aluminium powder so that when the mixture is set hard after autoclaving, a uniform cellular structure is obtained.
As per para 31 of the applied meth, leakage emissions due to
1) Production of these raw materials and additives
2) Consumption of these raw materials and additives
3) Transportation of these raw materials and additives to the project site.</td></tr>
<tr><td>Leakage emissions due to production of these raw materials and additives</td><td>Raw material used is fly ash, cement, lime and Aluminium powder in the production of AAC block. Leakage emissions due to production of these raw materials and additives are summation of leakage due to production of flyash, cement, lime and Aluminium. The verification of the same is detailed below.</td></tr>
<tr><td>Leakage due to production of fly ash</td><td>Leakage due to production of fly ash = Quantity of fly ash consumed x Emission factor for fly ash production</td></tr>
<tr><td>Quantity of fly ash consumed<table><tr><td>Year</td><td>Quantity of fly ash consumed (1000 tonnes)</td></tr><tr><td>2014</td><td>17.292</td></tr><tr><td>2015</td><td>35.978</td></tr><tr><td>2016</td><td>20.488</td></tr></table>
(monitored parameter)</td><td>Ex-post calculation:
It is recorded during every purchase and recorded at the site. The verification team has reviewed the documents and accepted the value.

QA/QC procedure:
It can be crosschecked using purchase bills.</td></tr>
<tr><td>Emission factor for fly ash production = 0 tCO2e/tonne of fly ash

(ex-ante parameter)</td><td>As per SSC_518[/10/] clarification, leakage emission due to waste material is not required to be considered, hence this emission is zero. It is ex-ante parameter hence accepted by the verification team.</td></tr>
<tr><td>Leakage due to production of fly ash<table><tr><td>Year</td><td>Leakage due to production of fly ash in tCO2e</td></tr><tr><td>2014</td><td>0</td></tr><tr><td>2015</td><td>0</td></tr><tr><td>2016</td><td>0</td></tr></table></td><td>Leakage due to production of fly ash = Quantity of fly ash consumed x Emission factor for fly ash production</td></tr>
</table>

<table>
<tr><td>(calculated)</td><td></td></tr>
<tr><td>Leakage due to production of lime</td><td>Leakage due to production of lime = Quantity of lime consumed x Emission factor for lime production</td></tr>
<tr><td>Quantity of lime consumed
<table><tr><td>Year</td><td>Quantity of lime consumed (1000 tonnes)</td></tr><tr><td>2014</td><td>3.178</td></tr><tr><td>2015</td><td>6.612</td></tr><tr><td>2016</td><td>3.765</td></tr></table>
(monitored parameter)</td><td>Ex-post calculation:
It is taken records maintained at the site. The verification team has reviewed an accepted the same.

QA/QC procedure:
It is crosschecked with using purchase bills.</td></tr>
<tr><td>Emission factor for lime production =0.75 tCO2e/tonne of lime

(Ex-ante parameter)</td><td>The validation team has reviewed the IPCC 2006/14/ database and accepted the value as correct. It is ex-ante parameter hence accepted by the verification team.</td></tr>
<tr><td>Leakage due to production of lime
<table><tr><td>Year</td><td>Leakage due to production of lime in tCO2e</td></tr><tr><td>2014</td><td>2383.5</td></tr><tr><td>2015</td><td>4959</td></tr><tr><td>2016</td><td>2823.75</td></tr></table>(calculated)</td><td>Leakage due to production of lime = Quantity of lime consumed x Emission factor for lime production</td></tr>
<tr><td>Leakage due to production of cement</td><td>Leakage due to production of cement = Quantity of cement consumed x Emission factor for cement production</td></tr>
<tr><td>Quantity of cement consumed
<table><tr><td>Year</td><td>Quantity of cement consumed in 1000 tonnes</td></tr><tr><td>2014</td><td>4.711</td></tr><tr><td>2015</td><td>9.802</td></tr><tr><td>2016</td><td>5.582</td></tr></table>
(monitored parameter)</td><td>Ex-post calculation:
It is monitored during every purchase and recorded at the site. The verification team has reviewed the records maintained at the site and accepted.

QA/QC procedure:
It is crosschecked with using purchase bills.</td></tr>
<tr><td>Emission factor for cement production =0.638 tCO2e/tonne of cement

(Ex-ante parameter)</td><td>The validation team has reviewed the CSI Protocol/14/ default emission factor of cement production for India and China and accepted the value as correct. It is ex-ante parameter hence accepted by the verification team.</td></tr>
<tr><td>Leakage due to production of cement
<table><tr><td>Year</td><td>Leakage due to production of cement in tCO2e</td></tr><tr><td>2014</td><td>3005.618</td></tr><tr><td>2015</td><td>6253.676</td></tr><tr><td>2016</td><td>3561.316</td></tr></table>
(calculated)</td><td>Leakage due to production of cement = Quantity of cement consumed x Emission factor for cement production</td></tr>
<tr><td>Leakage due to production of Aluminium</td><td>Leakage due to production of Aluminium = Quantity of Aluminium consumed x Emission factor for Aluminium</td></tr>
</table>

<table>
<tr><td></td><td>production</td></tr>
<tr><td>Quantity of Aluminium consumed
<table><tr><td>Year</td><td>Quantity of Aluminium consumed in 1000 tonnes</td></tr><tr><td>2014</td><td>0.016</td></tr><tr><td>2015</td><td>0.033</td></tr><tr><td>2016</td><td>0.019</td></tr></table>
(monitored parameter)</td><td>Ex-post calculation:
It is monitored during every purchase and recorded at the site. The verification team has reviewed the records maintained at the site and accepted.

QA/QC procedure:
It is crosschecked with using purchase bills.</td></tr>
<tr><td>Emission factor for Aluminium production =1.7 tCO2e/tonne of Aluminium

(Ex-ante parameter)</td><td>The validation team has reviewed the IPCC 2006[/14/] database and accepted the value as correct. It is ex-ante parameter hence accepted by the verification team.</td></tr>
<tr><td>Leakage due to production of Aluminium
<table><tr><td>Year</td><td>Leakage due to production of Aluminium in tCO2e</td></tr><tr><td>2014</td><td>27.2</td></tr><tr><td>2015</td><td>56.1</td></tr><tr><td>2016</td><td>32.3</td></tr></table>(calculated)</td><td>Leakage due to production of Aluminium = Quantity of Aluminium consumed x Emission factor for Aluminium production</td></tr>
<tr><td>Leakage due to production of raw material during AAC block production
<table><tr><td>Year</td><td>Leakage due to production of raw material in tCO2e</td></tr><tr><td>2014</td><td>5416.32</td></tr><tr><td>2015</td><td>11268.78</td></tr><tr><td>2016</td><td>6417.37</td></tr></table></td><td>Raw material used is fly ash, cement, lime and Aluminium powder in the production of AAC block. Leakage emissions due to production of these raw materials and additives are summation of leakage due to production of flyash, cement, lime and Aluminium.</td></tr>
<tr><td>Leakage emissions due to consumption of the raw materials and additives during AAC block production =0 tCO2e/year</td><td>It is observed at the onsite that there is no processing of raw materials or additives before using it production of AAC block, hence Leakage emissions due to consumption of the raw materials and additives is zero.</td></tr>
<tr><td>Leakage emissions due to transportation of the raw materials and additives to the project site during AAC block production.</td><td>As per the tool for “Project and leakage emissions from transportation of freight[/12/]” version 1.1.0,
Leakage emissions due to transportation of raw materials = Quantity of each raw material per year x Return trip distance between the origin and destination of freight transportation activity x Default CO2 emission factor for freight transportation activity</td></tr>
<tr><td>Quantity of each raw material
(monitored parameter)</td><td>The verification of the same is detailed above.</td></tr>
</table>

<table>
<tr><td>Return trip distance between the origin and destination of freight transportation activity for all the years
<table><tr><td>Flyash</td><td>400 km</td></tr><tr><td>Lime</td><td>1200 km</td></tr><tr><td>Cement</td><td>500 km</td></tr><tr><td>Aluminium</td><td>3600 km</td></tr></table>
(monitored parameter)</td><td>Ex-post calculation:
It is recorded for every trip. It is determined once ex-ante for each freight transportation activity for a reference trip (actual purchase invoices). The verification team has accepted the value.

QA/QC procedure:
It is crosschecked with purchase bills.</td></tr>
<tr><td>Default CO2 emission factor for freight transportation activity = 0.000245 tCO2e/tonne-km

(ex-ante parameter)</td><td>The validation team has reviewed the tool for “Project and leakage emissions from transportation of freight[/12/]” version 1.1.0 and accepted the value. It is ex-ante parameter hence accepted by the verification team.</td></tr>
<tr><td>Leakage emissions due to transportation of the raw materials and additives to the project site
<table><tr><td>Year</td><td>Leakage emissions due to transportation in tCO2e</td></tr><tr><td>2014</td><td>3220.16</td></tr><tr><td>2015</td><td>6699.62</td></tr><tr><td>2016</td><td>3815.29</td></tr></table>
(calculated)</td><td>Leakage emissions due to transportation of raw materials = Quantity of each raw material per year x Return trip distance between the origin and destination of freight transportation activity x Default CO2 emission factor for freight transportation activity</td></tr>
<tr><td>Leakage (LE_y) during AAC block production
<table><tr><td>Year</td><td>Leakage emissions in tCO2e</td></tr><tr><td>1</td><td>8636.48</td></tr><tr><td>2</td><td>17968.40</td></tr><tr><td>3</td><td>10232.65</td></tr></table></td><td>By reviewing the process at the onsite, the production process involves the use of aerated concrete which is made by introducing air or other gas to a slurry of fly ash, lime, cement and Aluminium powder so that when the mixture is set hard after autoclaving, a uniform cellular structure is obtained.
As per para 31 of the applied meth, leakage emissions due to
1) Production of these raw materials and additives
2) Consumption of these raw materials and additives
3) Transportation of these raw materials and additives to the project site.</td></tr>
<tr><td>Leakage emissions (LE_y) –flyash brick</td><td>As per para 29 and 30 of the applied meth, Leakage emission during flyash brick production consists of 1) Leakage emissions on account of the diversion of biomass residues from other uses (competing uses) 2) the incremental emissions associated with the production/consumption and transport of those raw and/or additive materials consumed.</td></tr>
<tr><td>Emissions on account of the diversion of biomass residues from other uses (competing uses)
<table><tr><td>Year</td><td>Emissions on account of the diversion of biomass residues from other uses in tCO2e</td></tr><tr><td>2014</td><td>0</td></tr></table></td><td>Leakage emissions on account of the diversion of biomass residues from other uses (competing uses) shall be calculated as per the “General guidance on leakage in biomass project activities”. Specifically, where NRB is involved, the leakage specified in leakage section of AMS-II.G. shall also be considered. As per the “Tool Leakage in biomass small-scale project activities”[/12/] version 4.0 if PP is able to demonstrate via DPR[/13/] that</td></tr>
</table>

<table>
<tr><td><table><tr><td>2015</td><td>0</td></tr><tr><td>2016</td><td>0</td></tr></table></td><td>quantity of available biomass in the region, is 25% larger than the quantity of biomass that is utilised including the project activity, this emission can be considered as zero. Since PP has demonstrated that quantity of available biomass in the region is 25% larger than the quantity of biomass that is utilised including the project activity, this emission is zero.</td></tr>
<tr><td>Incremental emissions associated with the production/consumption and transport of those raw and/or additive materials consumed as compared to baseline 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</td><td>By reviewing the process at the onsite, the production process of flyash brick involves the use of flyash and cement.
As per para 31 of the applied meth, leakage emissions due to
1) Production of these raw materials and additives
2) Consumption of these raw materials and additives
3) Transportation of these raw materials and additives to the project site.</td></tr>
<tr><td>Leakage emissions due to production of these raw materials and additives</td><td>Raw material used is cement and fly ash in the production of flyash brick. Leakage emissions due to production of these raw materials and additives are summation of leakage due to production of cement and flyash. The verification of the same is detailed below.</td></tr>
<tr><td>Leakage due to production of cement</td><td>Leakage due to production of cement = Quantity of cement consumed x Emission factor for cement production</td></tr>
<tr><td>Quantity of cement consumed
<table><tr><td>Year</td><td>Quantity of cement consumed in 1000 tonnes</td></tr><tr><td>2014</td><td>0</td></tr><tr><td>2015</td><td>0.732</td></tr><tr><td>2016</td><td>0.431</td></tr></table>
(monitored parameter)</td><td>Ex-post calculation:
It is monitored during every purchase and recorded at the site. The verification team has reviewed the records maintained at the site and accepted.

QA/QC procedure:
It is crosschecked with using purchase bills.</td></tr>
<tr><td>Emission factor for cement production =0.638 tCO2e/tonne of cement

(Ex-ante parameter)</td><td>The validation team has reviewed the CSI Protocol/14/ default emission factor of cement production for India and China and accepted the value as correct. It is ex-ante parameter hence accepted by the verification team.</td></tr>
<tr><td>Leakage due to production of cement<table><tr><td>Year</td><td>Leakage due to production of cement in tCO2e</td></tr><tr><td>2014</td><td>0</td></tr><tr><td>2015</td><td>467.016</td></tr><tr><td>2016</td><td>274.978</td></tr></table>(calculated parameter)</td><td>Leakage due to production of cement = Quantity of cement consumed x Emission factor for cement production</td></tr>
<tr><td>Leakage due to production of fly ash</td><td>Leakage due to production of fly ash = Quantity of fly ash consumed x Emission factor for fly ash production</td></tr>
</table>

<table>
<tr><td>Quantity of fly ash consumed
<table><tr><td>Year</td><td>Quantity of fly ash consumed (1000 tonnes)</td></tr><tr><td>2014</td><td>0</td></tr><tr><td>2015</td><td>3.049</td></tr><tr><td>2016</td><td>1.796</td></tr></table>(monitored parameter)</td><td>Ex-post calculation:
It is monitored during every purchase and recorded at the site. The verification team has checked the records and accepted the value.

QA/QC procedure:
It is crosschecked with using purchase bills.</td></tr>
<tr><td>Emission factor for fly ash production = 0 tCO2e/tonne of fly ash
(ex-ante parameter)</td><td>As per SSC_518[/10/] clarification, leakage emission due to waste material is not required to be considered, hence this emission is zero. It is ex-ante parameter hence accepted by the verification team.</td></tr>
<tr><td>Leakage due to production of fly ash
<table><tr><td>Year</td><td>Leakage due to production of fly ash in tCO2e</td></tr><tr><td>2014</td><td>0</td></tr><tr><td>2015</td><td>0</td></tr><tr><td>2016</td><td>0</td></tr></table>
(calculated)</td><td>Leakage due to production of fly ash = Quantity of fly ash consumed x Emission factor for fly ash production</td></tr>
<tr><td>Leakage due to production of raw materials during fly ash production
<table><tr><td>Year</td><td>Leakage due to production of raw materials during fly ash production in tCO2e</td></tr><tr><td>2014</td><td>0</td></tr><tr><td>2015</td><td>467.016</td></tr><tr><td>2016</td><td>274.978</td></tr></table></td><td>Raw material used is cement and fly ash in the production of fly ash brick. Leakage emissions due to production of these raw materials and additives are summation of leakage due to production of cement and fly ash.</td></tr>
<tr><td>Leakage emissions due to consumption of the raw materials and additives
<table><tr><td>Year</td><td>Leakage emissions due to consumption of the raw materials and additives in tCO2e</td></tr><tr><td>2014</td><td>0</td></tr><tr><td>2015</td><td>0</td></tr><tr><td>2016</td><td>0</td></tr></table></td><td>It is observed at the onsite that there is no processing of raw materials or additives before using it production of fly ash brick, hence Leakage emissions due to consumption of the raw materials and additives is zero.</td></tr>
<tr><td>Leakage emissions due to transportation of the raw materials and additives to the project site.</td><td>As per the tool for “Project and leakage emissions from transportation of freight[/12/]” version 1.1.0,
Leakage emissions due to transportation of raw materials = Quantity of each raw material per year x Return trip distance between the origin and destination of freight transportation activity x Default CO2 emission factor for freight transportation activity</td></tr>
<tr><td>Quantity of each raw material
(monitored parameter)</td><td>The verification of the same is detailed above.</td></tr>
<tr><td>Return trip distance between the origin and destination of freight transportation activity</td><td>Ex-post calculation:
It is recorded for every trip. It is determined once ex-ante for each freight transportation activity for a reference trip</td></tr>
</table>

<table>
<tr><td><table><tr><td>Flyash</td><td>400 km</td></tr><tr><td>Cement</td><td>500 km</td></tr></table>
(monitored parameter)</td><td>(actual purchase invoices)

QA/QC procedure:
It is crosschecked with purchase bills.</td></tr>
<tr><td>Default CO2 emission factor for freight transportation activity = 0.000245 tCO2e/tonne-km

(ex-ante parameter)</td><td>The validation team has reviewed the tool for “Project and leakage emissions from transportation of freight[/12/]” version 1.1.0 and accepted the value. It is ex-ante parameter hence accepted by the verification team.</td></tr>
<tr><td>Leakage emissions due to transportation of the raw materials and additives to the project site

<table><tr><td>Year</td><td>Leakage emissions due to transportation in tCO2e</td></tr><tr><td>2014</td><td>0</td></tr><tr><td>2015</td><td>0.388</td></tr><tr><td>2016</td><td>0.228</td></tr></table>
(calculated)</td><td>Leakage emissions due to transportation of raw materials = Quantity of each raw material per year x Return trip distance between the origin and destination of freight transportation activity x Default CO2 emission factor for freight transportation activity</td></tr>
<tr><td>Leakage during fly ash brick production

<table><tr><td>Year</td><td>Leakage emissions in tCO2e</td></tr><tr><td>2014</td><td>0</td></tr><tr><td>2015</td><td>467.40</td></tr><tr><td>2016</td><td>275.21</td></tr></table></td><td>As per para 29 and 30 of the applied meth, Leakage emission during flyash brick production consists of 1) Leakage emissions on account of the diversion of biomass residues from other uses (competing uses) 2) the incremental emissions associated with the production/consumption and transport of those raw and/or additive materials consumed.</td></tr>
<tr><td>Leakage emission in the project

<table><tr><td>Year</td><td>Leakage emissions in tCO2e</td></tr><tr><td>2014</td><td>8636.48</td></tr><tr><td>2015</td><td>18435.8</td></tr><tr><td>2016</td><td>10507.86</td></tr></table></td><td>Leakage emissions due to the project activity consists of leakage during AAC block production and leakage during fly ash brick production.</td></tr>
<tr><td>Emission reduction (ER_y)
<table><tr><td>Year</td><td>Emission reduction in tCO2e</td></tr><tr><td>2014</td><td>7264.58</td></tr><tr><td>2015</td><td>21216.00</td></tr><tr><td>2016</td><td>12214.54</td></tr><tr><td>Total</td><td>40,695 (rounded down)</td></tr></table></td><td>As per para 33 of the applied meth, emission reduction achieved by the project activity shall be calculated as below
$ER_y = BE_y - PE_y - LE_y$

Where
ERy – Emission reductions
BEy-Baseline emissions
PEy- Proejct emissions
LEy-Leakage emissions</td></tr>
<tr><td>Compressive strength of AAC block* Compressive strength of flyash brick

<table><tr><td></td><td>Compressive strength of AAC block</td><td>Compressive strength of flyash brick</td></tr><tr><td>2014</td><td>43.24 kg/cm^2 & 54 kg/cm^2</td><td>-</td></tr></table></td><td>Ex-post calculation:
As per para 11 of the applied meth, service level of project bricks is tested in lab at six month intervals. PP has tested the service level at an accredited lab with time interval of 6 months. Hence accepted by the verification team.

QA/QC procedure:
It is under taken by third party hence accepted.</td></tr>
</table>

2015	5.2 N/mm^2	87.71 kg/cm^2	
2016	-	-	
(monitored parameter)			

4.2 Quality of Evidence to Determine GHG Emission Reductions and Removals

Refer section 4.1 of this report.

5 VALIDATION AND VERIFICATION CONCLUSION

EPIC performed a validation and verification of the proposed VCS project "AAC Block Project By Aerocon Buildwell Pvt. Ltd. (EKIESL- June 2016-02)". The validation was carried out to independently assess whether the project confirms to the qualification criteria and requirements of the Voluntary Carbon Standard (VCS), including the baseline and monitoring methodology applied. The VCS program provides the standard and framework for independent validation based on ISO 14064-2:2006 and ISO14064-3:2006 standards.

The validation was performed using a risk based approach, the review of the project description and the subsequent follow-up interviews provided EPIC with sufficient evidence to determine the fulfillment of the stated criteria.

The GHG emission calculations are documented in a complete and transparent manner. The formulae and methodologies for accounting GHG emissions are appropriate and emission factors are deemed to be of sufficient accuracy. The emission reductions forecast has been checked and it is deemed likely that the stated amount is achievable on the basis that the underlying assumptions do not change.

The monitoring plan is in line with the approved monitoring methodology of AMS.III.Z version 6.0. The plan adequately addresses all necessary information for monitoring and reporting of emissions reductions due to the project activity. Responsibilities and authorities for project management, monitoring and reporting, and the data quality control and quality assurance procedures have been described in the PD.

In summary, it is EPIC opinion that the "AAC Block Project By Aerocon Buildwell Pvt. Ltd. (EKIESL- June 2016-02)" in the the PD&MR version 2.0 dated 9th July 2016, meets all relevant VCS requirements, is eligible as Large scale renewable energy generation project type and correctly applies the baseline and monitoring methodology specified in AMS.III.Z version 6.0. As such, EPIC recommends the registration of the project as a VCS project activity.

The verification was carried out in accordance with the requirements of the Validation and Verification standard Version 9.0 and VCS Standard 3.6. As a result of the verification, the verification team confirms that for the reporting period:

- all operations of the project were implemented as described in the registered PD, (project ID PL1549) ,
- the monitoring plan is in accordance with the approved monitoring methodology applied by the project activity.
- the monitoring has been carried out in accordance with the PD&MR version 2.0 dated 9th July 2016.

- the monitoring aspects (i.e. additional monitoring parameters, monitoring frequency and calibration frequency) were in place and functional, with the installed equipment essential for generating emission reduction operating appropriately and the calibration of all the equipment had been carried out accordingly and appropriate adjustments had been made when there were delays in the calibration, and
- the GHG emission reductions achieved were calculated correctly on the basis of approved monitoring methodology.

We have verified that the information included in the final PD &MR (version 2.0, dated 9th July 2016) was correct and that the emission reductions achieved had been determined correctly. In our opinion, the GHG emission reductions for the monitoring period stated in the latest revised monitoring report for the project are fairly stated

The verifier confirms that the GHG emission reductions were calculated without material misstatements for the whole monitoring period. Our opinion is based on the project's GHG emissions and resulting GHG emission reductions reported, and, to the valid and registered project baseline and monitoring documents. We confirm that Verified GHG emission reductions and removals for the period from 15th July 2014 to 30th June 2016 is 40,695 tCO2e.

Year	Emission Reductions (vintage wise)
2014 (15th July 2014 to 31st December)	7,264.58 tCO2e
2015 (1st Jan 2015 to 31st December)	21,216.00 tCO2e
2016 (from 1st January 2016 to 30th June 2016)	12,214.54 tCO2e
Total	40,695 (rounded down)

Prepared by :	Approved by:
R. Vijayaraghavan (Vijayaraghavan. R) Verification Team Leader	(K. Sudheendra) Head-Operations

Resolution of CARs and CLs

Correction Action Request (CAR) or Clarification Request (CR) or Forward Action Request (FAR)	Response from project participant	Validation team conclusion
CL 1 Please provide evidence for lifetime of the project	Evidence in support of overall project lifetime is being submitted.	The verification team has reviewed the DPR/offer and accepted the value is accepted. Conclusion: CL 1 is closed
CAR 1 Pls demonstrate flyash is abundance in the region with Flyash availability, fly ash usage in the project region, flyash demand by the project activity	For the proposed project activity, only fly ash is a waste product and surplus availability of fly ash is found. As per annual report of Central Electricity Authority, Government of India, the utilisation of fly ash was 55.69%[1], resulting in a surplus availability of 44%.	From the review of the process at the onsite, it is inferred that raw material used are fly ash, cement, Lime, Gypsum, Aluminium powder. Referring the clarification response[/10/] (SSC_518), the validation team has understood that the underlying rationale regarding the requirement on demonstration of the availability abundance of the raw materials is that the alternative raw materials used in the manufacturing of alternative bricks are waste products. The assessment of these applicable criteria of the methodology is not intended for industrial products with commercial value used as raw materials or additives. Hence the validation team has accepted the argument of PP that surplus

[1] http://cea.nic.in/reports/others/thermal/tcd/flyash_final_1415.pdf Pg- 2

Correction Action Request (CAR) or Clarification Request (CR) or Forward Action Request (FAR)	Response from project participant	Validation team conclusion
		availability of raw materials which is waste products (flyash alone) and not which is having commercial value is required to be demonstrated. As per the DST report[/11/], fly ash production in 2013-2014 is 2.25 Million Tonnes per Annum (7500 Million per day at 300 days a year at Mundi thermal power plant) whereas the fly ash demand is only 72,000 Million tonnes per annum (as per manufacturer's data). Hence surplus availability of flyash (more than 30 times the flyash demand) is established and accepted by the verification team. Conclusion: CAR 1 is closed
CAR 2 Please demonstrate what type of coal selected as the baseline fuel and how. Pls also demonstrate in the project region the most commonly used fuel in baseline brick manufacturing is fossil fuel i.e coal. Pls list the brick manufacturing units and coal based thermal power plants in the project	In India particularly in unorganized bricks sector, poor quality Indian sub bituminous coal is being used. This is available easily and hence same type of coal is considered as baseline fuel. There are no Thermal Power based Power Plant within 100 km of project boundary and fly ash is being sourced from Shree Singaji Thremal Power Plant, Khandwa of 2 x 600 MW owned by MPPGENCO. There had not been any formally operational brick making units or thermal power plants operational within 100 kms of project region found in public domain.	The verification team has accepted the argument as correct. Conclusion: CAR 2 is closed

Correction Action Request (CAR) or Clarification Request (CR) or Forward Action Request (FAR)	**Response from project participant**	**Validation team conclusion**
region within 100 km PD did not mention the details of the thermal power plant	Fly ash is being procured from Thermal Power plant owned by MPPGENCO having capacity 1200 MW.	
CAR 3 The validation team could not find any table as mentioned in page 15 of PD. Pls also mention compressive strength of baseline and project brick. Service level is compressive strength. Pls mention what standard is used to measure compressive strength of baseline and project brick.	Table showing comparison of service level of bricks has been mentioned in page 15 of PD. To measure compressive strength of the project bricks, IS 6441 (Pt- 5) of 1972 is being used.	The verification team has reviewed the PD/MR and accepted the value as correct. As per para 11 of the applied meth, service level of project bricks to be tested in lab at six month intervals. PP has proposed to test the service level at an accredited lab with time interval of 6 months. Hence accepted by the verification team. Conclusion: CAR 3 is closed.
CAR 4 Please explain non-compliance of regulation (50% usage of fly ash) with respect to the baseline scenario and project scenario. Please demonstrate the compliance rate in	There is a local regulation on use of fly ash (one of the raw material for project blocks and bricks) for the manufacturing of bricks. As per MOEF Notification dated 14th September 1999 and its amendments dated 27th August 2003 and 3rd November 2009, use of 50% fly ash in brick manufacturing units set up within 100 km of a coal or lignite based thermal power plant is mandatory. As per data taken from “Graph I” on page 82 of the Central Electricity Authority Annual	The verification team has reviewed the MOEF Notification (http://envfor.nic.in/legis/hsm/flyash.html) dated 14th September 1999 and its amendments dated 27th August 2003 and 3rd November 2009 and observed that use of 50% fly ash in brick manufacturing units

Correction Action Request (CAR) or Clarification Request (CR) or Forward Action Request (FAR)	**Response from project participant**	**Validation team conclusion**
actual figures.	Report 2009-10, of the 57.11% utilization of fly ash generated annually, that consumed in bricks manufacturing is a meager 9%. The absence of compliance of the aforesaid notification has been mentioned in the report11 submitted jointly by Akanksha Tiwari and Anubhav Sogani to the regional MoEF office of the Western Region of India. Reasons behind the non-compliance vary from inappropriate quality of the fly ash available, to high transportation costs and lack of adequate technological and financial support from the regulatory or funding institutions, as have been reported in the experimental study12 by B.V.M Engineering College, Gujarat, and presented in the "National Conference on Recent Trends in Engineering and Technology". In many states of India, incompatibility of the soil in mixing with the fly ash was cited, as one of the major reasons by the brick manufacturers The increase in cost of fly ash bricks production, compared to the BAU practice of manufacturing clay bricks, resulting from the above factors deter the brick manufacturers from utilizing fly ash, thus leading to low compliance of the aforesaid notification, as has been mentioned in "Utilization of Fly-ash by Brick Manufacturers - Environmental Costs vs. Benefits", a report14 sponsored by the MoEF (GoI). These facts have been further corroborated through studies published in the Indian Concrete Journal15 and independent publications16 by INSWAREB (Institute for Solid Waste Research& Ecological Balance – an NGO that has made significant contribution to the utilization fly ash in India) in response to the above notification. Hence, it can be concluded from the above discussion that there is widespread non-compliance of the regulation to use 50% of fly-ash for brick	set up within 100 km of a coal or lignite based thermal power plant is mandatory in India. However, by reviewing the document titled "International Journal of Waste Resources"(http://www.omicsonline.com/open-access/indian-flyash-production-and-consumption-scenario-2252-5211.1000118.pdf), an article on Indian fly ash production and consumption scenario dated 2010-2011, of the 55.79% utilization of fly ash generated annually, that consumed in bricks manufacturing is a meager 6.30% only. As per the report (*http://moef.nic.in/downloads/public-information/MoEF-IIFM-thermal-power-plants.pdf)* submitted jointly by Akanksha Tiwari and Anubhav Sogani to the regional MoEF office of the Western Region of India, reasons behind the noncompliance vary from inappropriate quality of the fly ash available, to high transportation costs and lack of adequate technological and financial support from the regulatory or funding institutions. Conclusion: CAR 4 is closed.

Correction Action Request (CAR) or Clarification Request (CR) or Forward Action Request (FAR)	Response from project participant	Validation team conclusion
	manufacturing within 100 kms of a thermal power plant.	
CAR 5 Briquette production requires electricity. Please demonstrate that it is included as project emission?	Biomass briquettes are sourced from nearby local vendors. Emissions due to use of electricity during production of biomass briquettes are included in project emissions.	Ex-ante estimation: It is considered from the DPR which is accepted by the validation team. Since briquette is used in steam boiler for process, but since it is procured not more than 200 km, the leakage emissions due to briquette usage are neglected. Ex-post monitoring: It is monitored continuously and recorded in log sheets monthly. QA/QC procedure: It can be crosschecked with purchase invoices. Conclusion: CAR 5 is closed.
CAR 6 Please confirm EB54 Annex 13 is the latest rule available. Please refer page no 21 of PD.	PD has been updated with latest applicable Guideline on debundling of small scale project activity.	The verification team has reviewed the PD/MR and accepted the change. Conclusion: CAR 6 is closed.
CL 2 As per page 22 of PD, “In cases where the	No dedicated plantations has been used for briquettes generation for the project activity and the biomass briquettes used in project activity are being produced	Since briquette is procured and not cultivated in dedicated plantations, this

Correction Action Request (CAR) or Clarification Request (CR) or Forward Action Request (FAR)	**Response from project participant**	**Validation team conclusion**
renewable biomass is sourced from dedicated plantations it also includes the area of the plantations." Please clarify if dedicated plantation is used in the project activity.	from agri residues left as a by-product after the crops are harvested.	emission is zero. Conclusion: CL 2 is closed.
CAR 7 Version 5 of AMS.III.Z is not the latest one. Refer page no 23 of PD.	PD has been revised as per latest applicable methodology.	The verification team has reviewed the PD/MR and accepted the change. Conclusion: CAR 7 is closed.
CAR 8 Baseline identification does not follow relevant additionality tool. Please also clarify why FaL-G type is not considered during baseline identification.	Baseline has been established as per latest applicable tools and also FAL-G Bricks is being considered as one of most plausible alternative to the project activity in revised PD & MR.	The verification team has reviewed the document/11/ titled "Strategies for Cleaner Walling Material in India", and accepted that the penetration of this technology is to the tune of only 1.6%. Hence FAL-G bricks cannot be considered as an alternative. Conclusion: CAR 8 is closed.
CAR 9 Please demonstrate baseline identification with fuel usage. Fuel wood is also used brick	Coal is the main source of energy used for manufacturing burnt clay bricks in India. However the second choice of fuel is biomass, including fuel wood but one of the studies by the FAO[2] the annual use of	Please refer baseline identification for closure. Conclusion:

[2] Source: FAO Field Document No. 35, "Regional Wood Energy Development Programme in Asia", GCP/RAS/154/NET.

Correction Action Request (CAR) or Clarification Request (CR) or Forward Action Request (FAR)	**Response from project participant**	**Validation team conclusion**
production. Please demonstrate the baseline identification with respect to emission as well.	fuel wood in the entire brick industry in the country is reported to be only 300,000 tonnes, while the use of coal is reported to be about 14,000,000 tonne. Thus use of fuel wood represents less than 2% in terms of energy inputs of the total energy requirement of the brick industry in all of India. Since the values reported in the FAO report do not distinguish between the renewable biomass and non-renewable biomass, the actual fraction of renewable biomass (with zero emissions) is likely to be lower. The 2% biomass consumption has adjusted by PP to compute the emission factor as mentioned below:	CAR 9 is closed.
CAR 10 Baseline identification and additionality aspects are not discussed for fly ash bricks.	Baseline identification and additionality demonstration has been shown for fly ash bricks also.	Please refer baseline identification and additionality sections for closure. Conclusion: CAR 10 is closed.
CL 3 Please clarify what is meant by biomass adjustment factor	Coal is the main source of energy used for manufacturing burnt clay bricks in India. However the second choice of fuel is biomass, including fuel wood but one of the studies by the FAO[1] the annual use of fuel wood in the entire brick industry in the country is reported to be only 300,000 tonnes, while the use of coal is reported to be about 14,000,000 tonne. Thus use of fuel wood represents less than 2% in terms of energy inputs of the total energy requirement of the brick industry in India. Since the values reported in the FAO report do not distinguish between the renewable	Coal is the main source of energy used for manufacturing burnt clay bricks in India. However the second choice of fuel is biomass, including fuel wood but one of the studies by the FAO the annual use of fuel wood in the entire brick industry in the country is reported to be only 300,000 tonnes, while the use of coal is reported to be about 14,000,000 tonne. Thus use of fuel wood represents less than 2% in terms of energy inputs of the total energy

Correction Action Request (CAR) or Clarification Request (CR) or Forward Action Request (FAR)	Response from project participant	Validation team conclusion
	biomass and non-renewable biomass, the actual fraction of renewable biomass (with zero emissions) is likely to be lower. The 2% biomass consumption adjustment factor has been applied by PP to compute the emission factor which is a conservative approach	requirement of the brick industry in all of India. Conclusion: CL 3 is closed.
CAR 11 PD reports "none of the credible alternatives to the VCS project activity involve investments" Please demonstrate this statement with evidence	Corrected.	The verification team has reviewed the PD/MR and accepted the change. Conclusion: CAR 11 is closed.
CAR 12 Please demonstrate against each point in this para why benchmark analysis is more suitable than the investment analysis. Please refer page 33.	Detailed demonstration has been shown in Version 02 of PD.	PP had the option of choosing simple cost analysis, investment comparison analysis or benchmark analysis. The verification team found that the PP has selected benchmark analysis. The validation team has assesses the rationale behind choosing benchmark analysis method as the appropriate analysis method to prove additionality. Simple cost analysis method is appropriate if the proposed project activity generate no financial benefits other than VCS related income. As the project activity generates revenue by selling the bricks to the market, the rationale behind opting out of simple cost analysis is accepted by the verification

Correction Action Request (CAR) or Clarification Request (CR) or Forward Action Request (FAR)	Response from project participant	Validation team conclusion
		team. Investment comparison analysis method is appropriate if the proposed baseline scenario leaves the PP no other choice than to make an investment to supply the same (or substitute) products or services. As the baseline identified for the project activity is production FC-BTK based bricks are available to all the potential project owners, the rationale behind the opting out of investment comparison analysis method is accepted by the verification team. Hence benchmark analysis is appropriate. Conclusion: CAR 12 is closed.
CAR 13 Version 5.0 of investment analysis guidelines is not the latest.	Thanks, PD has been updated with latest applicable version of guidelines.	The verification team has reviewed the PD/MR and accepted the change. Conclusion: CAR 13 is closed.
CL 4 Please provide DPR	Submitted with PD & MR Version 02.	The verification team has received the DPR. Conclusion:

Correction Action Request (CAR) or Clarification Request (CR) or Forward Action Request (FAR)	Response from project participant	Validation team conclusion
		CL 4 is closed.
CL 5 Please provide document that CDM/VCS was considered before placing an order of procurement of technology/equipment.	Board Resolution detailing investment making decision has been submitted with PD & MR Version 02.	The verification team has reviewed the board decision and accepted. Conclusion: CL 5 is closed.
CL 6 PD does not discuss leakage due to production of raw materials. Why emission due to production of those raw materials is not considered or is not to be considered? Pls explain.	All kind of leakage emissions due to production of raw materials has been taken into consideration for both type of products.	Please refer emission reduction section above for closure. Conclusion: CL 6 is closed.
CL 7 Sandstone is also consumed in the AAC block production but the leakage due to production/consumption/transport of this material is not discussed in the PD. Please clarify**.**	Due to the fact that stone dust is being consumed in very marginal quantities and also being procured from adjacent stone crushing units to the project site, hence emissions due to manufacturing or transportation can be neglected.	The verification team has accepted the arguemt of PP and closed the issue. Conclusion: CL 7 is closed.
CL 8 Please provide document for raw material consumption such as cement, flyash,	Document for raw material consumption has been submitted with PD Version 02.	The verification team has received the documents Conclusion:

Correction Action Request (CAR) or Clarification Request (CR) or Forward Action Request (FAR)	Response from project participant	Validation team conclusion
Aluminium, limestone etc.		CL 8 is closed.
CL 9 Please provide all the clearances.	All statutory clearances related to project has been submitted.	The validation team has reviewed MoEF notification/11/ dated 1st Dec 2009 and observed that the project activity does not fall under positive list of projects for which Environment Impact Assessment (EIA) is required. Hence, the project activity does not require Environment Impact Assessment to be conducted. The validation team has reviewed the approvals/7/ given by State Pollution Control Board dated 26th September 2014 and licence to establish the plant given by Inspector of Factories dated 27th February 2015. Based on the above findings, the validation team has concluded that the project activity satisfies the requirements related to Environment impact. Conclusion: CL 9 is closed.
CAR 14 Please provide document biomass is abundant within 100 km of the of the project or atleast 25% greater than biomass consumed in the region including the project	The project is not using any type of biomass (biomass from forests, biomass from croplands or grass lands, biomass residues or waste) as per attachment C of Appendix B. Thus general guidance on leakage on biomass project activities is not applicable for proposed project activity. The proposed project	Since briquette is used in steam boiler for process, but since it is procured not more than 200 km, the leakage emissions due to briquette usage are neglected Conclusion:

Correction Action Request (CAR) or Clarification Request (CR) or Forward Action Request (FAR)	**Response from project participant**	**Validation team conclusion**
activity so as not to consider biomass as competing one.	activity consumes biomass briquettes provided by supplier and PP is procuring the briquettes based on availability.	CAR 14 is closed.
CAR 15 Sampling plan of the project for testing of the bricks produced is not detailed out. CAR is raised as sampling plan needs more detailing.	Detailed sampling plan for testing of fly ash bricks has been included in the revised PD.	The verification team has reviewed the sampling plan and accepted the same as correct. Conclusion: CAR 15 is closed.