



VALIDATION REPORT

INDIA-FAL-G BRICK AND BLOCKS PROJECT NO.3 IN INDIA

REPORT No. 2009-0393

REVISION No. 03

DET NORSKE VERITAS



VALIDATION REPORT

Date of first issue: 2010-03-15	ConCert Project No.: PRJC-195431-2009-CCS-IND
Approved by Michael Lehmann	Organisational unit: DNV KEMA Energy & Sustainability Accredited Climate Change Services
Client: Eco Carbon Private Limited	Client ref.: Mr. N.Kalidas, Executive Director

Summary:
Project Name: India-FaL-G Brick and Blocks Project No.3.
Country: India
Methodology: AMS-III.Z
Version: 03
GHG reducing Measure/Technology: Process improvement and energy efficiency in brick manufacture.
ER estimate: 46 728 tCO₂e per year (average) over a fixed crediting period of ten years
Size
☐ Large Scale ☒ Small Scale
Validation Phases:
☒ Desk Review ☒ Follow up interviews
☒ Resolution of outstanding issues
Validation Status
☐ Corrective Actions Requested ☐ Clarifications Requested
☒ Full Approval and submission for registration ☐ Rejected

In summary, it is DNV's opinion that the "India-FaL-G Brick and Blocks Project No.3" project in India as described in the PDD of version 4, dated 7 May 2012, meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology AMS-III Z, version 03. DNV thus requests the registration of the project as a CDM project activity. This report has been revised in response to the review request by three members of CDM Executive Board.

Report No.: 2009-0393	Subject Group: Environment
Report title: India-FaL-G Brick and Blocks Project No.3 in India.	
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Date of this revision: 10 May 2012	Rev. No.: 03
Number of pages: 27	

Indexing terms Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism	<input checked="" type="checkbox"/> No distribution without permission from the client or responsible organisational unit <input type="checkbox"/> free distribution within DNV after 3 years <input type="checkbox"/> Strictly confidential <input type="checkbox"/> Unrestricted distribution
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***Abbreviations***

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CH ₄	Methane
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
FAR	Forward Action Request
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of approval
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
tCO ₂ e	Tonnes of CO ₂ equivalents
UNFCCC	United Nations Framework Convention on Climate Change
GWP	Global Warming Potential



1 EXECUTIVE SUMMARY – VALIDATION OPINION

DNV Climate Change Service AS (DNV) has performed a validation of the project activity “India-FaL-G Brick and Blocks Project No.3.” in India. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.

The host Party is India and the Annex I Parties are Italy and the Netherlands. All the Parties fulfil the participation criteria and have approved the project and authorized the project participants Eco Carbon Private Limited and the International Bank for Reconstruction and Development as the Trustee of the Community Development Carbon Fund (CDCF). The DNA from India confirmed that the project assists in achieving sustainable development and issues the Letter of Approval on 3 September 2008 /50/.

The project correctly applies the baseline and monitoring methodology AMS-III.Z, version 03 “Fuel Switch, process improvement and energy efficiency in brick manufacture”. The determination of the baseline is well elaborated, transparent and sufficiently supported with facts. The selected baseline scenario is reasonable for the selected 10 years of fixed crediting period. As a result, the project results in reductions of CO₂ emissions that are real, measurable and gives long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the project are estimated to be on the average 46 728 tCO₂e per year over the selected 10 years of fixed crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

The monitoring plan provides for the monitoring of the project’s emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is DNV’s opinion that the project participants are able to implement the monitoring plan. The PDD was published on the UNFCCC website for global stakeholder consultation. No comments were received.

In summary, it is DNV’s opinion that the project activity “India-FaL-G Brick and Blocks Project No.3” in India, as described in the PDD, version 04 dated 7 May 2012, meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology AMS-III.Z, version 03. Hence, DNV requests the registration of the project as a CDM project activity.

Bangalore and Oslo, 10 May 2012

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CDM Validator
DNV Bangalore, India

Michael Lehmann
Director of Services and Technologies
DNV Climate Change Service AS



2 INTRODUCTION

Eco Carbon Private Limited (ECPL) has commissioned DNV Climate Change Service AS (DNV) to perform a validation of the India-FaL-G Brick and Blocks Project No.3 in India (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board.

2.1 Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project activities and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AMS-III.Z, version 03. The validation was based on the recommendations in the Validation and Verification Manual /53/.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.



3 METHODOLOGY

The validation consisted of the following three phases:

- I a desk review of the project design documents
- II follow-up interviews with project stakeholders
- III the resolution of outstanding issues and the issuance of the final validation report and opinion.

The following sections outline each step in more detail.

3.1 Desk review of the project design documentation

The following tables list the documentation that was reviewed during the validation.

3.1.1 Documentation provided by the project participants

- /1/ Eco Carbon Pvt. Ltd.,: *CDM-SSC-PDD for project activity "India-FaL-G Brick and Blocks Project No.3." in India*, Version 01 dated 11 August 2009, version 02, dated 3 March 2011 and version 3, dated 8 December 2011 and version 04, dated 7 May 2012.
- /2/ Affirmation regarding no diversion of official development assistance from Government of Italy, dated 09 September 2005.
- /3/ Emission reduction purchase agreement between Eco Carbon Private Limited and International Bank for Reconstruction and Development, as Trustee of the Community Development Carbon Fund, dated 28 June 2006.
- /4/ IS: 516-1959: Method of test for strength of concrete: Indian standard: Bureau of Indian Standards.
- /5/ IS: 3495:1992: Method of test of burnt clay building bricks: Indian standard: Bureau of Indian Standards.
- /6/ IS:1077:1982: Common burnt clay building bricks specifications: Indian standard. Bureau of Indian standards.
- /7/ IS: 12894: 2002: Pulverized fuel ash building bricks specifications: Indian standard. Bureau of Indian standards.
- /8/ Abundant availability of fly ash – R&D and technology development/ application in Fly Ash area, Publication by Dept. of Science & Technology:
http://www.dst.gov.in/whats_new/what_new08/fly-ash.pdf
- /9/ Agreement for technical services between Institute for Solid Waste Research & Ecological Balance and Eco Carbon Pvt. Ltd, dated 4 November 2006
- /10/ Patent number 198639 dated 13.08.1996 for the project technology (hydraulic cement composition) from Intellectual Property India granted on 30 January 2006.
- /11/ Status and development issue of brick industry in Asia by Food and Agriculture Organization of United Nations, April 1993.
- /12/ Workshop on fly ash, Hyderabad, dated 18 – 19 October 2001.
- /13/ Clearances from the pollution control board for each individual unit under the project activity.
- /14/ Small-scale industries certificate by Director of Industries for the individual units of the

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- project activity.
- /15/ E-mail communication between Institute for Solid Waste Research & Ecological Balance (INSWAREB) and World Bank regarding the development of FaL-G project and its potential barriers and the estimated CERs from the project activity, dated 7 September 2000.
 - /16/ Project Idea Note (PIN), dated 03 January 2003, submitted to Community Development Carbon Fund (CDCF).
 - /17/ Excerpts of minutes of the 42nd Governing Body meeting of INSWAREB at FaL-G Mansion, Visakhapatnam, dated 20 September 2003 (on the consideration of CDM revenue and involvement of Eco Carbon Pvt. Ltd for participating in commercial pursuit).
 - /18/ E-mail to World Bank, dated 20 January 2004: PCN on FaL-G Brick units in tiny sector. Multiple units to be bundled under Community Development Carbon Fund (CDCF) and financial workings.
 - /19/ Letter of intent for the purchase of potential CERs from FaL-G Brick units in tiny sector Multiple units, India, between Eco Carbon Pvt. Ltd and World Bank, International Bank for Reconstruction and Development, dated 03 June 2004.
 - /20/ E-mail to State bank of India on scheduling of meeting, dated 4 January 2005 and Note to SBI on carbon activity between World Bank and Eco Carbon Pvt. Ltd., through FaL-G brick/block production in India.
 - /21/ Submission of New draft Methodology and PDD by World Bank to EB-CDM: SSC_014 and subsequent recommendation by CDM EB to use AMS-II.D on 13 February 2006.
 - /22/ Request for deviation submitted by DNV on 16 December 2008 (M-DEV0219) to the response to the deviation request.
 - /23/ SSC_297: Revision of AMS-III.Z regarding demonstration of abundance of raw materials and quality of bricks, submitted on 03 April 2009 and the response from SSC WG.
 - /24/ SSC_298: Revision to remove FaL-G technology-based brick manufacturing project activity from the scope of AMS-III.Z, submitted on 3 April 2009.
 - /25/ SSC_322: Revision of AMS-III.Z to provide clarity on nationally approved laboratories and product service life, submitted on 18 June 2009.
 - /26/ Article in news paper The Hindu, on the challenge related to quality assurance of FaL-G bricks, dated 26 March 2009 and 11 April 2009.
 - /27/ Study on “Cost Effective Building Materials & Technologies” undertaken by Holtec Consulting Private Limited in the year 2004 on behalf of Building Materials Technology Promotion Council, a Government of India.
 - /28/ Emission Standards for brick kilns- An opportunity for Technology upgrade by Sameer Maithel, The Energy Research Institute (TERI), India.
 - /29/ Central Electricity Authority, Ministry of Power, Government of India: Clause 18 of Gazette Notification No. 502/70/CEA/DP&D, dated 17 March 2006.
 - /30/ Press Information Bureau, Government of India: Indian Cement Industry – Opportunities and Challenges <http://www.pib.nic.in/release/release.asp?relid=55724>
 - /31/ Food and Agriculture Organization of the United Nations: Field Document No. 35, “Regional Wood Energy Development Programme in Asia”, GCP/RAS/154/NET



- /32/ Minutes of the meeting conducted at the premises of INSWAREB Building Centre, Ootagedda Junction, Paravada, dated 28 July 2003.
- /33/ Work shop on FaL-G technology at Hyderabad and Cuddapah in September 2003.
- /34/ INSWAREB Building Centre: Compressive strength test results, dated 02 February 2010.
- /35/ Eco Carbon Pvt. Ltd: Emission reduction spreadsheet.
- /36/ Technical report on fly ash-lime-phosphogypsum cementitious binder: A new trend in bricks, by S. Kumar from Department of civil engineering, BIET, Jhansi.
<http://www.springerlink.com/content/f376400212484564/>
- /37/ Explanatory Notes (Central Excise) on withdrawal of excise duty exemption:
<http://indiabudget.nic.in/ub2006-07/cen/exnotecex.pdf>
- /38/ Restoration of excise duty exemption sought on fly ash bricks: Indian Concrete Journal:
http://www.icjonline.com/news_apr2006.htm
- /39/ Letter to the Editor of Economic Times on 10 May 2006 by Institute for Solid Waste Research & Ecological Balance (INSWAREB): http://www.fal-g.com/Lr_to_Editor_ET_on_Dr_Chand_article.pdf
- /40/ Test certificate by Institute of Solid Waste Research and Ecological Balance, dated 19 March 2010 and by Department of Technivcal Education, Government Polytechnic, Ongole, Government of Andhra Pradesh, dated 31 March 2010.
- /41/ Diesel density: Society of Indian Automobile Manufactures:
<http://www.siamindia.com/scripts/Diesel.aspx>
- /42/ Sixth CANMET/ACI international conference on fly ash, silica fume, slag in natural pozzolans in concrete at Bangkok in the article "*Role of Pozzolanic and Cementitious Material in Sustainable Development of Concrete Industry*" by Prof PK Mehta
- /43/ TERI: "Energy Efficiency Improvements in the Indian Brick Industry" by TERI in association with UNDP.
<http://www.resourceefficientbricks.org/background.php>
- /44/ A book on "Prospect and problem of Brick Industry" (2008) by Ghoshal, Pallab K
- /45/ Eco Carbon Pvt. Ltd.: Agreement between the individual brick manufacturing units and Eco Carbon Pvt. Ltd. for the participating the bundling of project activity.
- /46/ External expert, Dr. A.R. SANTHAKUMAR Former Emeritus Professor, IIT (Madras), Former Chairman(Civil Engineering), Anna University, Consultant, CDMM, Department of Civil Engineering, Anna University
- /47/ Email from Eco Carbon Pvt. Ltd. to DNV: PDD of "India-FaL-G Brick and Blocks Project No.3" (applying AMS-IIID), dated 24 March 2008.
- /48/ Gazette Notification No. 502/70/CEA/DP&D, dated 17 March 2006
- /49/ Provisional/temporary certificate by Director of Industries for the individual units of the project activity (for 28 units).

3.1.2 Letters of approval

- /50/ Letter of approval from DNA of India, dated 3 September 2008.
- /51/ Letter of approval from DNA of Italy, dated 15 April 2010.
- /52/ Letter of approval from DNA of the Netherlands, dated 21 January 2011.



Methodologies, tools and other guidance by the CDM Executive Board

- /53/ CDM Executive Board: *Validation and Verification Manual*. Version 1.2.
- /54/ Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories AMS-III.Z Version 03 “*Fuel Switch, process improvement and energy efficiency in brick manufacture*”.
- /55/ CDM Executive Board: Tool to calculate baseline, project and /or leakage emissions from electricity consumption, version 01.
- /56/ CDM Executive Board 49 “Guidelines on the demonstration and assessment of prior consideration of the CDM”, version 3.1.
- /57/ 2006 IPCC default values.
- /58/ CDM India, Designated National Authority, Ministry of Environment and Forest ID No.988-08: http://cdmindia.in/reports_list_details.php?id=16&reporttype=1&page=14
- /59/ CDM Executive Board: “Guidelines on assessment of debundling for SSC project activities”, version 3
- /60/ CDM Executive Board: “Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories”

Main changes between initially webhosted PDD and the revised PDD:

- The emission reduction calculation formula has been corrected as per the methodology (CAR 5).
- The additionality of the project activity has been further justified to explain the need of CDM to alleviate the barriers.
- The start date of the crediting period has been revised to 1 July 2012.
- Each applicability criteria of the methodology has been justified.
- The chronology of events for securing CDM status has been included in the PDD.
- The starting date of the project activity has been revised as per CDM glossary and based on the request for review (CAR 3).
- The monitoring plan has been revised to use net production of FaL-G bricks by the project activity as required by the methodology (CAR 5). The comparison of the production with three approaches: production records, fly ash consumption and electricity or diesel consumption has been removed.
- The PDD have been revised inline with the version 3 of AMS-III.Z from version 2 used during webhosting (CAR 12).
- Electricity meter calibration procedure has been described in the PDD in line with the CDM VVM and national guidance.

3.2 Follow-up interviews with project stakeholders

Between 5 February and 5 March 2010, DNV visited the sampled locations of the project and performed interviews with project stakeholders.

Date	Name	Organization	Topic
05 February 2010 - 05 March 2010	Mr. N. Kalidas Dr. Bhanumathidas	Eco Carbon Pvt Ltd.	Project design Baseline scenario Additionality Monitoring and reporting



	Major D. Bhushan Rao	Sri Venkateswara Fly Ash Products	Stake holders consultation
	Ms. Y. Sita Mahalakshmi	Chandra Fly Ash Bricks	Baseline scenario
	Mr. Pramod Kumar	Sri Hiranmai Bricks	Monitoring and reporting
	Mr. A Venkateswara Rao	Sri Lakshmi Venkateswara	
	Mr. Ch.Durga Venkata	Sri Durga Fly ash Brick Industry	
	Mr. B. Srinivasa Rao	Sri Venkata Triveni Fly Ash Brick Industry	
	Mr. E.Srinivasa Reddy	Sri Sai Raghava Fly Ash Bricks Industries	
	Mr. R.Ramesh	Sri Sai Siva Brick Products	
	Mr. Y.Sambasiva Rao	Sri Sai Tulasi Brick Products	
	Mr. K. M. Siva Kumar	Hari Eco Building Materials	
	Ms Abha Pandey	A-1 Bricks	

3.3 Resolution of outstanding issues

The objective of this phase of the validation was to resolve any outstanding issues which needed be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project. The protocol shows in a transparent manner the criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM 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 four tables. The different columns in these tables are described in the figure below. The completed validation protocol for the project activity “India-FaL-G Brick and Blocks Project No.3” in India is enclosed in Appendix A to this report.

A corrective action request (CAR) is raised if one of the following occurs:

- (a) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- (b) The CDM requirements have not been met;
- (c) There is a risk that emission reductions cannot be monitored or calculated.

A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the CDM requirements for registration.



Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities				
Requirement	Reference	Conclusion		
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	This is either acceptable based on evidence provided (OK) or a corrective action request (CAR) if a requirement is not met.		

Validation Protocol Table 2: Requirement Checklist				
Checklist question	Reference	Means of verification (MoV)	Assessment by DNV	Draft and/or Final Conclusion
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the CDM-PDD	Gives reference to documents where the answer to the checklist question or item is found.	Means of verification (MoV) are document review (DR) , interview (I) or any other follow-up actions (e.g., on site visit and telephone or email interviews) and cross-checking (CC) with available information relating to projects or technologies similar to the proposed CDM project activity under validation.	The discussion on how the conclusion is arrived at and the conclusion on the compliance with the checklist question so far.	OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements. A corrective action request (CAR) is raised when project participants have made mistakes, the CDM requirements have not been met or there is a risk that emission reductions cannot be monitored or calculated. A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. A forward action request (FAR) during validation is raised to highlight issues related to project implementation that require review during the first verification of the project activity.

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Corrective action and/or clarification requests	Ref. to checklist question in table 2	Response by project participants	Validation conclusion
The CARs and/ or CLs raised in Table 2 are repeated here.	Reference to the checklist question number in Table 2 where the CAR or CL is explained.	The responses given by the project participants to address the CARs and/or CLs .	The validation team's assessment and final conclusions of the CARs and/or CLs .

Validation Protocol Table 4: Forward Action Requests		
Forward action request	Ref. to checklist question in table 2	Response by project participants
The FARs raised in Table 2 are repeated here.	Reference to the checklist question number in Table 2 where the FAR is explained.	Response by project participants on how forward action request will be addressed prior to first verification.

Figure 1: Validation protocol tables



3.4 Internal quality control

The validation report underwent a technical review performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3.5 Validation team

<i>Role</i>	<i>Last Name</i>	<i>First Name</i>	<i>Country</i>	<i>Type of involvement</i>					
				Desk review	Site visit / interviews	Reporting	Supervision of work	Technical review	TA4 Others competency
Technical team leader (CDM validator)	Astakala	Vidyacharan	India	✓	✓	✓			
Assessor under training	Shome	Sharmistha	India	✓	✓	✓			
Assessor under training	Faggin	Matteo	Italy	✓		✓			✓
Technical reviewer	Kakaraparthi	Venkata Raman	India					✓	
Person with sectoral competence assisting technical reviewer	Yang Xiao Shan	Alan	China					✓	✓

The qualification of each individual validation team member is detailed in Appendix B to this report.



4 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The validation report relates to the project design as documented and described in the PDD, version 4, dated 7 May 2012 /1/

4.1 Participation requirements

The project participants are Eco Carbon Private Limited (ECPL) of host Party India and the International Bank for Reconstruction and Development (IBRD) as the Trustee of the Community Development Carbon Fund (CDCF) authorised by the Annex I Parties Italy and the Netherlands. Italy and the Netherlands have indicated that they wish to be considered as project participant.

The host Party (India) and the Annex I Party (Italy and Netherlands) meet all relevant participation requirements. The host Party India fulfils the participation requirements, having ratified the Kyoto Protocol on the 26 August 2002 and having established National Clean development Mechanism Authority, Ministry of Environment and Forests (MoEF), as its DNA. Both Italy and Netherlands have ratified the Kyoto protocol on 31 May 2002 established their respective Designated National Authority.

The DNA of India has issued a Letter of Approval (LoA) on 3 September 2008 /50/, authorizing Eco Carbon Private Limited (ECPL) as a project participant and confirming that the project assists in achieving sustainable development. The issuance of the Letter of Approval by DNA of India for the proposed project activity has been further verified by DNV from the Ministry of Environment and Forest, CDM India, Designated National Authority's website /58/.

The DNA of Italy and Netherlands have also approved the project on 15 April 2010 /51/ and 21 January 2011 /52/, respectively, confirming the voluntary participation of International Bank for Reconstruction and Development as the Trustee of the Community Development Carbon Fund (CDCF). The letters of approval were received from the project participants. DNV does not doubt the authenticity of the letters of approval. DNV considers the letters are in accordance with paragraphs 45- 48 of the VVM /53/.

The validation did not reveal any information which indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards India and this has been verified from the affirmation regarding no diversion of official development assistance from Government of Italy, dated 9 September 2005 /2/. It is confirmed in the letter of Approval from Netherlands that no diversion of official development assistance towards India is involved in the project activity /52/.

4.2 Project design

The project activity is a bundling of 42 small FaL-G (Fly ash-Lime-Gypsum) plants located in the states of Andhra Pradesh, Tamil Nadu, Orissa and Chhattisgarh, in India. Out of 42 plants, 35 plants are located in various districts of Andhra Pradesh, 2 plants in Tamilnadu, 4 plants in



Chhattisgarh and other one plant is located in the state of Orissa. Details of locations of the each plant have been clearly included in the project design document. The geographical coordinates of the individual facilities have been provided in the Annex 6 of the PDD /1/.

The project activity involves the installation of the new FaL-G technology for the manufacture of brick and blocks which works with the hydration chemistry of fly ash, lime and/or OPC and gypsum. The technology does not require any thermal energy for brick manufacturing. The raw materials used in FaL-G technology are fly ash, lime and/or cement (OPC), gypsum and stone dust. The raw materials are mixed wet as a homogeneous mortar in the roller mixer and moulded into bricks/blocks which are compacted under vibro-press or hydraulic compression. Subsequently, the bricks/blocks are dried under sun and subjected to periodical water spray. No vapour curing is involved in the project activity as verified during the site visit. The technology used in project activity is based on the hydration chemistry and thus avoids the sintering process using coal. Electricity and/or diesel are used for the operation of project activity units. The project activity results in emission reductions by avoiding the usage of coal in the brick making process.

The project activity is expected to result in an estimated average emission reduction of 46 728 tCO₂e per year. The technology used in the project activity is good and is expected to remain same during the crediting period.

The starting date of the project activity has been selected to be 1 February 2004, which is the earliest of date of establishment among all the bundle units (cf. section 4.6.1). The expected operational lifetime of the project is 20 years and a fixed crediting period of 10 years has been chosen with the starting date of the first crediting period as 1 July 2012 or date of registration, whichever is later.

The accuracy of the description in the PDD with the actual project technology has been verified during the site visit. DNV considers that the project description is complete and accurate.

DNV considers the project description of the project contained in the PDD to be complete and accurate. The PDD complies with the relevant forms and guidance for completing the PDD.

4.3 Application of selected baseline and monitoring methodology

The project activity correctly applies the baseline methodology stipulated for category III.Z of the “simplified modalities and procedure for small scale CDM project activity” The simplified baseline methodology AMS-III.Z, version 03 is applicable for fuel switch, process improvement and energy efficiency in brick manufacture. The applicability of the project activity to AMS-III.Z, version 03 meets all the applicability criteria and this was assessed as following:

- The project activity involves the change in the raw material in comparison to the baseline manufacturing process. The project activity involves the brick production using the hydration chemistry of fly ash, lime and/or cement and gypsum mixed together in the correct proportion. The compressive strength of the project activity brick ranges from 6 to 12 MPa in contrast to the compressive strength of 3 to 6 MPa in the baseline clay bricks. This has been verified from the sample test results certificate of the project activity bricks (FaL-G technology). The tests are conducted by Institute of Solid Waste Research and Ecological Balance, dated 19 March 2010 /40/ and by Department of Technical Education, Government Polytechnic, Ongole, Government of

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Andhra Pradesh, dated 31 March 2010 /40/ The service level of the baseline and the project activity has been assessed as per the following national standards:

- IS: 12894: 2002: Pulverized fuel ash building bricks specifications /7/,
 - IS: 516-1959: Method of test for strength of concrete: Indian standard /4/
 - IS: 3495:1992: Method of test of burnt clay building bricks: Indian standard: Bureau of Indian Standards /5/ and
 - IS: 1077:1982: Common burnt clay building bricks specifications: Indian standard Bureau of Indian standards /6/.
- The project activity is a Greenfield project. This has been confirmed during the site visit by DNV. It has been verified from the study on “Cost Effective Building Materials & Technologies” undertaken by Holtec Consulting Private Limited in the year 2004 on behalf of Building Materials Technology Promotion Council, a Government of India concern /27/ that 95.3% of the material is contributed by the clay burnt bricks and this technology is the most conventional process of brick manufacturing in India.
- The project activity is a green field project and does not involve any replacement of the existing equipment. The project changes the starting materials from the process that otherwise would have been carried out. Even though not all of these have been considered raw materials as not all of them are in a natural, unrefined stage, but instead produced/incidentally generated materials, the availability of the starting materials for the process has been demonstrated. The starting materials for the process used in the project activity are fly ash, lime or cement and gypsum, as well as locally available sand/stone dust as filler material. The availability of fly ash, which is the main raw material in the FaL-G brick manufacturing process, has been verified from publication by Dept. of Science & Technology the R&D and technology development/ application in Fly Ash area /8/. As per the publication by Dept. of Science & Technology, Ministry of Science and Technology /8//, the fly ash generation in India increased to the level of 130 million tonne per year, whereas the utilization the fly ash increased to only 60 million tonne during the year 2006-07. Furthermore, the publication also states that though the utilization of fly ash has been increased from 1 million tonnes in 1993-1994 to 60 million tonnes in 2006-2007, the quantum of un-utilized fly ash has also increased from 39 million tonne per year to 70 million tonne per year in 2006-2007. This demonstrates the availability of fly ash in India. The cement (OPC) and lime are available in the commercial market and shall be purchased from the localized market. Production of cement depends on the localized market demand and with the present annual production of 150 million tons at national level, there is no shortage of cement. Moreover, cement or lime or both can be used for the project activity based on the availability. Gypsum is used to an extent of 0.1% of the total mass. It is a by-product from hydrofluoric acid and fertiliser industries and is also available commercially in the market.
- As explained above, the compressive strength of the project activity brick ranges from 6 to 12 MPa in contrast to the compressive of 3 to 6 MPa in the baseline clay bricks. This has been verified from the sample test results of the project activity bricks (FaL-G technology). The service level of the baseline and the project activity has been



assessed as per the national standard /4//5//6//7/. It has been verified from the test results conducted by the INSWAREB Building Centre, dated 02 February 2010/35/ that compressive strength of clay brick is 4.3 MPa in comparison to compressive strength of 9.8 MPa of FaL-G bricks.

- The net annual emission reduction from the project activity is calculated to be 46 728 tCO₂e per annum which is lower than the stipulated limit of 60 000 tCO₂e per year. The project activity has 42 brick-manufacturing units and the aggregate capacity of 248 930 m³ (considering continuous production in the single shift and 300 working days which is the generally practiced by FaL-G brick units.).
- It has been verified from the Study on “Cost Effective Building Materials & Technologies” /31/ that 95.3% of the bricks requirement is contributed by the clay burnt bricks and also this is the most conventional process of brick manufacture. It has also been verified from the Gazette Notification No. 2804, dated 3 November 2009 by Ministry of Environment and Forests, Government of India, that only 1.59% of the total national brick demand is produced by FaL- G technology. There is national regulation on the usage of fly ash in the brick manufacturing. The Union government has passed the regulation for the usage of fly ash by the brick manufacturing industries however, the regulation at the national level encounters wide spread non-compliance, which is evident from the aforementioned Study on “Cost Effective Building Materials & Technologies” /31/ that 95.3% of the material is contributed by the clay burnt bricks and also the most conventional process of brick manufacturing. DNV also confirms that the statistical data available from the HOLTEC report prepared in 2004 is the latest available at the time of validation and no other data on market penetration was available. Hence the data of 2004 report was accepted.

The assessment of the project’s compliance with the applicability criteria of AMS-III.Z (version 03) are documented in detail in section B.2 of Table 2 in the validation protocol in Appendix A to this report.

4.4 Baseline determination

In line with the applied methodology, AMS-III.Z, version 03, the baseline of the project activity has been determined to be the fossil fuel that would have been used in the related technology in the brick manufacturing units in absence of the project activity.

As verified from the Holtec report a study on “Cost Effective Building Materials & Technologies” /27/, clay burnt bricks contributes for 95.3% of total market size of the walling material in India. The market penetration of 95.3% has been validated as follows. The study report uses the sales revenue values to address market penetration. The total cost of walling materials projected by Holtec report /27/ in India is INR 347 450 million. The report (page 3-2, section 3.3.1) also gives the market potential of cost effective building materials (CEBM) as INR 19 200 million. The market potential for concrete blocks and fly ash bricks and blocks is INR 16 200 million. The remaining INR 3 000 million comprises of miscellaneous temporary walling material (includes earth blocks, boards, panel, bamboo etc). Thus, the total cost of permanent walling material is INR 344 450 million (347 450 – 3 000). Since fly ash bricks are meant for permanent walls, the % of fly ash bricks, concrete blocks and sintered clay bricks is derived based on total sales value figure of INR 344 450 million.



Fly ash bricks/blocks:	INR 4 850 million, 1.40 % out of all India wall market
Concrete blocks:	INR 11 350 million, 3.30 % of market
Clay brick is remaining balance (344 450- 4 850-11 350)	INR 328 250 million, 95.30% of market.

Thus, 4.7% is for fly ash bricks/blocks and concrete blocks. The report also states that among the CEBM walling materials, concrete blocks, fly ash bricks and gypsum plaster boards are gaining acceptance. Together these three materials constitute about 88% of the CEBMs and the current penetration of CEBMs within walling materials varies from 0.02% to 3.3%. Hence the derivation of the current market share of burnt bricks at 95.3% is conservative. DNV also confirms that the construction material industry being an unorganised sector, the market penetration of the walling material in terms of volumes/numbers is not available. This is also evident from the fact that the HOLTEC report was commissioned by the Building Materials and Technology Promotion Council (BMTPC), which was established by the Ministry of Urban Development. Hence the baseline for the project activity is that all the FaL-G bricks manufactured will replace burnt bricks in the walling material used in India. This baseline assumption is further substantiated by the following arguments.

The Holtec report /27/ also indicates, the split-up of the walling materials region wise. In the page 3-20 of the report, the walling material split up for the southern region, where the project is located is provided. The split-up states burnt bricks to have a market share of 60% in Urban regions and 35% in rural areas. Usage of stone to the extent of 11% and 19% is also reported in urban and rural areas. However the report also concludes that “Majority of the consumers in south prefer to use red burnt bricks for construction. Other preferred materials are mud, un-burnt bricks and stone. In comparison to other regions, the use of stone is high in south. This is due to their easy availability at lower prices”. Hence the above assumption that the FaL-G_ project bricks would replace the burnt bricks is reasonable as the other preferred materials like mud, un-burnt bricks and stone are priced lower than Fal-G bricks.

The cost (per unit basis) of walling by temporary walling material is low in comparison to the burnt bricks. In view of (1) the socio-economic structure and (2) the cost of Fal-G bricks being higher than the burnt bricks, it is logical to assume that the project activity bricks will replace only burnt bricks. It is envisaged that the population which shall not/cannot afford the burnt bricks would not opt for project activity bricks, as this would result in higher cost of walling in comparison to burnt brick. Thus, in absence of the project activity Fal G bricks, burnt brick would have been used mainly due to the price factor.

DNV has also interacted with an external expert, Dr. A.R. Santha Kumar, Former Emeritus Professor, Indian Institute of Technology (Madras) & Former Chairman (Civil Engineering), Anna University, currently working, on the prevalent trends of market for the walling material in India, and on the selection of clay bricks as the baseline scenario. Based on his extensive working knowledge and expertise in the field of material science of construction from brick to advance concrete technology, the expert confirmed the absence of any recent statistical data



on the market share post, but indicated that the market share of clay burnt bricks is assumed to be 96% /46/. This observation is in line with the TERI/UNDP web based article (copyright © 2010 TERI), which estimates production of 140 billion bricks during the year 2000–01 with a growth rate of 4% per year /43/

The production level of the project activity is 248 930 m³/annum. In comparison the burnt bricks production in India as per TERI/UNDP is an estimated 140 billion bricks during the year 2000–01 and estimated to be growing at a rate of 4% per year /43/. Considering that the % of FaL-G bricks production is miniscule compared to the total burnt bricks production, it is assumed that the FaL-G bricks, being costlier than the burnt bricks, would 100% replace the immediately less costlier walling material of burnt bricks.

In India, the different technologies that are used to produce burnt clay bricks are clamps, Movable Chimney- Bull Tranche Kilns (MCBTK), Fixed Chimney-Bull Tranche Kiln (FCBTK), High Draft Kilns (HDK) and the recently introduced Vertical Shaft Brick Kiln (VSBK) technology. It has been verified from the emission standards for brick kilns by TERI /28/ that coal is used as fuel for the above mentioned systems used in the clay brick production. As shown in Section 4.5, the project activity faces barrier that, in the absence of CDM funding, would have prevented the project activity.

In line with the methodology the baseline energy consumption has been conservatively calculated based on the specific energy consumption of the burnt bricks manufacture. Since the burnt bricks are manufactured by various technologies (as detailed in section 4.7), the weighted average method has been adopted and is conservative. This is in line with the methodology para 10(b), which states that “If the baseline scenario identified includes different technologies with different levels of energy consumption, a weighted average energy use of these technologies can be considered for determining the baseline emissions of the facility or facilities.” DNV concludes that baseline scenario has been determined as per the applied methodology equation 2.

The approved baseline methodology has been correctly applied to identify a complete list of realistic and credible baseline scenarios, and the identified baseline scenario most reasonably represents what would occur in the absence of the proposed CDM project activity.

All the assumption and data used by the project participants are listed in the PDD and/or supporting documents. All documentation relevant for establishing the baseline scenario are correctly quoted and interpreted in the PDD. Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD.

4.5 Project boundary

The project boundary of the project activity includes the physical and geographical limits of all the 42 FaL-G plant units in the project activity. The facilities included in the boundary of each of the FaL-G plant unit are storage yard for raw materials, pan mixer for mortar preparation, casting machine, drying yard and curing yard.

Emission sources and gases included in the project boundary are:



	GHGs involved	Description
Baseline emissions	CO ₂	Emission due to the usage of coal in the clay brick manufacturing system that would have used in absence of the project activity.
Project emissions	CO ₂	Emission due to the usage of electricity and/or diesel consumption in the project activity.
Leakage	CO ₂	<p>Emission due to the cement (OPC) and/or lime usage in the project activity has been considered as leakage as per the methodology.</p> <p>Since the net emission due to the transportation of raw materials is 0.15% for lime route and 0.07% for OPC route, on the average annual emission reductions by the project activity, same has been considered as insignificant and neglected for simplicity.</p>

The identified boundary and selected sources and gases are justified for the project activity. The validation of the project activity did not reveal other greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed project activity which are expected to contribute more than 1% of the overall expected average annual emission reduction, which are not addressed by AMS-III.Z (version 03).

DNV has verified that the project activity in question is not to be considered a de-bundled project activity as the individual brick manufacturing units in the project activities are legally independently owned and operated. Eco Carbon Pvt. Ltd. only acts as a coordinator and focal point. Eco Carbon Pvt. Ltd. is authorized by individual entrepreneurs to represent them for all matters related to CDM and this fact has been verified by DNV from the sub-project agreement signed between each brick manufacturing unit owner and Eco Carbon Pvt. Ltd /45/. The legal independent brick manufacturing entity involved in the project activity “India-FaL-G Brick and Blocks Project No.3” has not involved in any other project activity under the similar category. Hence it is concluded that the registration of this project as CDM project does not have any direct impact due to other similar CDM project activities (UNFCCC # 0707 and UNFCCC # 4585) for which ECPL is the focal point. Thus, the project activity has not been considered as de-bundled component of a larger project.

4.6 Additionality

The additionality of the project activity has been demonstrated as per the Attachment A to Appendix B of simplified modalities and procedures for small-scale CDM project activities.



4.6.1 Evidence for prior CDM consideration and continuous actions to secure CDM status

The starting date of the project activity has been selected to be 1 February 2004, which is the earliest of the date of establishment among all the 42 FaL-G plants as included in the agreement between the individual brick manufacturing units and Eco Carbon Pvt. Ltd. for participating in the bundling of project activity /45/.

The start date of the project has been assessed from the following:

- The date of establishment of individual unit as verified from the agreement between the individual brick manufacturing units and Eco Carbon Pvt. Ltd. for the participating the bundling of project activity /45/. Since these agreements between SPE and ECPL only refer to the month of establishment, the earliest date of this month i.e. 1st of the indicated month has been accepted as date of establishment in-order to be conservative in approach.
- The date of commencement of production of the individual unit as verified from the small-scale industries certificate by Director of Industries for the individual units of the project activity (Part-II permanent registration)/14/.

Based on reviewing the aforementioned documents for all units, it has been verified that the earliest date of establishment among all the units is 1 February 2004 and the earliest date of commencement of production is 10 February 2004. Thus, as per paragraph 99 of VVM, version 1.2, the earliest date of establishment of 1 February 2004 has been considered as the start date of the project activity.

The date of establishment as mentioned in the Agreement between the individual brick manufacturing units and Eco Carbon Pvt. Ltd. for participating in the bundling of project activity /45/ has been further assessed from the temporary/provisional registration certificate (Part 1) for the units /49/. Since temporary registration (provisional) of an unit with the Department of Industries is carried out immediately after owners deciding to invest in such projects, the date of establishment indicated in the agreement between ECPL and individual Units are in line with the date of provisional Part I registration/49/. This has been verified for 28 out of 42 units in the bundle. For remaining 14 units the temporary registration Part-I were not available as Units have directly gone for permanent registration due to the short time taken for establishing the units. However, information on 28 units (out of 42 units) were considered sufficient to establish the above fact.

It has been verified that for 4 units, only temporary registration (Part 1) is available. It has confirmed by project participant as a response to CAR 3 raised by DNV that these units became inactive after joining the bundle; hence no further documents were available. The date of establishment, date of commencement of production as per the Small-scale industries certificate by Director of Industries and date of issuance of temporary registration (provisional) unit with Department of Industries has been provided in annex 7 of the PDD /1/.

It is demonstrated that CDM was seriously considered in the decision to proceed with the project activity in compliance with “Guidelines on the demonstration and assessment of prior consideration of the CDM”, version 3.1 /56/, which was confirmed through:

- E-mail communication between Institute for Solid Waste Research & Ecological Balance (INSWAREB) and World Bank regarding the development of FaL-G project



and its potential barriers and the estimated CERs from the project activity, dated 7 September 2000 /15/.

- Project Idea Note (PIN) for the FaL-G project activity as CDM project activity was developed and submitted to Community Development Carbon Fund (CDCF), dated 3 January 2003 /16/.
- Excerpts of minutes of the 42nd Governing Body meeting of INSWAREB at FaL- G Mansion, Visakhapatnam, dated 20 September 2003 /17/, on the consideration of CDM revenue to overcome barrier due to price competition and investment in the market promotion. The introduction and involvement of Eco Carbon Pvt. Ltd for participating in the commercial pursuit as the project proponent has also been verified from the Excerpts of minutes of the 42nd Governing Body meeting of INSWAREB at FaL- G Mansion, Visakhapatnam, dated 20 September 2003 /17/ .
- Letter of intent for the purchase of potential CERs from “FaL-G Brick units in tiny sector Multiple units” (i.e. individual units), India, between Eco Carbon Pvt. Ltd and World Bank, International Bank for Reconstruction and Development, dated 3 June 2004 /19/.

The assessment that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation is summarized below:

- E-mail to State bank of India on scheduling of meeting, inviting SBI to be the leading bank for financial the FaL-G project, dated 4 January 2005 and Note to SBI on carbon activity between World Bank and Eco Carbon Pvt. Ltd., through FaL-G brick/block production in India and potential for CDM revenue/20/.
- New draft Methodology and PDD for the FaL-G project activity has been submitted by World Bank to EB-CDM: SSC_014 and subsequent recommendation by CDM EB to use AMS-II.D on 13 February 2006 /21/.
- Emission reduction purchase agreement between Eco Carbon Private Limited and International Bank for Reconstruction and Development, as Trustee of the Community Development Carbon Fund, dated 28 June 2006 /3/.
 - The PDD of the “India-FaL-G Brick and Blocks Project No.3” has been submitted to DNV for validation with methodology, AMS-II.D on 24 March 2008 /47/. The validation could not be commenced due to the methodological issue in considering leakage due to raw material input.
- CDM SSC PDD for the “India-FaL-G Brick and Blocks Project No.3” with methodology AMS-III.Z, version 2 was webhosted on 25 November 2009.
- Since there were no gaps of more than two years between actions to secure CDM status, it was concluded that sufficient efforts were taken to secure CDM status for the project activity. The continuous effort for securing CDM status has been further substantiated as during April 2009 to June 2009, various revisions /23/ and clarification as stated below in AMS-III.Z were sought /24/.
 - SSC_297 and SSC_298: Revision of AMS-III.Z regarding demonstration of abundance of raw materials and quality of bricks, submitted on 03 April 2009



and the response from SSC WG /23/ subsequent to which methodology version was revised and AMS-III.Z, version 2 was published.

- SSC_322: Revision of AMS-III.Z, version 02 to provide clarity on nationally approved laboratories and product service life, submitted on 18 June 2009 to which the SSC_WG provided the clarification on the procedure accepted for the service level testing as per the methodology /24/.

It is DNV's opinion that the proposed CDM project activity complies with the requirements of the latest version of the guidance on prior consideration of CDM.

4.6.2 Barrier analysis

The additionality of the project activity has been demonstrated with the following:

- Barrier due to prevailing practice: It has been verified from the study on “Cost Effective Building Materials & Technologies” /31/, undertaken by Holtec Consulting Private Limited in the year 2004 on behalf of the Building Materials Technology Promotion Council, a Government of India concern, that the clay burnt bricks contributes for 95.3% of total market size of the walling material and thus dominates the brick market. The HOLTEC report also states that the current share of market penetration of the CEBMs in the walling material market to be in range of 3.3%, with the fly ash bricks penetration at 1.4%. The reasonableness of the low penetration was also verified from the Gazette Notification No. 2804, dated 3 November 2009 by Ministry of Environment and Forests, Government of India, that only 1.59% of the total national brick demand is produced by FaL- G technology. The burnt clay bricks dominate the walling market and are manufactured in the small units in conventional process that require no technology backup, specialised equipment or skilled manpower. In comparison, the FaL-G units are fixed units which require electrical equipment, technology backup in terms of analysing the quality of the raw materials and skilled manpower. Also considering the fact that there is no incentive for shifting from burnt clay bricks manufacture to FaL-G technology with additional investments, the penetration figure of 1.4% is negligible. As stated in the earlier section, there is no market penetration information available in terms of the volumes/numbers.
- The raw materials, lime and/or cement and gypsum, used in FaL-G bricks/blocks makes it cost intensive in comparison to clay brick. It has been verified from the technical report on fly ash-lime-phosphogypsum cementitious binder: A new trend in bricks, by S. Kumar from Department of civil engineering, BIET, Jhansi /36/, that due to the process of beneficiation of raw materials for FaL- G bricks, the cost of the same is increased considerably in comparison to the clay bricks. The FaL-G bricks have hence to be sold at a higher price. This acts as a significant barrier to the project activity and has been considered at the 42nd Governing Body meeting of INSWAREB at FaL-G Mansion, Visakhapatnam, dated 20 September 2003 /17/. To encourage the FaL-G bricks, the Union Government of India, did exempt FaL-G from excise duties until 2006 /37/; however, the same was merged with the similar level of sector, which includes the clay brick industries. From the fiscal year 2006, the excise duty exemption on this was withdrawn /37/. Further, it has been verified from the website of Indian Concrete Journals /38/ that the clay brick industry, being an unorganised



sector does not strictly follow the tax regime, whereas, the FaL-G brick industries are in an organised sector and follow the tax regime. The same has also been reflected from the letter to the Editor of Economic Times on 10 May 2006 /39/, as available in the website of Institute for Solid Waste Research & Ecological Balance (INSWAREB). This leads to continuance of burnt clay bricks production, which results in higher emission. Thus, it can be concluded that the project activity encounters barrier due to prevailing practice.

The CDM revenue shall be used for the technological upgradation, market development and the meeting the price competition with the clay bricks, thus alleviating the barrier.

- Technological barrier: Technological barrier has been established based on two factors: Sourcing of suitable quality of raw materials and correct application of FaL-G technology.

FaL-G brick/block production uses the patented technology /10/ and this is not a business as usual scenario in brick industry of India. The main raw materials used in the process of FaL-G brick manufacturing are fly ash, lime and/or cement (OPC) and gypsum. The strength of the product depends on the purity and the mixing proportions of these materials. The sourcing and the right mixture (recipe) of the raw materials to get the commensurate hydration chemistry are the technological risks of the project. The starting materials have to be tested and selected for sourcing and, in case of change in the source of starting materials, the chemistry needs to be optimised to get the adequate service level. This fact has been further substantiated by Dr. P. Kumar Mehta, Professor in Civil Engineering department at University of California, Berkeley at Sixth CANMET/ACI international conference on fly ash, silica fume, slag in natural pozzolans in concrete at Bangkok in the article "*Role of Pozzolanic and Cementitious Material in Sustainable Development of Concrete Industry*" /46/, which explains the variation in the quality of raw materials like fly ash and how FaL-G technology imparts tailor made solutions for such non-standard starting materials in producing consistent quality of bricks, that is crucial for success of the FaL-G technology.

Furthermore, even though FaL-G is a patented technology /10/, the licensors have not invoked the patent to facilitate the proliferation of technology. This have resulted into operation of some unlicensed FaL-G brick units on the pirated technology and are likely to produce low- grade fly ash bricks which is not in control of the technology provider. The low quality of fly ash bricks produced in the unlicensed plants may have customer-complaints and hamper the overall brick market of FaL-G. This fact has been verified by DNV through some of news articles in India's leading newspaper "The Hindu" on the challenges related to quality assurance of FaL-G bricks, dated 26 March 2009 /26/ which were based on the incidences of reporting usage of poor quality fly ash bricks. It was also verified from another article in the same newspaper dated 11 April 2009 /26/ in which, as a response, the technology providers INSWAREB explained that the quality control of bricks in the market can be assured only through conducting awareness in the brick users on the random quality checks and use of bricks from the licensed manufacturers only.



The revenue from CDM shall facilitate the brick unit to afford for the technology fee to the FaL-G patent holder and to receive 'Improvement Information' of the technology from technology provider. Also this would offset the effort required to promote this technology, thus alleviating the barrier.

The project activity encounters barrier due to prevailing practice and technological risk that prevents the project from happening without CDM funding, and the emissions reductions occurring from the project are deemed additional to those that would occur in the absence of the project activity. DNV is able to confirm this conclusion.

4.7 Monitoring

The selected monitoring plan is as per the applied methodology, AMS-III.Z, version 03.

The baseline has been calculated as the product of annual production specific emission factor and the net production of FaL-G bricks. The electricity consumption and diesel consumption by the project activity have been accounted as project emissions. The emission due to the transportation of raw materials and usage of cement (OPC) and/or lime in the process have been accounted as leakage as per the methodology, AMS-III.Z, version 03.

The net production of FaL-G bricks shall be monitored based on the number of bricks/ blocks produced and recorded at the individual unit level. The electricity consumed by the project activity is monitored by the energy meters and, the latter shall be calibrated as per the national regulation of India.

The monitoring plan is in accordance with the monitoring methodology. The monitoring plan will give opportunity for real measurements of achieved emission reductions.

The application of the monitoring methodology is transparent and DNV considers the project participants would be able to implement the monitoring plan.

4.7.1 Parameters determined ex-ante

The parameters determined ex ante are:

- Annual production specific emission factor of $0.2683 \text{ tCO}_2/\text{m}^3$ has been determined from the data sourced from the emission standards for brick kilns by TERI /28/ (as described in Section 4.7).
- Emission factor of electricity at $1.3 \text{ tCO}_2/\text{MWh}$ has been sourced from the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption". This data has been used for calculation of project emissions. The default data has been accepted based on the conservativeness and in-line with guidance provided in scenario A, option A2 of "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".
- Emission factor of diesel at $74.8 \text{ ton CO}_2/\text{TJ}$ has been sourced from 2006 IPCC Guidelines on National GHG Inventories /57/. Default value at the upper limit of the uncertainty at a 95% confidence interval has been considered. Net calorific value of 43.3 TJ/Gg for diesel has been sourced from IPCC 2006 and shall be updated as per the revision of the IPCC values. The density of diesel at 0.820 kg/L has been sourced from Society of Indian Automobile Manufactures /41/ and shall be updated as per any revision in the value. The default values of net calorific value and density has been used in line with the "Tool to calculate baseline, project and/or leakage emissions



from electricity consumption”, as stipulated by the applied methodology, AMS-III.Z, version 3.

- Emission factor of cement at 0.82 tCO₂/ ton of cement has been sourced and verified from the technical article by Press Information Bureau, Government of India: Indian Cement Industry /30/.
- Emission factor of lime at 0.42 tCO₂/ton of lime has been used for the calculation of leakage. This has been verified from the IPCC 2006 default value of 0.40 tCO₂/ton for lime. This has been accepted based on the conservativeness.

All other data shall be monitored *ex-post*. IPCC default values shall be updated as per the latest IPCC values at the upper limit of the uncertainty at 95% confidence interval.

4.7.2 Parameters monitored ex-post

The parameters determined *ex post* are:

- Net quantity of brick produced in m³ by the project activity. This shall be monitored based on the number of bricks/ blocks produced and recorded in the stock register at the unit level on daily basis.
- The electricity consumption by each unit of the project activity. This shall be measured with the energy meters and monthly electricity bills shall be provided by the state electricity board at each unit level.
- Diesel consumption by each unit of the project activity shall be monitored and recorded in the stock register. This shall be cross verified from the purchase bills.
- Cement and lime purchased by each unit of the project activity shall be monitored and recorded from the purchase bills.
- The FaL-G brick or block shall be tested in a Compressive strength Testing Machine (CTM) in any of the laboratories of polytechnics, engineering colleges, building centers, national laboratories etc. once in six months and the test certificates are provided by the laboratory.

In view of the above mentioned monitoring procedure for each of *ex-post* monitored parameters /53/, DNV concludes that monitoring plan is feasible for the project activity design and project proponent is considered able to implement the monitoring plan.

4.7.3 Management system and quality assurance

All the necessary data as per the methodology shall be monitored and recorded. The day to day data shall be compiled on monthly basis and the same shall be reviewed by the project entity. All the data shall be kept for two years after the end of crediting period.

The electricity meters shall be calibrated at least once in every five years as stipulated by Central Electricity Authority, Ministry of Power, Government of India: Clause 18 of Gazette Notification No. 502/70/CEA/DP&D, dated 17 March 2006 /29/. The electricity meters are in the control of state electricity board and are to be calibrated by the state agency. To comply with the calibration requirement, any one of the following option shall be applied by the project participant:

- The electricity meters shall be calibrated by the State Electricity Board (SEB) and the calibration certificate shall be provided.

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- As per the clause 18 (2) of Gazette Notification No. 502/70/CEA/DP&D, dated 17 March 2006 /48/, the electricity meters may be replaced by another test meter by the SEB and the relevant test certificate shall be obtained for the electricity meter.
- In case, SEB is unable to provide the calibration certificate, as per the options mentioned above, a supplementary electricity meter shall be installed and the same shall be calibrated by a third party once in three years, in line with the CDM Executive Board guidance /60/.

The periodic inspection of the FaL-G brick units of the project activity shall be conducted by the project entity to ensure the data accuracy and recording consistency.

4.8 Estimation of GHG emissions

The calculations and formulae as addressed in the approved baseline and monitoring methodology AMS-III.Z, version 03, have been applied. All aspects related to the direct and indirect GHG emissions as relevant to the project activity have been addressed and are presented in a transparent manner, in line with the approved methodology. No other project emission or leakage sources contributing more than 1% and not mentioned by the methodology have been found.

4.8.1: Baseline emission: Baseline emission has been calculated as per the formula provided in the applied methodology, AMS-III.Z, version 03. It has been verified from the emission standards for brick kilns by TERI /28/ that coal is used as fuel for the above mentioned systems used in the clay brick production. In line with the methodology the baseline has been conservatively calculated based on the specific energy consumption of the burnt bricks manufacture. Since the burnt bricks are manufactured by various technologies (as described in section 4.4), the weighted average method has been adopted and is conservative. This is in line with the methodology para 10(b), which states that “If the baseline scenario identified includes different technologies with different levels of energy consumption, a weighted average energy use of these technologies can be considered for determining the baseline emissions of the facility or facilities.”

The report by TERI /28/, “Emission standards for brick kilns: An opportunity for technology up gradation, 1999” is the latest data available at the time of the start date of the project activity, June 2004, and during the validation of the project activity. DNV had verified that the TERI report has also been referred to in the publication “Prospect and problem of Brick Industry” (2008) /44/. This is indicative of the fact that the TERI report /28/ of 1999 was valid at the time of validation of the project activity. Furthermore, the brick manufacturing in India is an old technology. The different types of technologies used for brick manufacturing has been considered for the specific emission calculation. It has been verified from the website during 2010 of TERI a project on “Energy Efficiency Improvements in the Indian Brick Industry” by TERI in association with UNDP /43/ that traditional technologies are used in the brick manufacturing process and due to various technological, financial and socio-logistic barriers, technological up-gradation in the brick manufacturing sector has not taken place in India. Thus, the data from the TERI report /28/, has been considered relevant and acceptable for the specific emission factor calculation by DNV.



Baseline emission has been calculated as the product of annual production specific emission factor and annual net production by the project activity. Specific emission factor of production at $0.2683 \text{ tCO}_2/\text{m}^3$ has been calculated based on the specific energy consumption, calorific value of coal and emission factor of coal /28/. The total clay brick production per year and the corresponding coal consumption and calorific value of coal have been sourced from the emission standards for brick kilns by TERI /28/. It has been verified and concluded from the document on “Regional Wood Energy Development Programme in Asia” by Food and Agriculture Organization of the United Nations /31/ that biomass contributes less than 2% of the total fuel consumption in the brick industry in India. In absence of any specific data on the percentage of renewable biomass and non-renewable biomass consumption, an adjustment factor of 5% has been considered on the conservative basis. Thus, the net baseline emission shall be calculated after factoring 5% from the gross baseline emission computed by formula (1) of the methodology. The specific emission factor of production has been fixed *ex ante*.

The baseline emission factor has been calculated on volume basis, to have the parity in project bricks and blocks, irrespective of it being solid or hollow. Volume approach is more accurate, as the project brick/block replaces the equivalent volume of clay bricks, which are primarily used as walling material in India. Based on the above mentioned reasons, DNV has validated and accepted the emission reduction calculations based on the volume approach.

The production of bricks shall be monitored *ex post* at the unit level on daily basis.

4.8.2: Project emission: The project emission due to the usage of electricity and/or diesel consumption by the project activity has been calculated as per “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”. In line with the mentioned tool, emission due to electricity consumption has been calculated as per scenario A of “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”. As explained in section 4.7.1, a default emission factor at $1.3 \text{ tCO}_2/\text{MWh}$ has been considered as stipulated by option A 2 of the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”. Since, this factor shall be used for project emission calculation, option A 2 has been accepted by DNV on basis of guidance given in the tool and conservativeness.

Since the requisite data, as per option A of “Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion” is not available, option B as per the “Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion” has been used for calculating the project emission from diesel consumption by the project activity. The net calorific value and emission factor of diesel has been sourced and verified from the IPCC 2006 default value at the upper limit of the uncertainty at a 95% confidence interval has been considered. The IPCC default values shall be revised as per the revision in the IPCC default value. The density of diesel at 0.820 kg/L has been sourced from Society of Indian Automobile Manufacturers /41/. Diesel consumption shall be monitored during the crediting period.

4.7.3: Leakage: The emission due to the transportation of raw materials (at the rate of $4\,500 \text{ m}^3$ brick production per year) in the project scenario is 34% to 68% higher than the emission in the baseline. The emission of $35 \text{ tCO}_2/\text{year}$ to $44 \text{ tCO}_2/\text{year}$ (based on the OPC or lime route) for $4\,500 \text{ m}^3$ production per year in project scenario is 0.53% of the net annual



emission reduction by the project activity unit generating 4 500 m³ of bricks and thus has been considered as insignificant and neglected for simplicity.

The leakage due to the usage of cement (OPC) and/or lime has been calculated as required by the applied methodology. Emission factor of cement and lime has been considered as discussed in Section 4.6.1. The quantities of cement (OPC) and lime purchased for the project activity shall be monitored for the calculation of project emission during the crediting period.

DNV is of the opinion that the baseline and project emissions estimate can be replicated using data and parameter values provided in the PDD and supporting files submitted for registration. The data sources mentioned have been verified by DNV.

Based on the calculations and results presented in the sections above the implementation of the project activity will result in an average ex-ante estimation of emission reduction conservatively calculated to be 46 728 tCO₂e per year for the selected crediting period.

All assumptions and data used by the project participants are listed in the PDD and/or supporting documents, including their references and sources. All documentation used by the project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD. All values used in the PDD are considered reasonable in the context of the proposed CDM project activity. The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions. All estimates of the baseline, project and leakage emissions can be replicated using the data and parameter values provided in the PDD.

In summary, the GHG calculations are complete and transparently documented by the spreadsheet /35/ and data accuracy has been verified.

4.9 Environmental impacts

The proposed project activity contributes to towards avoiding of coal fossil fuel in the brick manufacturing units and is expected to benefit the economic development of the region. Thus, the project activity is expected to have only beneficial impacts and no adverse impacts are foreseen. There is no legislative mandate for carrying out an environmental impact assessment study, as brick manufacturing units fall under small scale industries and are exempted from such requirement. The clearances from the pollution control board /13/ and small-scale industries certificate by Director of Industries /14/ for all the individual units under the project activity have been provided and verified by DNV. The project activity is in compliance with all current, applicable legislations.

4.10 Comments by local stakeholders

The local stakeholders include the owners of brick manufacturing units, consumers, local residents, workers at FaL-G plants and the suppliers of raw materials. Minutes of the meeting conducted with local stakeholders at various location /32/ have been provided and verified by DNV. The evidence on conducting the workshops at Hyderabad and Cuddapah on FaL-G technology in September 2003 has been provided to DNV /33/. The feedback from the local stakeholders has been adequately documented in the PDD. No negative feedback has been received. DNV considers that the local stakeholder consultation process is adequate for the proposed project activity.



4.11 Comments by Parties, stakeholders and NGOs

The PDD, version 01 dated 11 August 2009, was made publicly available on the CDM website and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 25 November 2009 to 24 December 2009 (<http://cdm.unfccc.int/Projects/Validation/DB/LU03G5NL45HBTDICDSA0VWQ7VCSQT8/view.html>).

There were no comments on the project.

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APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 **Mandatory requirements for Clean Development Mechanism (CDM) project activities (refers to/based on webhosted PDD)**

Requirement	Reference	Conclusion
About Parties		
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.	Kyoto Protocol Art.12.2	OK
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	CAR-1 OK
4. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	CAR-1 OK
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	The validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards India and this has been verified from the affirmation regarding no diversion of official development assistance from

Requirement	Reference	Conclusion
		Government of Italy, dated 9 September 2005 /2/. It is confirmed in the letter of Approval from Netherlands that no diversion of official development assistance towards India is involved in the project activity /45/.
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	OK
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	OK
About additionality		
10. Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	CL11 OK
About forecast emission reductions and environmental impacts		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	CL17 OK

Requirement	Reference	Conclusion
About small-scale project activities (if applicable)		
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakech Accords and shall not be a debundled component of a larger project activity.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK
13. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and use the simplified baseline and monitoring methodology for that project category.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK
14. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	NA
About stakeholder involvement		
15. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	OK
16. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK. The PDD has been published on UNFCCC web site from 25 November 2009 to 24 December 2009. No comments were received on the project
Other		
17. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
18. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	OK
19. The baseline methodology shall exclude to earn CERs for decreases in activity	CDM Modalities and	OK

Requirement	Reference	Conclusion
levels outside the project activity or due to force majeure.	Procedures §47	
20. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK

Table 2 Requirements checklist (Refers/based on webhosted PDD)

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
A General description of project activity					
A.1 Title of the project activity(VVM para 55-57)					
A.1.1 Does section A.1 of the PDD include a clearly identifiable project title, version number of the PDD and date of the PDD?	/1/	DR/I	<input checked="" type="checkbox"/> Clearly identifiable title of the project activity <input checked="" type="checkbox"/> Version number of the PDD is included <input checked="" type="checkbox"/> Date of the PDD is included.		OK
A.1.2 Is the PDD is in accordance with the applicable requirements for completing PDDs?	/1/	DR/I	<input checked="" type="checkbox"/> Yes <i>If no, list where the PDD is not in accordance:</i>		OK
A.2 Description of the project activity(VVM para 58-64 and VVM para 135 and 136 (a) & (c) for small-scale project activities, as applicable)					
A.2.1 How was the design of the project assessed?	/1/	DR/I	<i>What type is the project?</i> <input type="checkbox"/> Project in existing facility or utilizing existing equipment(s) <input type="checkbox"/> Large scale project <input checked="" type="checkbox"/> bundled small scale projects, each with emission reductions not exceeding 15 000 tCO ₂ e per year <input type="checkbox"/> individual small scale project activity with emission reductions not exceeding		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				<p>15 000 tCO₂e per year</p> <p><input checked="" type="checkbox"/> Greenfield project</p> <p><i>How was the design of the project assessed?</i></p> <p><input checked="" type="checkbox"/> Physical site inspection</p> <p><input type="checkbox"/> Reviewing available designs and feasibility studies</p> <p><i>If a physical site inspection is not undertaken, justify why no site visit was undertaken:</i></p>		
A.2.2	If a greenfield project, describe the physical implementation of the project when the validation was commenced.	/1/	DR/I	<p>The project activity is bundled project of 42 FaL-G units which are newly implemented and considered as green field project.</p> <p>The PDD does not address the details on project implementation. The chronology of the project activity needs to be added in the PDD.</p>	CL1	OK
A.2.3	If physical site visits were performed based on sampling (only applicable for bundled small scale projects, each with emission reductions not exceeding 15 000 tCO ₂ e per year), justify the sampling through a statistical analysis:	/1/	DR/I	Physical site inspection of all 22 out of 42 units have been conducted which forms more than 50% of the total units.		OK
A.2.4	Is the description of the proposed CDM project activity as contained in the PDD sufficiently covers all relevant elements, is accurate and that it provides the reader with a clear understanding of the nature of the proposed	/1/	DR/I	The project activity involves the installation of the new Fal G technology for the manufacture of bricks/blocks, which works with the chemical strength of fly ash, lime		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
CDM project activity?				<p>and gypsum.</p> <p>The technology does not require any thermal energy for brick preparation. The raw materials used in FaL G technology for brick preparation are fly ash, lime or cement, gypsum and stone dust.</p> <p>The raw materials are mixed in to homogeneous mortar in the roller mixture and moulded into blocks which are compacted under vibration or vibro-press or hydraulic compression. Subsequently, the bricks are dried under sun and subjected to periodical water spray.</p> <p>The accuracy of the description in the PDD with the actual project technology have been verified during the site visit.</p>		
A.2.5	Does the project activity involve alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?	/1/	DR/I	The project activity is a bundled activity of all green field units.		OK
A.2.6	Does the project design engineering reflect current good practices?	/1/	DR/I	<p>The technology of the project activity has been developed by Dr N Bhanumathidas and N Kalidas.</p> <p>The Copy of the patent and applicable countries covered under this patent for FaL G technology needs to be provided.</p>	CL-2	OK
A.2.7	Would the technology result in a significantly better performance than any commonly used technologies in	/1/	DR/I	The validation does not reflect any transfer of technology from Annex I country. The		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
the host country? Is any transfer of technology from any Annex-I Party involved?				proposed project technology eliminates the thermal treatment, and does not require combustion of any fossil fuel.		
A.2.8	Does the project qualify as a small scale CDM project activity as defined in paragraph 6(c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/1/	DR/I	The project activity involves the installation of an alternative bricks/blocks making process and eliminating the fossil fuel combustion. The total emission reduction by the project activity in 41 323 tCO ₂ per year average. The project activity qualifies as Type III category Z of the small scale CDM projects as the annual emission reductions are within the small scale limit of 60kCO ₂ e per year.		OK
A.2.9	Is the small scale project activity a de-bundled component of a larger project activity?	/1/	DR/I	The project activity is a bundled project covering 42 units of Andhra Pradesh, Orissa, Chhattisgarh and Tamilnadu States. Bundling capacity is within the limits of small scale activity.		OK
A.3 Participation requirements(VVM para 51-54, 123-125)						
A.3.1	Do all participating Parties fulfil the participation requirements as follows:	/1/	DR	Yes		OK
		India (host)		Italy	Netherlands	
a) Party has ratified the Kyoto Protocol		<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
b) Party has designated a Designated National Authority		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
c) The assigned amount has been determined		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
A.3.2	Do the letters of approval meet the following	/1/	DR/I	The LoA from the DNA of host country and		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
requirements?			the Annex I parties are yet to be provided.	CAR-1	
			India (host) Italy Netherlands	CAR-1	OK
a) LoA confirms that Party has ratified the Kyoto Protocol			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
b) LoA confirms that participation is voluntary			<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No		
c) The LoA confirms that the project contributes to the sustainable development of the host country?			<input type="checkbox"/> Yes <input type="checkbox"/> No NA NA		
d) The LoA refers to the precise project activity title in the PDD			<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No		
e) The LoA is unconditional with respect to (a) to (d) above			<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No		
f) The LoA is issued by the respective Party's DNA			<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No		
g) The LoA was received directly by the DNA or the PP			<input type="checkbox"/> DNA <input type="checkbox"/> PP <input type="checkbox"/> DNA <input type="checkbox"/> PP <input type="checkbox"/> DNA <input type="checkbox"/> PP		
h) In case of doubt regarding the authenticity of the letter of approval, describe how it was verified that the letter of approval is authentic					
A.3.3 Have all private/public project participants been authorized by an involved Party?	/1/	DR/I	The LoA from the DNA of host country and the Annex I parties are yet to be provided.	CAR-1	OK
A.4 Technical description of the project activity(VVM para 58-64)					
A.4.1 Is the project's location clearly defined?	/1/	DR/I	The project activity is a bundled activity of 42 units located in Various districts of Andhra Pradesh, Orissa, Chhatisgarh, and Tamilnadu, India. The details of locations of the districts have been provided in the PDD. The geographical coordinates of the	CL-3	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			individual facilities need to be provided in the PDD as per the UNFCCC's requirement.		
A.5 Public funding of the project activity					
A.5.1 In case public funding from Parties included in Annex I is used for the project activity, have these Parties provided an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties?	/1/	DR/I	The validation does not reflect the involvement of ODA. The CDCF includes funding from several Annex I Party governments and the project thus includes public funding. Section A.4.5 and Annex 2 will have to be revised and an affirmation has to be provided by at least the Annex I Party that eventually will authorize IBRD's participation in which this Annex I Party confirms that funding used does not represent a diversion of ODA:	CL 4	OK
B Application of a baseline and monitoring methodology					
B.1 Methodology applied(VVM para 65-76 and VVM para 136 (b) for small-scale project activities, as applicable)					
B.1.1 Does the project apply an approved methodology and the correct version thereof?	/1/	DR/I	Yes. The project activity correctly applies approved methodology AMS-III.Z, version 02.		OK
B.2 .					
B.2.1 How was it validated that project complies with the following applicability criteria: Para 1 of the methodology AMS-III.Z, version 02?	/1/	DR/I	The project activity involves the installation of an alternative brick manufacturing process. It is to be demonstrated in line with methodology with the analysis and	CL 5	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			documented studies that the quality parameters of the brick from FaL-G technology are better or comparable to the conventional bricks. It is also required to demonstrate that the project meets the requirements of paragraph 8 of methodology.		
B.2.2 How was it validated that project complies with the following applicability criteria: Para 2 of the methodology AMS-III.Z, version 02?	/1/	DR/I	The project activity involves the installation of a new system in new units for bricks/blocks manufacturing. This has been confirmed during the site visit through verification of various regulatory clearance certificates like small scale industrial approval from department of Industries, etc.		OK
B.2.3 How was it validated that project complies with the following applicability criteria: Para 3 of the methodology AMS-III.Z, version 02?	/1/	DR/I	The project activity is a Greenfield project and the total emission reduction is 41 323 tCO ₂ e average per year. However the project activity has to demonstrate that it meets the relevant requirements of green field activities as per general guidance of the SSC methodologies.	CL-6	OK
B.2.4 How was it validated that project complies with the following applicability criteria: Para 4 of the methodology AMS-III.Z, version 02?	/1/	DR/I	The project activity is Greenfield activity, thus, demonstration of the remaining life is deemed not required.		OK
B.2.5 How was it validated that project complies with the following applicability criteria: Para 5 of the methodology AMS-III.Z, version 02?	/1/	DR/I	The project activity is a Greenfield activity, thus demonstration of usage of fossil fuel in the past three years is deemed not applicable.		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Conc l.
B.2.6	How was it validated that project complies with the following applicability criteria: Para 6 of the methodology AMS-III.Z, version 02?	/1/	DR/I	The raw materials required in the project activity technology are fly ash, lime or cement, gypsum and stone dust. The abundant availability of each of the raw materials needs to be demonstrated in line with requirements referred in Para 6 of the methodology.	CL7	OK
B.2.7	How was it validated that project complies with the following applicability criteria: Para 7 of the methodology AMS-III.Z, version 02?	/1/	DR/I	The project activity is a Greenfield project, thus, para 7 (b) is not applicable to the project activity. In line with the para 7 (c), the total emission reduction is 41 323 tCO ₂ per year which is less than 60 kt CO ₂ per year. It is to be demonstrated in line with methodology with the analysis and documented studies that the quality parameters of the brick from FaL-G technology are better or comparable to the conventional bricks. It is also required to demonstrate that the project meets the requirements of paragraph 8 of methodology. It is to be addressed and clarified the national standard being used for identifying the strength class of the bricks in general. It is to be clarified if the density (tonnes/m ³)	CL5 CL8	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>is the only and adequate parameter that will be monitored during the crediting period to assess the performance level of the project brick as methodology also refers to parameters like dry compressive strength, wet compressive strength.</p> <p>The national standards used for the baseline brick strength assessment and project brick performance needs to be provided.</p>		
B.2.8 How was it validated that project complies with the following applicability criteria: Para 8 of the methodology AMS-III.Z, version 02?	/1/	DR/I	<p>It has been addressed in the project design document that even though there is a local regulation for the usage of fly ash for the brick production, there is wide spread non compliance. This non compliance needs to be demonstration.</p> <p>All the applicability criteria defined in applied methodology are to be specifically addressed in the PDD, preferable in the tabular format, in section B.2 of the PDD.</p>	CL-9	OK
B.2.9 Is the selected baseline on of the baseline(s) described in the methodology and this hence confirms the applicability of the methodology?	/1/	DR/I	<p>The baseline of the project activity is the energy use of the facilities that would otherwise be built in the absence of the project in order to meet the demand of bricks of comparable quality and utility to that of bricks and blocks produced through FaL-G technology.</p> <p>The applicability of the methodology is to</p>	CL-5	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			be confirmed subjected to the satisfactory response to CL 5.		
B.3 Project boundary(VVM para 77-79)					
B.3.1 What are the project's system boundaries (components and facilities used to mitigate GHGs)? Are they clearly defined and in accordance with the methodology?	/1/	DR/I	The project boundary includes the physical and geographical site of the brick production facilities. The boundary includes storage yard for raw materials, pan mixer for mortar preparation, casting machine, drying yard and curing yard.		OK
B.3.2 Which GHG sources are identified for the project? Does the identified boundary cover all possible sources linked to the project activity? Give reference to documents considered to arrive at this conclusion.	/1/	DR/I	GHG sources identified for the project activity are: 1) Baseline CO ₂ emission from the fossil fuel in absence of the project activity. 2) CO ₂ emission from the electricity combustion. 3) CO ₂ from the usage of diesel. 4) Leakage due to consumption of cement and lime.		OK
B.3.3 Does the project involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology? Do these sources contribute with more than 1% of the estimated emission reductions of the project?	/1/	DR/I	All the emissions as per the methodology have been considered.		OK
B.4 Baseline scenario determination(VVM para 80-87, 103-105)					
B.4.1 Which baseline scenarios have been identified? Is the list of baseline scenarios complete?	/1/	DR/I	The baseline of the project activity is the energy use of the facilities that would		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			otherwise be built in the absence of the project to meet the demand of bricks of comparable quality and utility to that of bricks and blocks produced through FaL-G technology. This is as per the methodology. Assessments of alternative baseline scenarios are not required as per the methodology.		
B.4.2 How have the other baseline scenarios been eliminated in order to determine the baseline?	/1/	DR/I	Assessments of alternative baseline scenarios are not required as per the methodology.		OK
B.4.3 What is the baseline scenario?	/1/	DR/I	The baseline of the project activity is the energy use of the facilities that would otherwise be built in the absence of the project to meet the demand of bricks of comparable quality and utility to that of bricks and blocks produced through FaL-G technology.		OK
B.4.4 Is the determination of the baseline scenario in accordance with the guidance in the methodology?	/1/	DR/I	Yes, the baseline scenario has been selected as per the methodology.		OK
B.4.5 Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR/I	The baseline scenario has been selected as per the methodology.		OK
B.4.6 Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR/I	The baseline scenario has been determined by considering the relevant policies.		OK
B.4.7 Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR/I	The evidences supporting the energy consumption in the brick production in India need to be provided.	CL-10	OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				Consideration of 5% of total energy inputs from biomass needs to be justified.		
B.4.8	Is the baseline determination adequately documented in the PDD? <ul style="list-style-type: none"> All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced. All documentation is relevant as well as correctly quoted and interpreted. Assumptions and data can be deemed reasonable Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity 	/1/	DR/I	The evidences supporting the energy consumption in the brick production in India need to be provided. Consideration of 5% of total energy inputs from biomass needs to be justified. The baseline scenario has been determined by considering the relevant policies.	CL 10	OK
B.5 Additionality determination. (VVM para 93-119 and VVM para 137 for small-scale project activities, as applicable)						
B.5.1	What approach/tool does the project use to assess additionality? Is this in line with the methodology? In case of small-scale CDM project activities, is Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities applied considering also the “Non-binding best practice examples to demonstrate additionality for SSC project activities”.	/1/	DR/I	The project activity follows the Appendix B of the simplified modalities and procedures for small-scale CDM project activities, Attachment A to Appendix B for the demonstration of additionality of the project activity. “Non-binding best practice examples to demonstrate additionality for SSC project activities” has been used for demonstrating the additionality.		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.2	Have the regulatory requirements correctly been taken into account to evaluate the project activity and the alternatives?	/1/	DR/I	As per the methodology and SSC guidance, evaluation and negation of alternatives is not required.		OK
B.5.3	Is sufficient evidence provided to support the relevance of the arguments made?	/1/	DR/I	As per the methodology and SSC guidance, evaluation and negation of alternatives is not required.		
B.5.4	What is the project additionality mainly based on (Investment analysis or barrier analysis)?	/1/	DR/I	The project activity demonstrates the additionality with barrier and technological barrier.		OK
Prior consideration of CDM(VVM para 96-102)						
B.5.5	What is the evidence for serious consideration of CDM prior to the time of decision to proceed with the project activity?	/1/	DR/I	The evidence for the serious CDM consideration has to be provided.	CAR-2	OK
B.5.6	If the starting date is after 2 August 2008 and before the global stakeholder consultation, has the DNA and UNFCCC confirmed that the project participants have informed in writing of the project's intention to seek CDM status?	/1/	DR/I	The start date of the project activity has been stated to be 1 May 2004. The evidence for the state date of the project activity needs to be provided and the relevance of the choice of start date has to be demonstrated as per EB41 annex 67 guidelines.	CAR-3	OK
Continuous efforts to secure CDM status (only to be completed if starting date is before 2 August 2008)						
B.5.7	What initiatives were taken by the project participants from the starting date of the project activity to the start of validation in parallel with the physical implementation of the project activity?	/1/	DR/I	The continuous and realistic effort for securing the CDM status for the project activity needs to be demonstrated with supporting evidences as per EB41 Annex 46 guidelines.	CAR-4	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			The complete chronology of the event related to the project activity needs to be included in section B.5 of the PDD.		
B.5.8 When did the construction of the project activity start?	/1/	DR/I	The start date of the project activity is 1 May 2004. The complete chronology of the event related to the project activity needs to be included in section B.5 of the PDD.	CAR-4	OK
B.5.9 When was the project commissioned?	/1/	DR/I	The chronology of the project activity is yet to be provided.	CAR-4	OK
B.5.10 Does the timeline of the project confirm that continuous actions in parallel with the implementation were taken to secure CDM status?	/1/	DR/I	The continuous and realistic effort for securing the CDM status for the project activity needs to be demonstrated with supporting evidences. The complete chronology of the event related to the project activity needs to be included in section B.5 of the PDD.	CAR-4	OK
Investment analysis(VVM para 106-112)					
B.5.11 Does the project activity or any of the remaining alternatives generate revenues apart from CDM? Is this reflected in the PDD?	/1/	DR/I	The Investment analysis option has not been chosen by the project proponent to demonstrate the additionality.		OK
B.5.12 Do any of the alternatives to the project activity involve investment? Is this reflected in the PDD?	/1/	DR/I	Not applicable		OK
B.5.13 Is the choice of benchmark analysis, investment comparison or simple cost analysis correct?	/1/	DR/I	Not applicable		OK
B.5.14 Is the benchmark/discount rate the latest available at the time of decision?	/1/	DR/I	Not applicable		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.15 What is the financial indicator? Is it on equity/project basis? Before/after tax? Is the financial indicator in correspondence with the benchmark?	/1/	DR/I	Not applicable		OK
B.5.16 Are the underlying assumptions appropriate, e.g. what is considered as waste in the baseline is considered to have zero value?	/1/	DR/I	Not applicable		OK
B.5.17 Does the income tax calculation take depreciation into account? Is the depreciation year in accordance with normal accounting practice in the host country?	/1/	DR/I	Not applicable		OK
B.5.18 Is the time period of the investment analysis and operating time of the project realistic? Has salvage value been taken into account? Is working capital returned in the last year of operation?	/1/	DR/I	Not applicable		OK
B.5.19 When a feasibility study report or similar approved by the government is used as the basis for the investment analysis: Can it be confirmed that the values used in the PDD are fully consistent with the FSR and is the period of time between finalization of the FSR and the investment decision adequate?	/1/	DR/I	Not applicable		OK
B.5.20 How was the amount of output (e.g. sales of electricity) assessed? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM version 1 paragraph 95.	/1/	DR/I	<input type="checkbox"/> The plant load factor provided to banks and/or equity financiers while applying the project activity for project financing, or to the government while applying the project activity for implementation approval <input type="checkbox"/> The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company) <input type="checkbox"/> Other approach.		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<i>Provide details on how the load factor was validated::</i> Not applicable		
B.5.21 How was the output price (e.g. electricity price) assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM version 1 paragraph 95.	/1/	DR/I	<input type="checkbox"/> Cross-check against third-party or publicly available sources (e.g. invoices or price indices) <input type="checkbox"/> Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants <i>Provide details on how the output price was validated:</i> Not applicable		OK
B.5.22 How were the investment costs assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM version 1 paragraph 95.	/1/	DR/I	<input type="checkbox"/> Cross-check against third-party or publicly available sources (e.g. invoices or price indices) <input type="checkbox"/> Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants <i>Provide details on how the investment costs were validated:</i> Not applicable		OK
B.5.23 How were the O&M costs assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM version 1 paragraph 95.	/1/	DR/I	<input type="checkbox"/> Cross-check against third-party or publicly available sources (e.g. invoices or price indices) <input type="checkbox"/> Review of feasibility reports, public		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			announcements and annual financial reports related to the project and the project participants <i>Provide details on how the O&M costs were validated:</i> Not applicable		
B.5.24 Describe the assessment of the other input parameters. Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM version 1 paragraph 95.	/1/	DR/I	<input type="checkbox"/> Cross-check against third-party or publicly available sources (e.g. invoices or price indices) <input type="checkbox"/> Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants <i>Provide details on how other input parameters were validated:</i> Not applicable		OK
B.5.25 Was the financial calculation spreadsheet verified and found to be correct?	/1/	DR/I	Not applicable		OK
B.5.26 Sensitivity analysis: Have the key parameters contributing to more than 20% of the revenue/costs during operating or implementation been identified? Has possible correlation between the parameters been considered?	/1/	DR/I	Not applicable		OK
B.5.27 Sensitivity analysis: Is the range of variations is reasonable in the project context?	/1/	DR/I	Not applicable		OK
B.5.28 Have the key parameters been varied to reach the benchmark and the likelihood of this to happen been justified to be small?	/1/	DR/I	Not applicable		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
Barrier analysis(VVM para 113-116)					
B.5.29 Are the barriers identified complimentary to a potential investment analysis? Does the barrier have a clear impact on the financial returns so that it can be assessed in an investment analysis? Each barrier is discussed separately.	/1/	DR/I	The investment analysis has not been considered by the project proponent. Thus, barrier analysis being complimentary to investment analysis is deemed not applicable here.		OK
B.5.30 How were the <u>investment barriers</u> assessed to be real? Are the investment barriers substantiated by a source independent of the project participants?	/1/	DR/I	Investment barrier has not been discussed in the PDD.		OK
B.5.31 How does CDM alleviate the investment barriers?	/1/	DR/I	Investment barrier has not been discussed in the PDD.		OK
B.5.32 Is the project activity prevented by the investment barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR/I	Investment barrier has not been discussed in the PDD.		OK
B.5.33 How were the <u>technological barriers</u> assessed to be real? Are the technological barriers substantiated by a source independent of the project participants?	/1/	DR/I	The technological barrier have been discussed on the following aspects: Sourcing of raw materials: It has been addressed that the raw materials for the project brick making technology needs to be tested, selected and sourced from the industries. Thus, the brick making facilities needs to be carefully located. The proponent needs to demonstrate how the CDM revenue shall alleviate the technological barrier. Furthermore, in accordance with the applicability of the methodology, it has been demonstrated that adequate supply of raw is	CL-H	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>available. The barrier due to supply of raw material needs to be justified in this line.</p> <p>Operating within the specified limits for right chemistry: It has been addressed that the project technology requires the raw material control and any change in the source of the raw material will result to interruption in the plant operation. The likelihood of occurrence of the same needs to be explained in more detail.</p>		
B.5.34 How does CDM alleviate the technological barriers?	/1/	DR/I	The proponent needs to demonstrate how the CDM revenue shall alleviate the technological barrier.	CL-12	OK
B.5.35 Is the project activity prevented by the technological barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR/I	The additionality of the project activity has been demonstrated by technological and barrier due to prevailing practice.		OK
B.5.36 How were the <u>barriers due to prevailing practise</u> assessed to be real? Are the barriers due to prevailing practise substantiated by a source independent of the project participants?	/1/	DR	<p>It has been addressed that FaL-G technology bricks constitute 1.4% of the total walling materials in contrast to 95.3 of burnt clay bricks and 3.3 % of the cement concrete blocks.</p> <p>The evidence for the data needs to be provided. It needs to be justified that how major share of burnt clay bricks is the barrier to the implementation and operation of units under project activity.</p> <p>The proponent needs to demonstrate how the</p>	CL-13	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			CDM revenue shall alleviate the above discussed barrier.		
B.5.37 How does CDM alleviate the barriers due to prevailing practise?	/1/	DR	The proponent needs to demonstrate how the CDM revenue shall alleviate the above discussed barrier.	CL-13	OK
B.5.38 Is the project activity prevented by the barriers due to prevailing practise and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Assessment of alternative is not required as per the methodology. The barrier due to major amount of burnt clay bricks to the project activity needs to be justified and substantiated.	CL-13	OK
B.5.39 How were the <u>other barriers</u> assessed to be real? Are the other barriers substantiated by a source independent of the project participants?	/1/	DR	Other barriers have not been discussed.		OK
B.5.40 How does CDM alleviate the other barriers?	/1/	DR	Other barriers have not been discussed.		OK
B.5.41 Is the project activity prevented by the other barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Other barriers have not been discussed.		OK
Common practice analysis(VVM para 117-119)					
B.5.42 What is the geographical scope of the common practice analysis? Is this justified?	/1/	DR	As per the Appendix B of the simplified modalities and procedures for small-scale CDM project activities, Attachment A to Appendix B, common practice is not required to be performed for small scale project activity.		OK
B.5.43 What is the scope of technology and size (e.g. capacity of power plant) for the common practice analysis and	/1/	DR	Not applicable		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
how has this been justified?					
B.5.44 What is the data source(s) used for the common practice analysis?	/1/	DR	Not applicable		OK
B.5.45 How many similar non-CDM-projects exist in the region within the scope?	/1/	DR	Not applicable		OK
B.5.46 How were possible essential distinctions between the project activity and similar activities assessed?	/1/	DR	Not applicable		OK
B.5.47 What is the conclusion of the common practice analysis?	/1/	DR	Not applicable		OK
Conclusion					
B.5.48 What is the conclusion with regard to the additionality of the project activity?	/1/	DR	Further demonstration and justification of the technological barrier and barrier due to prevailing practice needs to be provided. The issues raised in CL 12 and CL 13 to be addressed.	CL-12 CL-13	OK
B.6 Calculations of GHG emission reductions					
Data and parameters that are available at validation and that are not monitored(VVM para 198-200)					
B.6.1 How was the thermal energy required for the brick making process verified?	/1/	DR/I	The thermal energy in GWh _{th} used for baseline brick making process has been sourced from TERI. While source data is provided from http://www.brickindia.com/article/detail.asp?id=36&cat=5 website, it is to be justified how the data of year 1999 is still relevant for the current period of project activity. The details of these estimations need to be made part of PDD and also the excel calculation	CL-14	OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				sheet in a reproducible manner.		
B.6.2	How was the Emission from electricity consumption verified?	/1/	DR/I	Electricity consumption will be the metered electricity supply from the electricity board supply meter. For the ex ante calculation, the emission from the electricity consumption of 1.3 ton CO ₂ per MWhe has been sourced from the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”. The back up calculations in excel format and the source of data used in arriving at the used emission factor has to be provided verification.	CL-15	OK
B.6.3	How was the emission from diesel consumption verified?	/1/	DR/I	The diesel consumption is for units which use diesel based power for their equipment operations apart from grid electricity. This is monitored by generator operators on daily basis from the diesel tank level indicator.		OK
B.6.4	How was the cement/lime consumption available at validation verified?	/1/	DR/I	This has been estimated based on the number of bricks generated by the project activity.		OK
Baseline emissions (VVM para 88-92)						
B.6.5	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR/I	The baseline calculation and the formula used in the PDD needs to be done as per the methodology. The baseline is to be calculated on the net production of the brick and not on the acceptable scale of the bricks.	CAR-5	OK
B.6.6	Have conservative assumptions been used when	/1/	DR/I	The baseline calculation and the formula		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
calculating the baseline emissions?				used in the PDD needs to be done as per the applied baseline methodology AMS-III.Z.	CAR-5	
B.6.7	Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR/I	The baseline calculation and the formula used in the PDD needs to be done as per the methodology.	CAR-5	OK
Project emissions (VVM para 88-92)						
B.6.8	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR/I	The project emission includes emission due to electricity consumption and diesel consumption. The ex ante estimation, the formula given in the relevant tool is to be used. The formula for the ex ante calculation of project emission from electricity and diesel needs to be in line the tool available for estimation of project emissions.	CAR-6	OK
B.6.9	Have conservative assumptions been used when calculating the project emissions?	/1/	DR/I	The project emissions in the PDD need to be calculated as per the formula given in the tool used.	CAR-6	OK
B.6.10	Are uncertainties in the project emission estimates properly addressed?	/1/	DR/I	The project emissions in the PDD need to be calculated as per the formula given in the tool used.	CAR-6	OK
Leakage (VVM para 88-92)						
B.6.11	Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR/I	The leakage due to the consumption of cement and lime has been accounted for. A default of 4% of cement and 8% of lime in the total FaL – G brick weight of production. The actual consumption of the cement and lime shall be monitored during	CL-16	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			the crediting period. The applicability and conservativeness of 4% and 8% of cement and lime respectively needs to be substantiated. The leakage due to the transportation needs to be addressed as per the methodology.		
B.6.12 Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR/I	The applicability and conservativeness of 4% and 8% of cement and lime respectively needs to be substantiated.	CL16	OK
B.6.13 Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR/I	It has been stated that in case of uncertainty in the purchase bills of cement and lime, default values will be used. The proponent needs to demonstrate the conservativeness of the default values.	CL17	OK
Emission Reductions (VVM para 88-92)					
B.6.14 Algorithms and/or formulae used to determine emission reductions: <ul style="list-style-type: none"> All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced All documentation is correctly quoted and interpreted. All values used can be deemed reasonable in the context of the project activity The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and 	/1/	DR/I	The baseline calculation formula needs to be inline with the methodology. The project emission calculation needs to be done inline with the tool. The conservativeness of the applied default value for cement and lime needs to be demonstrated.	CL17	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
supporting files to be submitted for registration.					
B.7 Monitoring plan(VVM para 120-122)					
Data and parameters monitored					
B.7.1 Do the means of monitoring described in the plan comply with the requirements of the methodology?	/1/	DR/I	<p>The monitoring plan needs to address the following:</p> <p>The production of project brick needs to be monitored on daily basis as per the methodology.</p> <p>The consumption of fossil fuel that will be used for the project activity needs to be monitored and the cross checking can be done with the purchase invoices.</p> <p>The monitoring plan needs to include in section B.7.1 that the project brick shall be tested for performance every six months.</p>	CAR-7	OK
B.7.2 Does the monitoring plan contains all necessary parameters, and are they clearly described?	/1/	DR/I	<p>The monitoring plan needs to address the following:</p> <p>The production of project brick needs to be monitored on daily basis as per the methodology.</p> <p>The consumption of fossil fuel that will be used for the project activity needs to be monitored and the cross checking can be done with the purchase invoices.</p> <p>The monitoring plan needs to include in section B.7.1 that the project brick shall be tested for performance every six months.</p>	CAR-7	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.7.3	In case parameters are measured, is the measurement equipment described? Describe each relevant parameter.	/1/	DR/I	The electricity shall be recorded from the monthly electricity bill. The monitoring equipment for each parameter needs to be described in the PDD monitoring plan.	CAR-8	OK
B.7.4	In case parameters are measured, is the measurement accuracy addressed and deemed appropriate? Describe each relevant parameter.	/1/	DR/I	The monitoring equipment for each parameter needs to be described, along with the accuracy class, calibration frequency of the equipment as applicable in the PDD monitoring plan.	CAR-8	OK
B.7.5	In case parameters are measured, are the requirements for maintenance and calibration of measurement equipment described and deemed appropriate? Describe each relevant parameter.	/1/	DR/I	The monitoring equipment for each parameter needs to be described, along with the accuracy class, calibration frequency of the equipment in the PDD monitoring plan.	CAR-8	OK
B.7.6	Is the monitoring frequency adequate for all monitoring parameters? Describe each parameter.	/1/	DR/I	The monitoring plan needs to address the following: The production of project brick needs to be monitored on daily basis as per the methodology. The consumption of fossil fuel that will be used for the project activity needs to be monitored and the cross checking can be done with the purchase invoices. The monitoring plan needs to include in section B.7.1 that the project brick shall be tested for performance every six months.	CAR-7	OK
B.7.7	Is the recording frequency adequate for all monitoring parameters? Describe each parameter.	/1/	DR/I	The data recording frequency for each of the parameters need to be included in the PDD.	CAR-9	OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
Ability of project participants to implement monitoring plan						
B.7.8	How has it been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project design?	/1/	DR/I	<p>The monitoring plan needs to address the following in line with the methodology: The production of project brick needs to be monitored on daily basis as per the methodology.</p> <p>The consumption of fossil fuel that will be used for the project activity needs to be monitored and the cross checking can be done with the purchase invoices.</p> <p>The monitoring plan needs to include in section B.7.1 that the project brick shall be tested for performance every six months.</p>	CAR-8	OK
B.7.9	Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?	/1/	DR/I	The procedure for day to day record handling needs to be addressed in the PDD.	CAR-10	OK
B.7.10	Are the data management and quality assurance and quality control procedures sufficient to ensure that the emission reductions achieved by/resulting from the project can be reported ex post and verified?	/1/	DR/I	The reviewing of the data and data storage needs to be addressed in the PDD.	CAR-10	OK
B.7.11	Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/1/	DR/I	It has not been addressed if the data will be stored for 2 years after the completion of the crediting period.	CAR-11	OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
Monitoring of sustainable development indicators/ environmental impacts					
B.7.12 Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR/I	The DNA of India does not warrant monitoring of sustainable development indicators.		OK
B.7.13 Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR/I	NA		OK
B.7.14 Are the sustainable development indicators in line with stated national priorities in the host country?	/1/	DR/I	Project activity is in line with social, economical, environmental and technological well being.		OK
C Duration of the project activity / crediting period					
C.1.1 Start date of project activity (VVM para 96-97, 102)					
C.1.2 How has the starting date of the project activity been determined? What are the dates of the first contracts for the project activity? When was the first construction activity?	/1/	DR/I	The start date of the project activity has stated to be 1 May 2004. The evidence for the start date of the project activity is to be provided.	CAR-3	OK
C.1.3 Is the stated expected operational lifetime of the project activity reasonable?	/1/	DR/I	The expected life time of the project activity has been considered to be 15 years.		OK
C.1.4 Is the start date, the type (renewable/fixed) and the length of the crediting period clearly defined and reasonable?	/1/	DR/I	Fixed crediting period of 10 years has been selected. The start date of the crediting period has been stated to be 1 February 2010 or the date of registration, which ever is later.		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
D Environmental Impacts (VVM para 129-131 and VVM para 136 (d) for small-scale project activities, as applicable)					
D.1.1 Are there any host country requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved? Does the approval contain any conditions that need monitoring? For small-scale project activities, is an assessment of the environmental impacts of the proposed CDM project activity is required by the host Party?	/1/	DR/I	The units covered under this projects are under small scale category hence does not come under requirement of EIA.		OK
D.1.2 Does the project comply with environmental legislation in the host country?	/1/	DR/I	The copies of all statutory clearances related to the project activity needs to be provided.	CL-18	OK
D.1.3 Will the project create any adverse environmental effects?	/1/	DR/I	The project activity eliminates the usage of fossil fuel in the brick making process. The project activity is not envisaged to have any negative environmental impact.		OK
D.1.4 Have identified environmental impacts been addressed in the project design?	/1/	DR/I	The project activity is not envisaged to have any negative environmental impact.		OK
E Stakeholder Comments (VVM para 126-128)					
E.1.1 Have relevant stakeholders been consulted?	/1/	DR/I	The local stakeholder consultation has been conducted in 2001 and 2003. The participants for the stakeholder consultation are The entrepreneurs, consumers, local residents, workers, manufacturing FaL-G blocks at FaL-G plants and suppliers of raw materials.	CL-19	OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				The evidence for the local stakeholder consultation needs to be provided.		
E.1.2	Have appropriate media been used to invite comments by local stakeholders?	/1/	DR/I	The media used for inviting the local stakeholder needs to be clarified and the supporting evidence is to be provided.	CL-19	OK
E.1.3	If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/	DR/I	This is not mandatory for small scale industries.		OK
E.1.4	Is a summary of the stakeholder comments received provided?	/1/	DR/I	The summary of the stakeholder meeting has been provided in the PDD. The summary given in the PDD does not reflect any negative comment by the local stakeholder. The minute of the meeting is to be provided.	CL-19	OK
E.1.5	Has due account been taken of any stakeholder comments received?	/1/	DR/I	The summary of the stakeholder meeting has been provided in the PDD. The summary given in the PDD does not reflect any negative comment by the local stakeholder. The minute of the meeting is to be provided.	CL-19	OK

Table 3 Resolution of corrective action requests and clarification requests

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
CAR 1 The LoA from the DNA of host country and the Annex I parties are yet to be provided.	A.3.2 A.3.3	LoA from The Netherlands & from Italy and, Host Country Approval from India are attached. (Annex 1 - a to c)	Letter of Approval from India, Netherlands and Italy has been provided. OK. CAR 1 is closed.
CAR 2 The evidence for the serious CDM consideration has to be provided.	B.5.5	Table on Chronology of Events may please be referred in B.5 of PDD.	Chronology of events has been included in section B.5 of PDD. It has been demonstrated with the supporting evidence that Project Concept Note (PCN) along with financial workings, considering CDM revenue was submitted to CDCF for FaL-G Brick. Evidence of the chronology of events has been provided to DNV. OK. CAR 2 is closed.
CAR 3 The evidence for the state date of the project activity needs to be provided and the relevance of the choice of the event chosen for start date has to be demonstrated as per EB41 annex 67 guidelines.	B.5.6	List of SSI regn-dates and dates of establishments are provided – Annex 2 The start date of the project is taken as the earliest date of establishment occurred out of 42 SPE units in the bundle; that is 10February 2004	The start date of the project activity has been selected to be 10 February 2004 which is the earliest of date of commencement of production of all the individual brick manufacturing facility in the bundled. The production unit does not require construction and contracts to buy equipment. The evidence for the same has been provided and all the dates of has been

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			<p>included in the PDD.</p> <p>CAR 3 is not closed due to the following:</p> <p>The start date of the project activity needs to be justified in line with the Para 99 of VVM, version 1.2.</p> <p>The permanent registration certificates for all the units are to be provided to assess the date of commencement of production.</p>
<p>CAR 3 continues</p> <p>The start date of the project activity needs to be justified in line with the Para 99 of VVM, version 1.2.</p> <p>The permanent registration certificates for all the units are to be provided to assess the date of commencement of production.</p>		<p>The start date of the project activity has been revised to the earliest date of establishment, 1 February 2004.</p> <p>The four SPE's, ie.,</p> <ol style="list-style-type: none"> 1) AP/VSP/III/29 2) AP/VSP/III/30 3) AP/VSP/III/31 4) CG/RAIP/III/42 have become inactive after signing agreement, and did not submit full scale of documents. Thus we don't have Part II, Permanent Registration Certificate for these four units. <p>The establishment date for all these four units have been given based on their application submitted to project participant.</p>	<p>The start date of the project has been assessed from the date of establishment of individual unit as verified from the Agreement between the individual brick manufacturing units and Eco Carbon Pvt. Ltd. for the participating the bundling of project activity and the date of commencement of production of the individual unit as verified from the Small-scale industries certificate by Director of Industries for the individual units of the project activity (Part-II permanent registration).</p> <p>Based on reviewing the aforementioned documents for all units, it has been verified that the earliest date of establishment among all the units is 1 February 2004 and the earliest date of commencement of production is 10</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			February 2004. Thus, as per paragraph 99 of VVM, version 1.2, the earliest date of establishment of 1 February 2004 has been considered as the start date of the project activity. It has been verified that for 4 units, only temporary registration is available. These 4 units will not be the active participant of the project activity. OK. CAR 3 is closed.
<p>CAR 4</p> <p>The continuous and realistic effort for securing the CDM status for the project activity needs to be demonstrated with supporting evidences as per EB41 Annex 46 guidelines.</p> <p>The complete chronology of the event related to the project activity needs to be included in section B.5 of the PDD.</p>	B.5.7	<p>Please refer Table on chronology of events in B.5 of PDD</p> <p>Soft Copies of ERPA and one model copy of ERTA in CD Annex 3 (a & b)</p>	<p>The chronology of events has been included in the PDD. The evidence for the same has been provided.</p> <p>It has been assessed from the chronology of events and supporting documents that continuous effort has been taken for securing CDM status in line with the EB guidance.</p> <p>OK. CAR 4 is closed.</p>
<p>CAR 5</p> <p>The baseline calculation and the formula used in the PDD needs to be done as per the methodology. The baseline is to be calculated on the net production of the brick and not on the acceptable scale of the bricks.</p>	B.6.5	PDD has been corrected. Please refer 6.2 of PDD.	The baseline emission has been corrected as per the methodology. The data used of the calculation of specific emission factor has been verified from the article “Emission Standards for brick kilns- An opportunity for Technology upgradation” by Sameer Maithel, The Energy Research Institute (TERI), India. Since, the data is publicly available and from a third party

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			source this has been accepted by DNV. OK. CAR 5 is closed.
<p>CAR 6</p> <p>The formula for the ex ante calculation of project emission from electricity and diesel needs to be in line the tool available for estimation of project emissions.</p>	B.6.8	Formulae are taken as per tool. Pl. refer 6.2 of PDD.	<p>The project emission due to the usage of electricity and fossil fuel has been revised as per the “Tool to calculate baseline, project and /or leakage emissions from electricity consumption” allowed by the methodology.</p> <p>The project emission from the usage of fossil fuel has been revised in line with “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion”.</p> <p>OK. CAR 6 is closed.</p>
<p>CAR 7</p> <p>The monitoring plan needs to address the following:</p> <p>The production of project brick needs to be monitored on daily basis as per the methodology.</p> <p>The consumption of fossil fuel that will be used for the project activity needs to be monitored and the cross checking can be done with the purchase invoices.</p> <p>The monitoring plan needs to include in section B.7.1 that the project brick shall be tested for performance every six months.</p>	B.7.1	<p>Please Ref. B.7.1 of PDD</p> <p>This aspect is taken care and one more box is added for Diesel purchases. Please refer B.7.1 of PDD.</p> <p>This is taken care in PDD by adding one more box. Please refer B.7.1 of PDD.</p>	<p>The monitoring plan has been adequately revised to include production of project brick to be monitored on daily basis.</p> <p>The diesel consumption shall be maintained in the stock register and shall be cross check from the purchase receipts.</p> <p>The monitoring plan has been revised to include the brick tested for performance every six months.</p> <p>OK. CAR 7 is closed.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<p>CAR 8</p> <p>The monitoring equipment for each parameter needs to be described, along with the accuracy class, calibration frequency of the equipment as applicable in the PDD monitoring plan.</p>	<p>B.7.3</p> <p>B.7.4</p> <p>B.7.5</p>	<p>There is no equipment for monitoring Diesel, fly ash, cement and/or lime which are charged in to the production by using traditional measuring systems such as cans and head loads, or random volumetric doses using respective vessels.</p> <p>Electricity is monitored by the Service Provider's meter for which the latter is responsible for calibration.</p> <p>Calibration of CTM for strength test is taken care by respective labs and outside the project boundary</p>	<p>It has been explained that apart from the energy meter for the electricity consumption, no other measuring equipments are used in the project activity.</p> <p>The calibration of the electricity meter shall be performed by the service provider as per the requirements of SSC guidelines and national regulations.</p> <p>OK. CAR 8 is closed.</p>
<p>CAR 9</p> <p>The data recording frequency for each of the parameters need to be included in the PDD.</p>	<p>B.7.7</p>	<p>This is taken care in PDD. Please refer B.7.1 of PDD.</p>	<p>The PDD has been revised to include the recording frequency of each of the parameters.</p> <p>OK. CAR 9 is closed.</p>
<p>CAR 10</p> <p>The procedure for day to day record handling and the reviewing of the data and data storage needs to be addressed in the PDD.</p>	<p>B.7.9</p> <p>B.7.10</p>	<p>Day to day records are taken care by the Sub-Project Entity, who sends monthly statements to PE who reviews the diligence of data and archives the same. Such archived data would be stored for 2 years after completion of crediting period.</p> <p>Please refer B7.2 of PDD.</p>	<p>The day to day record handling procedure has been included in the monitoring plan of the PDD.</p> <p>OK. CAR 10 is closed.</p>
<p>CAR 11</p>	<p>B.7.11</p>	<p>This has been addressed in B.7.2 of</p>	<p>The data shall be stored for 2 years after</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
It has not been addressed if the data will be stored for 2 years after the completion of the crediting period.		PDD	the crediting period. OK. CAR 11 is closed.
CAR 12 The PDD needs to be updated in line with the valid methodology version		The PDD has been updated with methodology AMS-III.Z, version 3.	The methodology version has been changed to AMS-III.Z, version 3 from AMS-III.Z version 2. OK. CAR 12 is closed.
CL 1 The PDD does not address the details on project implementation. The chronology of the project activity needs to be added in the PDD.	A.2.2	Please refer table of chronology of events under B.5 of PDD. Initial discussions with the World Bank are for enrolment of suitable number of SPEs which are later identified and included in the bundles.	The chronology of the events has been included in the PDD. OK. CL 1 is closed.
CL 2 The Copy of the patent and applicable countries covered under this patent for FaL G technology needs to be provided.	A.2.6	Soft copy of the patent included in CD. (Annex 4).	Patent letter, dated 30 January 2006, by the Controller of patent has been provided by the proponent. OK. CL 2 is closed.
CL 3 The geographical coordinates of the individual facilities need to be provided in the PDD as per the UNFCCC's requirement.	A.4.1	Please specify the requirements. The VVM 1.1 does not include any specific requirements to provide geographical coordinates of the individual facilities. We have tried to use Google Earth to map the locations but due to the remoteness of these units and small areas occupied by them, we are unable to do so.	The indicative geo coordinates of the of ach of the bundle elements have been included in the PDD, annex 6. OK. CL 3 is closed.
CL 4 The CDCF includes funding from several Annex I Party governments and the project	A.5.1	CDCF funds from Annex I country-participants are in the form of contribution to a carbon fund and are	The letter of affirmation on diversion of ODA by the Ministry of Environment and Territory, dated 9 September 2005

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
thus includes public funding. Section A.4.5 and Annex 2 will have to be revised and an affirmation has to be provided by at least the Annex I Party that eventually will authorize IBRD's participation in which this Annex I Party confirms that funding used does not represent a diversion of ODA:		specifically for purchase of emission reductions. They are neither public funds nor can be considered as ODA funds.	has been provided by the proponent. It has been verified from the LoA of Netherlands that no ODA from the State of Netherlands is involved in the project activity. OK. CL 4 is closed.
CL 5 It is to be demonstrated in line with methodology with the analysis and documented studies that the quality parameters of the brick from FaL-G technology are better or comparable to the conventional bricks. It is also required to demonstrate that the project meets the requirements of paragraph 8 of methodology.	B.2.1	The strength classification vide IS: 12894: is very well complied by FaL-G bricks. There are no local regulations to use FaL-G bricks. This is explained in Section B.1 of PDD.	Test reports for a sample of FaL-G bricks is requested to be provided to demonstrate that project activity bricks comply with the strength classification standard. OK. CL 5 is closed.
CL 6 The project activity has to demonstrate that it meets the relevant requirements of green field activities as per general guidance of the SSC methodologies.	B.2.3	This has been updated and addressed. Please refer B.2 of PDD.	It has been verified from the SSI registration certificate and No objection certificate from the pollution control board that the each brick manufacturing units in the bundle is Greenfield. OK. CL 6 is closed.
CL 7 The abundant availability of each of the raw materials needs to be demonstrated in line with requirements referred in Para 6 of the methodology.	B.2.6	The project does not involve change of raw materials since this is green field project. Hence para 6 is not applicable. However availability of each of raw material is demonstrated vide clause B2	The availability of starting material (fly ash) has been verified from the article on R&D and technology development/ application in Fly Ash area by Ministry of Science & Technology, Department

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		of PDD.	of Science & Technology. Cement/lime and gypsum is available in the market as per the demand. OK. CL 7 is closed.
<p>CL 8</p> <p>It is to be addressed and clarified the national standard being used for identifying the strength class of the bricks in general.</p> <p>It is to be clarified if the density (tonnes/m3) is the only and adequate parameter that will be monitored during the crediting period to assess the performance level of the project brick as methodology also refers to parameters like dry compressive strength, wet compressive strength.</p> <p>The national standards used for the baseline brick strength assessment and project brick performance needs to be provided.</p>	B.2.7	<p>IS: 12894: Pulverised fuel ash – Lime Bricks</p> <p>Density is monitored to arrive to the conservative estimate of production based on fly ash consumption, and in turn baseline emissions. This is clarified in B 7.1</p> <p>Performance is judged in terms of compressive strength vide IS 516: Method of Test for Strength of Concrete.</p> <p>The compressive strength of clay brick ie., baseline brick is assessed by IS 3495 : Methods of tests of Burnt Clay Building Bricks (Part I). The project brick performance is assessed by IS 516- Method of Test for Strength of Concrete.</p>	<p>The copy of the standards has been provided by the proponent. The test results of sample Fal-G bricks has been provided.</p> <p>The performance test shall be performed for the project activity bricks once in six months and the test certificates are provided by the laboratory.</p> <p>The PDD has been adequately revised to address the same.</p> <p>OK. CL 8 is closed.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		<p>The different codes have been made applicable because baseline brick is a ceramic product and project brick is a hydraulic product in the lines of cement concrete.</p> <p>Soft copies of above BIS codes are provided in CD - Annex 5(a to d)</p>	
<p>CL 9</p> <p>It has been addressed in the project design document that even though there is a local regulation for the usage of fly ash for the brick production, there is wide spread non compliance. This non compliance needs to be demonstrated.</p>	<p>B.2.8</p>	<p>This is already addressed earlier in detailed in B.2</p> <p>For further justification for non-compliance below data from Gazette of MOEF is added in B.2 of PDD:</p> <p>Ministry of Environment and Forests, Government of India came out with a Gazette Notification No. 2804 dated 3rd November 2009 wherein it is mentioned that the fly ash use in manufacturing bricks and other products increased from 1.5 million tons in 2002-03 to 3.19 million tons in 2006-07, which is commensurate for the production of 3.19 billion bricks. This is only 1.51% on national demand for the bricks.</p> <p>These figures show that the penetration is very meagre demonstrating the non-</p>	<p>Ministry of Environment and Forests, Government of India came out with a Gazette Notification No. 2804 dated 3 November 2009 has been provided to DNV.</p> <p>The PDD has been revised to address each of the applicability criteria of methodology.</p> <p>OK. CL 9 is closed.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
All the applicability criteria defined in applied methodology are to be specifically addressed in the PDD, preferable in the tabular format, in section B.2 of the PDD.		<p>compliance of the national regulation</p> <p>Soft copy of Gazette notification in CD – Annex 6</p> <p>Please ref. table in PDD under B.2.</p>	
<p>CL 10</p> <p>The evidences supporting the energy consumption in the brick production in India need to be provided.</p> <p>Consideration of 5% of total energy inputs from biomass needs to be justified.</p>	<p>B.4.7</p> <p>B.4.8</p>	<p>Pl. ref. TERI document referred in the PDD.(soft copy in CD – Annex 7)</p> <p>Pl. ref. FAO document that mentioned about 2% of biomass used for clay bricks (Soft copy in CD – Annex 8). Thus 5% is the robust conservative figure.</p>	<p>The energy consumption by various type for brick production in India has been sourced from TERI documents.</p> <p>It has been verified from the FAO that biomass contributes for 2% fuel in the brick manufacturing process. In view of this, 5% usage of biomass has been accepted on the conservative basis.</p> <p>OK. CL 10 is closed.</p>
<p>CL 11</p> <p>Sourcing of raw materials: It has been addressed that the raw materials for the project brick making technology needs to be tested, selected and sourced from the industries. Thus, the brick making facilities needs to be carefully located. The proponent needs to demonstrate how the CDM revenue shall alleviate the technological barrier. Furthermore, in accordance with the</p>	B.5.33	The justification is clearly provided in PDD. The barrier is in sourcing right quality of raw material out of the abundant supply.	<p>The burnt bricks dominate 95% of the market, where as Fal-G bricks contributes to 1.4% of the total brick market.</p> <p>The strength of the product depends on the purity and the mixing proportions of these materials. The sourcing and the right mixture (recipe) of the raw material to get the correct bonding chemistry are the technological risks of</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<p>applicability of the methodology, it has been demonstrated that adequate supply of raw is available. The barrier due to supply of raw material needs to be justified in this line.</p> <p>Operating within the specified limits for right chemistry: It has been addressed that the project technology requires the raw material control and any change in the source of the raw material will result to interruption in the plant operation. The likelihood of occurrence of the same needs to be explained in more detail.</p>		<p>The interruption of production on account of change in RM may arise in the case of non-licensed plants. In case of licensed plants the production would be suitably altered under guidance from INSWAREB to result in non-interruption of the production. This technology-interaction is possible because of CDM project and relevant tie-up.</p>	<p>the project. The raw materials are to tested and selected for sourcing and in case of change in the source of raw material, the chemistry needs to be reworked to get the adequate mixture. Furthermore, even though FaL-G is a patent technology, the licensors has not invoked the patent to facilitate the proliferation of technology. This has resulted to the unlicensed FaL-G brick units, operates on the pirated technology and is likely to produce low grade of FaL-G bricks. The low quality of FaL-G bricks produced in the unlicensed plants are likely have customer complaints and hampers the overall brick market of FaL-G. Above mentioned has been verified from Article in The Hindu news paper on the challenge related to quality assurance of FaL-G bricks, dated 26 March 2009 and 11 April 2009</p> <p>OK. CL 11 is closed.</p>
<p>CL 12</p> <p>The proponent needs to demonstrate how the CDM revenue shall alleviate the technological barrier.</p>	B.5.34	As explained above	<p>The FaL-G brick manufacturing units, to participate in the CDM project activity, needs to be a licence of the technology and practice this with methodical manner and manufacture the product with quality standards. The technological fee and the primary interact with the manufacturing units</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			are taken care by the CDM revenue. OK. CL 12 is closed.
<p>CL 13</p> <p>It has been addressed that FaL-G technology bricks constitute 1.4% of the total walling materials in contrast to 95.3 of burnt clay bricks and 3.3 % of the cement concrete blocks.</p> <p>The evidence for the data needs to be provided. It needs to be justified that how major share of burnt clay bricks is the barrier to the implementation and operation of units under project activity.</p> <p>The proponent needs to demonstrate how the CDM revenue shall alleviate the above discussed barrier.</p>	B.5.36	<p>Please refer INSWAREB's inputs to MOEF for enriching the GO on fly ash, as available through the link below. http://fal-g.com/SuggestionstoDNonFAdt._6-11-08.pdf</p> <p>Soft copy of Review of GO with track changes is put in CD (Annex 9).</p> <p>Please refer Holtec Report Please refer B.5 of PDD.</p> <ul style="list-style-type: none"> • Part of the CDM revenue is used for technological upgradation and support from INSWAREB who also conduct programs for market development and capacity building. • Out of the revenue transferred to the SPEs, a portion of the revenue is utilised to meet the price competition with clay bricks and the remaining revenue is utilised to meet 	<p>The weblink for the market share of FaL-G bricks for the total walling material in Indian market has been provided.</p> <p>The colour of the Fal-G brick and the raw material used results to the negative sentiments of the consumers. To encourage the FaL-G bricks, the union government has exempted FaL-G from taxes until 2005, however, the same was merged with the similar level of sector which includes the clay brick industries. The clay brick industry, being an unorganised sector does not strictly follow the tax regime, whereas, the FaL-G brick industries is a organised sector and shall follow the tax regime. The CDM revenue shall be used for the technological up gradation, market development and the meeting the price competition with the clay bricks.</p> <p>The raw material, lime or cement and gypsum, used in FaL-G brick makes it cost intensive in comparison to clay brick. Since the manufacturing cost of FaL-G bricks are higher than the clay bricks, market price of FaL-G is higher and cannot match the price of clay brick</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		continued high-quality operation, production as well as product promotion	and thus losses market in price front with clay brick. It has been addressed in the PDD that CDM revenue shall help in alleviating the barrier due to technology and prevailing practice. OK. CL 13 is closed.
<p>CL 14</p> <p>The thermal energy in GWh_{th} used for baseline brick making process has been sourced from TERI. While source data is provided from http://www.brickindia.com/articledetail.asp?id=36&cat=5 website, it is to be justified how the data of year 1999 is still relevant for the current period of project activity.</p> <p>The details of these estimations need to be made part of PDD and also the excel calculation sheet in a reproducible manner.</p>	B.6.1	<p>Baseline of brick manufacturing process is same as that of 500 years back. New technologies in clay brick such as VSBK, that would have caused reduction in energy consumption, could not penetrate and not in use widely. Hence the applicability of thermal energy data can very well be accepted.</p> <p>More over, as conservative approach, baseline with weighted average thermal energy is taken as basis out of various technological options available in clay brick production. Therefore the energy baseline continues to be same.</p> <p>This is already taken care in PDD under B.4. Further, Excel calculation is attached -Annex 10</p>	<p>In view of the fact that brick industry in an age old small scale industry and not much changes happened in the industry, the data from TERI has been accepted. Furthermore, in line with the methodology, weighted average energy consumption has been considered thus, taking care of the mixture of technology in the industry in India.</p> <p>OK. CL 14 is closed.</p>
<p>CL 15</p> <p>The back up calculations in excel format and</p>	B.6.2	EF for power is the default value as per	Excel sheet has been provided by the proponent and verified by DNV.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
the source of data used in arriving at the used emission factor has to be provided verification.		Option A.2 in the “Tool to calculate emissions from electricity consumption”. (EB.39 Annex. 7)	OK. CL 15 is closed.
<p>CL 16</p> <p>The leakage due to the consumption of cement and lime has been accounted for. A default of 4% of cement and 8% of lime in the total FaL – G brick weight of production. The actual consumption of the cement and lime shall be monitored during the crediting period.</p> <p>The applicability and conservativeness of 4% and 8% of cement and lime respectively needs to be substantiated.</p> <p>The leakage due to the transportation needs to be addressed as per the methodology.</p>	B.6.11	<p>Default values on cement and lime are withdrawn. Actual purchase is only taken as the basis vide 15.B of methodology. The corrections are carried in B 6.1(c)</p> <p>The leakage due to transportation is negligible as explained in calculations vide B.6.1.c of PDD.</p> <p>The relevant calculations in excel are attached – Annex 11</p>	<p>Emission factor of cement of 0.82 tCO₂/ ton of cement has been sourced and verified from the technical article by Press Information Bureau, Government of India: Indian Cement Industry.</p> <p>Emission factor of lime of 0.42 tCO₂/ton of lime has been used for the calculation of leakage. This has been verified from the IPCC 2006 default value of 0.40 tCO₂/ton of lime. This has been accepted based on the conservativeness.</p> <p>The leakage due to the usage of cement (OPC) and lime has been calculated as required by the applied methodology. Emission factor of cement and lime has been considered as discussed in section 4.6.1. The quantity of cement (OPC) and lime consumed by the project activity shall be monitored for the calculation of project emission during the crediting period.</p> <p>OK. CL 16 is closed.</p>
<p>CL 17</p> <p>The baseline calculation formula needs to be</p>	B.6.13 B.6.14	As per methodology Baseline Emissions are to be computed based on production	The calculation has been revised as per the methodology. The data used of the

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<p>inline with the methodology.</p> <p>The project emission calculation needs to be done inline with the tool.</p> <p>The conservativeness of the applied default value for cement and lime needs to be demonstrated.</p>		<p>of bricks and blocks in terms of m³.and annual production specific emission factor.</p> <p>However the methodology also provides option to identify the baseline based on the thermal energy. Hence the baseline emissions for the plant in this PDD are calculated taking the weighted average specific energy of clay brick. Also biomass correction factor is taken to be more conservative. For this B.6.1 of PDD may please be referred.</p> <p>This is taken care in B.6.1 of PDD.</p> <p>As per 15.B of Methodology only purchases on monthly basis have to be monitored. In this background default values of cement and lime are withdrawn. The corrections are carried in B 6.1(c)</p>	<p>calculation of specific emission factor has been verified from the article “Emission Standards for brick kilns- An opportunity for Technology upgradation” by Sameer Maithel, The Energy Research Institute (TERI), India. Since, the data is publicly available and from a third party source this has been accepted by DNV.</p> <p>The project emission has been done as per the tool.</p> <p>Emission factor of cement of 0.82 tCO₂/ ton of cement has been sourced and verified from the technical article by Press Information Bureau, Government of India: Indian Cement Industry.</p> <p>Emission factor of lime of 0.42 tCO₂/ton of lime has been used for the calculation of leakage. This has been verified from the IPCC 2006 default value of 0.40 tCO₂/ton of lime. This has been accepted based on the conservativeness.</p> <p>OK. CL 17 is closed.</p>
<p>CL 18</p> <p>The copies of all statutory clearances related to the project activity needs to be provided.</p>	D.1.2	Soft copies in CD – Annex 12	<p>All the statutory clearance has been provided and verified by DNV.</p> <p>OK. CL 18is closed.</p>
CL 19	E.1.		Minutes of the meeting conducted with

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<p>The evidence for the local stakeholder consultation needs to be provided.</p> <p>The media used for inviting the local stakeholder needs to be clarified and the supporting evidence is to be provided.</p> <p>The minute of the meeting is to be provided.</p>		<p>Stakeholders have been invited through brochures, through letters and sometimes through telephone. Soft copies of couple of brochures and invitations are included.</p> <p>CD submitted with all the relevant information – Annex 13.</p>	<p>local stakeholders at various location has been provided and verified by DNV. The evidence on conducting the work shops at Hyderabad and Cuddapah on FaL-G technology on September 2003 has been provided to DNV . The feed back from the local stakeholder has been adequately documented in the PDD.</p> <p>OK. CL 19 is closed</p>
<p>CL20</p> <p>The crediting period in the PDD has to start at least 4 weeks after the project is submitted for registration. The project participants are therefore requested to update the PDD.</p>		<p>The start date of the crediting period has been revised to 1 July 2012.</p>	<p>The PDD has been updated adequately to revise the start date of the crediting period to 1 July 2012.</p> <p>OK. CL 20 is closed.</p>

Table 4 Forward action requests

Forward action request	Reference to Table 2	Response by project participants
No FAR has been identified.		NA

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APPENDIX B

CURRICULA VITAE OF THE VALIDATION TEAM MEMBERS

Sharmistha Shome, Auditor, DNV India, holds a Master Degree in Energy Systems. Her educational qualification covers the fields of sustainable development, power plant technology, renewable energy technology, performance of thermal & electrical utilities and project financing.

She has experience in validation and verification of several CDM projects/JI and other 3rd party validation/verification services. She has completed the ISO14001 EMS Lead Auditor course.

Astakala Vidyacharan, is a chemical engineer and prior to joining DNV in 2005, has had 11 years of direct work experience in various chemical industries. His work experience covers 4 years in project implementations in pesticide and fine chemical industries, including environment management activities; 7 years in process operations of pesticide, natural products and fine chemical industries.

He has received extensive training in the CDM validation and verification process. He is an appointed validator for the CDM validation and verification program of DNV and has performed validation of several CDM projects. He is also a trained auditor for GHG accounting standards and involved audit of Corporate GHG accounting. He is a qualified ISO9001, ISO 14001 Lead auditor and OHSAS 18001 auditor who has performed several audits for various industrial sectors under these management systems.

His qualification, industrial experience and experience in CDM facilitate him to assess renewable energy based on Hydro and Biomass, Energy Efficiency sectors, in particular to sufficient degree.

Matteo Faggin holds a Master Degree in Business Administration and a Master Degree in Mechanical Engineering.

He has an overall experience of around 8 years. Prior to joining DNV having 7 years experience in the cement, construction and aluminum industries covering industrial operations and new project implementation for cement plants, quarries, energy and thermal distribution projects. He has experience of around 1 year in validation and verification of numerous CDM projects. His qualification, industrial experience and experience in CDM demonstrate him sufficient sectoral competence in Cement Industry, Electricity Distribution, Heat Distribution, Mining and Mineral processes. Expertise in Project Management for the execution of large projects aimed at reducing the greenhouse gasses emissions and increasing the energy efficiency of manufacturing plants.

Kakaraparthi Venkata Raman holds a bachelor degree (B.Tech) in Chemical Engineering and a Diploma in Management. He has an overall experience of 18 years in the Chemical Process Industry - Fertilisers and Chemicals industry (FACT). His main areas of work include a) Technical Services (for Ammonia, Urea, Co-generation thermal power plants (captive), and complex fertilizers plants)- 10 years b) Erection, commissioning and hands-on operation of state of art HTAS Ammonia plant - 4 years c) Management and operation of Sulphuric acid plant as Plant Manager- 2 years and d) two years in management Information System operation and assisting of top management in planning of operations. While in FACT he has completed the ISO14001 EMS LA course and also involved in implementation of Environmental Management Systems and in conducting internal audits.

Experience prior to joining Fertiliser industry include six months experimental work on charcoal manufacture in Karnataka Regional Engineering college.

He has experience of around 5 years in validation and verification of numerous CDM projects. His qualification, industrial experience and experience in CDM demonstrate him sufficient sectoral competence in areas of (a) 1.1 Thermal energy generation from fossil fuels and Biomass as well as thermal electricity from solar (b) 1.2 Energy Generation from renewable energy sources (c) 5.1/4.13/11.1/12.1 Chemical Processes Industries and (d) 13.1 Waste handling and disposal.

Mr. Yang Xiao Shan, Alan holds a Bachelor Degree in Material Science and Engineering. He has an overall experience of around four years. Prior to joining DNV, he has around four years experience in cement manufacturing industry covering production, process optimization, quality assurance, waste heat recovery and energy efficiency improvement. His experience also covers the fields of environmental management and resource conservation including alternative fuels, cheap coal, and solid waste disposal in clinker kiln. He has also been actively involved in implementation of Quality Management System, ISO 9001 standard in cement manufacturing industry for more than three years.

He has experience of around 1 year in validation and verification of CDM and VCS projects.

His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in "Cement Manufacturing".