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Att: CDM Executive Board

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Your ref.:	Our ref.:	Date:
CDM Ref 0707	MLEH/ETL	22 December 2006

Response to request for review "India-FaL-G Brick and Blocks Project No.1" (0707)

Dear Members of the CDM Executive Board,

We refer to the requests for review raised by three Board members concerning DNV's request for registration of the "India-FaL-G Brick and Blocks Project No.1 (0707)" and would like to provide the following response to the issues raised by the requests for review.

Comment 1:
This project activity refers to AMS II D which is a generic methodology for energy efficiency and which is very vague in terms of the equations to be used to calculate emissions reductions. What is done here is the switch from one brick manufacturing process to a less energy intensive one. This seems to go beyond what was assumed in the context of AMS II D. Therefore the detailed methodology that is provided should be assessed by the SS working group before being accepted by the EB.

DNV Response:
We would like to refer to the fact that the methodology proposed for his project was submitted as a new small-scale methodology in September 2005 (submission number SSC_014, please see annex 1) and subsequently assessed by the Small-Scale Working group at its 4th meeting. The feedback the project proponent received from the SSC WG was in fact that the SSC WG deemed that the application of AMS II D was sufficient for the project, and that there was no need for a new separate methodology for this project (Please see annex 2). Hence, the project proponents took the decision to proceed with AMS II D when the SSC WG recommendation was confirmed at the CDM EB at its 23rd meeting.

Comment 2:
Neither the PDD or the validation report provide references proving that CDM was an important factor when the investment decision was taken. Since the project will request retroactive credits, strong evidences that CDM was considered from project inception are necessary. Moreover, it is stated that "the PDD for the project was prepared and offered for validation after 31st December 2005", and the Validation Report says that "It was verified that the project proponent was in the process of having a discussion with the Small Scale working group of UNFCCC regarding a new methodology for the project and was recommended to use the AMS II D methodology.". However, the COP/MOP decision regarding retroactive credits states that these can be requested by

"project activities that started in the period between 1 January 2000 and 18 November 2004 and have not yet requested registration but have either submitted a new methodology or have requested validation by a designated operational entity by 31December 2005 (...)". Therefore, the project does not comply with the requirements for prompt start project activities.

DNV Response:

As stated in the response to comment number 1, a new methodology was actually proposed to the SSC WG for the project before the project commenced its validation. We would like to refer to the decision at EB 26 on *"Clarification regarding registration procedure relating to retro-active crediting (paragraph 4 of decision 7/CMP.1)"* which states that:

86. In order to operationalize paragraph 4 of Decision 7/CMP.1 the Board clarified that project activities that started in the period between 1 January 2000 and 18 November 2004 that have either submitted a new methodology by 11 January 2006 or have requested validation by a designated operational entity by 31 December 2005 can request retroactive credits if:

(a) The request for registration of the project activity is submitted by the DOE through the electronic interface 31 December 2006, midnight GMT;

(b) Any required registration fee is received by the secretariat before 31 January 2007; and

(c) The request is complete and, hence published on the UNFCCC CDM website, by 15 February 2007."

We refer to the methodology submission to the SSC WG to evidence when the project methodology was proposed in 2005. For the fulfillment of the other criteria, these can be witnessed at the UNFCCC CDM web-site.

Regarding the claim that CDM was actually considered during the inception of the project, this can be evidenced by several documents: The Institute for Solid Waste Research & Ecological Balance (INSWAREB) submitted a Project Idea Note to the World Bank's Community Development Carbon Fund in September 2003, well in advance of any investment decisions on behalf of the technology provider and end users. Furthermore, the Project Inception Note (see attachment) from the World Bank's Community Development Carbon Fund dated 21 May 2004, which clearly shows that CDM revenue is deemed as a way to leverage the financing of the project and make it viable.

Hence, the project in our view meets all criteria for seeking retroactive credits from 01 April 2004.

Comment 3:

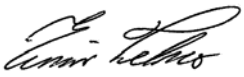
The product produced in this project (FaL-G bricks) utilizes cement/lime and other industrial products that caused GHG emission during their production process. These emissions should be included in the project emissions.

DNV Response:

We refer to the applied methodology AMS II D, which only identifies transferred technology as leakage under the methodology. Although we agree that the limited lime/cement use for the bricks can be considered as leakage effects, the amount of these additives is relatively small compared to what is included in comparable bricks, hence can be neglected under the small-scale rules.

We sincerely hope that the Board accepts our aforementioned explanations.

Yours faithfully
for DET NORSKE VERITAS CERTIFICATION LTD



Einar Telnes
Director
International Climate Change Services

Michael Lehmann
Technical Director

Annex 1

CDM: Recommendation Form for Small Scale Methodologies (version 01)

(To be used for presenting questions/proposals/amendments to the simplified methodologies for small-scale CDM project activity categories)

Date of SSC WG meeting:	12 - 13 September 2005
Title/Subject (give a small title or specify the subject of your submission, maximum 200 characters):	"Avoidance of thermal energy input in small-scale industrial processes"
Indicative methodology to which your submission relates (refer the items of Appendix B of the Simplified Modalities and Procedures), if applicable.	New category
Name of the authors of the query:	World Bank - PCF

Summary of the query:

Please use the space below to summarize the query related to SSC methodologies/categories SSC Modalities and Procedures provide recommendation/analysis of the SSC WG.

The World Bank - PCF proposed the following new category: "Avoidance of thermal energy input in small-scale industrial processes":

Technology/measure:

- This project category comprises measures that would avoid the use of thermal energy from fossil fuels, and possibly from non-renewable/renewable biomass, in an industrial process by implementing a process change at many sites/locations. The technology may replace technologies at existing sites or be installed at new sites. Measures may be implemented in small-scale brick manufacturing plants, etc. Measures shall both reduce anthropogenic emissions by sources, and directly emit less than 15 kilotonnes of carbon dioxide equivalent annually.

Boundary:

- The physical, geographical site of the equipment and the generation unit employed by the industrial process delineates the project boundary.

Baseline:

- The baseline scenario is the situation where, in the absence of the project activity, the existing technology/practice would have delivered the amount of output produced by the project activity.
- The fuel mix (fossil fuels and non-renewable/renewable biomass) and fuel consumption in the baseline scenario should be documented.
- The emissions baseline is the project output (in kg, or in volume) multiplied by an emission factor (in kg CO2e/kg output, or kg CO2e/volume) for the product activity displaced by the project activity.
- If available, host country specific data and information may be used. IPCC default values for calorific values and carbon emission factors for fuels may alternatively be used.

Leakage:

- No leakage calculation is required.
- In case the project activity consumes grid-based electricity, it should be assumed that diesel generators would have provided a similar amount of electric power. The emission coefficient (in kgCO2e/kWh) should be calculated as described in paragraphs 28 and 29 for category I.D.

Monitoring:

- Billing and other sales information should be used to document the output of the proposed project activity. Random sampling, carried out at a statistically significant level, would be sufficient.

Information on the amount of input material used in the project activity may be used as supportive information.

Recommendation by the SSC WG :

Please use the space below to provide amendments /changes (in your expert view, if necessary).

Reference is made to your query dated of 24 April 2005. The small scale working group (SSC-WG) of the CDM Executive Board would like to thank you for the submission and proposal of an additional category and the draft indicative methodology for the purpose.

The SSC-WG has had detailed discussions on your proposal and is of the opinion that we will need further information to better understand the nature and scope of the proposal. We would therefore seek further information on the following uncertainties that have not been addressed in your current proposal in an adequate manner.

- Definitions of "industrial process" and "replacing technology";
- Explanation of "how to reduce GHG emissions specifically by avoidance of thermal energy input";
- Justification of "how to estimate the fuel mix and fuel composition as well as emission factors (in kg CO_2/kg output, or kg CO_2/volume) in the baseline scenario in practical steps";
- Justification of the statement that "no leakage calculation is required".

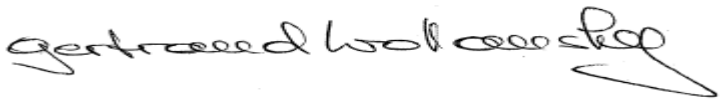
In addition to the above clarifications, focusing on small-scale brick manufacturing plants, there is a need to provide more elaboration on the baseline, if the methodology is to be widely applicable. The following should be incorporated:

- The possible baseline scenarios e.g. in the absence of the project. The following are possible:
  - Cement bricks;
  - Fired clay bricks;
  - Opened air-dried clay or ordinary soil bricks.
- Depending on the baseline, CO_2 emissions are reduced (or completely eliminated) from fuel combustion, and/or calcination of limestone.

Answer to authors of query by the SSC WG :

Please use the space below to provide an answer to the authors of the above query

You are welcome to provide the working group with further clarifications. Clarifications, if any, would need to be submitted by latest 28 November 2005.



Signature of SSC WG Chair ……..
Date: 16 / 09 /2005 *(Gertraud Wollansky)*

Signature of SSC WG Vice-Chair…….
Date: 16 / 09 /2005 *(name)*

Information to be completed by the secretariat	
SSC-Submission number	SSC_014
Date when the form was received at UNFCCC secretariat	16 September 2005
Date of transmission to the EB	16 September 2005
Date of posting in the UNFCCC CDM web site	16 September 2005

Annex 2

CDM: Recommendation Form for Small Scale Methodologies (version 01)

(To be used for presenting questions/proposals/amendments to the simplified methodologies for small-scale CDM project activity categories)

Date of SSC WG meeting:	26 - 27 January 2006
Title/Subject (give a small title or specify the subject of your submission, maximum 200 characters):	Avoidance of thermal energy input in the production of alternative building materials
Indicative methodology to which your submission relates (refer the items of Appendix B of the Simplified Modalities and Procedures), if applicable.	New category
Name of the authors of the query:	Mr. Lasse Ringius, Mr. Kirtan Chandra Sahoo

Summary of the query:

Please use the space below to summarize the query related to SSC methodologies/categories SSC Modalities and Procedures provide recommendation/analysis of the SSC WG.

Mr. Lasse Ringius and Mr. Kirtan Chandra Sahoo submitted the following answers and further clarifications required by the SSC WG in its recommendation dated 16/09/2005:

Discussion of proposed baseline alternatives.

The SSC WG suggests expanding the set of baselines to cement bricks, fired clay bricks, and opened air-dried clay or ordinary soil bricks. We have considered this recommendation in detail but for the reasons given below these building materials do not constitute actual alternatives to the project activity. For that reason, the proposed methodology has not been modified to include these scenarios. However, fired clay bricks constitute the baseline for the proposed methodology.

Cement Concrete blocks

The cement concrete block market is a separate market and thus not a plausible alternative to fly-ash bricks. Fly-ash bricks/blocks are not penetrating this market, and consumers who need cement bricks generally do not switch to fly ash bricks. Fly-ash bricks do not penetrate the market for cement concrete bricks, but the fired clay bricks market.

Fired Clay Bricks

The baseline for the proposed methodology is fired clay bricks, which are also called sintered clay bricks.

Opened Air-Dried Clay or Ordinary Soil Bricks

Application of air-dried clay brick is in Economically Weaker Section (EWS) housing, mostly in a rural scenario, for thatched-roof houses and other semi-pucca or kutcha (raw) houses. Those who depend on these products cannot afford even sintered clay brick. Those who cannot afford sintered clay bricks cannot afford to purchase fly-ash bricks. Hence opened air-dried clay or ordinary soil bricks do not constitute a plausible baseline alternative to fly-ash bricks.

Recommendation by the SSC WG :

Please use the space below to provide amendments /change (in your expert view, if necessary).

Answer to authors of query by the SSC WG :

Please use the space below to provide an answer to the authors of the above query

The reference is made to your query dated 28 November 2005. The small scale working group (SSC-WG) of the CDM Executive Board would like to thank you for submitting further clarifications on proposed baseline alternatives in response to the recommendation of the SSC WG dated 16/09/2005.

As a result of the discussion of related submissions including your query, the SSC-WG agreed on the following matters:

- According to the *Technology/measure* section as below (Para A), the proposed methodology is applicable to projects which introduce equipments at facilities manufacturing building materials including bricks, and reduce or eliminate completely the use of thermal energy from fossil fuels, and possibly from renewable biomass. The targeted projects are apparently energy efficiency improvement projects. So the proposed methodology must belong to Type II and not to other types.

A. Technology/measure in the proposed new methodology

This project category comprises equipment that would reduce or eliminate completely the use of thermal energy from fossil fuels, and possibly from renewable biomass, by implementing the equipment at many facilities manufacturing building materials. The equipment may replace equipment at existing facilities or be installed at new facilities. Equipment may be implemented in small-scale brick manufacturing plants, etc. The project activity shall both reduce anthropogenic emissions by sources, and directly emit less than 15 kilotonnes of carbon dioxide equivalent annually.

- For the energy efficiency improvement projects in factories, category II.D. "Energy efficiency and fuel switching measures for industrial facilities" of the Appendix B of the simplified modalities and procedures for small-scale CDM project activities is applicable. It covers not only the energy efficiency improvement in electricity but also thermal energy. So project participants do not need to propose a new methodology.

B. Technology/measure: category II. D.

This category comprises any energy efficiency and fuel switching measure implemented at a single industrial facility. This category covers project activities aimed primarily at energy efficiency; a project activity that involves primarily fuel switching falls into category III.B[1]. Examples include energy efficiency measures (such as efficient motors), fuel switching measures (such as switching from steam or compressed air to electricity) and efficiency measures for specific industrial processes (such as steel furnaces, paper drying, tobacco curing, etc.). The measures may replace existing equipment or be installed in a new facility. The aggregate energy savings of a single project may not exceed the equivalent of 15 GWhe per year. A total saving of 15 GWhe per year is equivalent to a maximal saving of 45 GWhth per year in fuel input.

The activity replacing the equipment at many facilities manufacturing building materials would also reduce or eliminate the use of thermal energy from renewable biomass. However, this component of the activity may not result in emission reductions. .

[1] *Thus fuel switching measures that are part of a package of energy efficiency measures at a single location may be a part of a project activity included in this project category*

Signature of SSC WG Chair ……..
Date: 27 / 01 /06 *(Gertraud Wollanksy)*

Signature of SSC WG Vice-Chair ……..
Date: / / *(name)*

Information to be completed by the secretariat	
SSC-Submission number	SSC_014
Date when the form was received at UNFCCC secretariat	13 February 2006
Date of transmission to the EB	13 February 2006
Date of posting in the UNFCCC CDM web site	13 February 2006

Annex 3

PROJECT CONCEPT NOTE

Name of Project: ***FaL-G Brick units in tiny sector***
Multiple units to be bundled under
Community Development Carbon Fund (CDCF)

A. Project details

Technical summary of the project ***Date submitted: 20th January 2004***

****Please provide photographs of proposed project site if possible***

Project outline description	This project aims to replace burnt clay brick with fly ash brick in construction sector, where the former is identified as eco-hostile due to emitting green house gases such as CO_2 from the clay brick kilns and for denuding the fertile topsoil. When fly ash is used to manufacture bricks/blocks in FaL-G technological route it results in the accrual of following benefits: • Conservation of energy (from coal / biomass) because the FaL-G process dispenses away with sintering and hence no thermal energy is used of whatsoever nature. Fly ash brick / block is GHG neutral, produced using the eco-friendly FaL-G technology. • Conservation of top soil because the same is replaced by industrial (wastes) byproducts such as fly ash, lime sludge, chemical gypsum and stone dust.
Technical description of the project	The development of FaL-G technology with down-to-earth practicing features has helped for the proliferation of over 1200 fly ash brick/block units in tiny sector throughout the country. It is feasible to manufacture these bricks in large scale in mechanized way for which companies like Masa AG, Germany, have developed suitable plants. For the fly ash availability and potential of 360 billion brick market in India, at least 50,000 plants have to be promoted both in tiny sector and medium scale sector. Even at this level, the penetration would be only 40%. An incentive mechanism would help to bridge this massive gap for which carbon credits have been identified as one of the plausible routes. This project envisages bundling 200 tiny sector units under Community Development Carbon Fund (CDCF). There is an opportunity for large-scale mechanized plants once the tiny sector units prove their marketing success. These large units may also be bundled together with tiny sector or tagged separately for PCF or put in the open CDM market. Institute for Solid Waste Research & Ecological Balance (INSWAREB), a non-profit non-government organisation, is the technology provider and the umbrella body to facilitate the units

	with required technical support. INSWAREB offers its services along with Eco-Carbon Pvt. Ltd., to catalyze the bundling activity, supervise the operations, and coordinate the monitoring and verification procedures with the accredited agency and, transfer the CERs to World Bank or its nominees under mutually acceptable mechanism.
Technology to be employed	FaL-G technology, developed by Dr N Bhanumathidas and N Kalidas in 1990, promoted by INSWAREB for the last twelve years, has helped to the proliferation of over 1200 tiny sector units throughout the country. Many government departments, including CPWD and state housing agencies, profusely use these bricks. This technology talks about fly ash-lime-gypsum system that can substitute cement even for structural applications. In the FaL-G system, wherever lime is in short supply, cement is used as the source of lime. Thus this technology has a great flexibility and proved to be sustainable.
Description of the technology	Fly ash-lime mix is known for its slow chemistry, which is overcome by using heavy-duty press (for compaction of the mass) and autoclave (to complete the hydration reactions within 12 hours that otherwise takes months together). Only a few foreign companies have perfected the technology, making it capital intensive both on know-how costs and plant costs. So only a couple of plants are working in India, selling the product at 5 times the price of clay bricks in order to serve the premium segment of the market. FaL-G technology maneuvered the chemistry by tapping ettringite phase to its threshold limits through sufficient input of gypsum. In fly ash-lime (FaL) mixes, the strengths are mainly from calcium silicate hydrates (CSH). Whereas in the case of fly ash-lime-gypsum (FaL-G) mixes, the early strengths are imparted by calcium alumino-sulphate hydratres (CA$\bar{S}$H) supplemented by CSH for late-age and ultimate strengths. In result, the strengths of FaL in the range of 60-80-120 kg/cm^2 get boosted to 200-250-350 kg/cm^2 as FaL-G. Because of high ultimate strengths, the one-day strengths are sufficient to handle the product for stacking. Thus the heavy-duty press and autoclave are avoided resulting in the reduction of plant cost from Rs. 50 million to 0.5 million, thereby bringing the technology within the reach of small and tiny sector entrepreneurs. FaL-G technology is free from the process step such as sintering as applied for clay brick. Hence, this technology is totally energy-free.

Project performance profile: Please attach supporting spreadsheets and electronic copies of models. Please assume a price of \$3/tCO_2e on delivery emission reductions. DO NOT assume any up-front payment from the PCF in the financial analysis that includes PCF revenue stream.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015		
Net Generation: Production of bricks or blocks computed in terms of cu.m @ 500/cu.m	0.7 mn. Cu.m	0.7 mn. Cu.m	0.7 mn. Cu.m	0.7 mn. Cu.m	0.7 mn. Cu.m	0.7 mn. Cu.m	0.7 mn. Cu.m	0.7 mn. Cu.m	0.7 mn. Cu.m	0.7 mn. Cu.m		
Total ER (ton CO_2e) in '000	224	224	224	224	224	224	224	224	224	224		
PCF Purchase requested (tons CO_2e) in '000	224	224	224	224	224	224	224	224	224	224		
PCF Payment requested (US\$ million)	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67		

Project developer	
Name of the project developer	**INSTITUTE FOR SOLID WASTE RESEARCH & ECOLOGICAL BALANCE (INSWAREB)**
Organizational category	Non Governmental Organization
Legal status	Registered as a Society.
Other function(s) of the project developer in the project	Technical advice and technology monitoring/upgradation from time to time; consultancy in baseline and additionality studies for carbon credits.
Summary of the relevant experience of the project developer	INSWAREB is the technology source and also operating as the accredited Building Centre under the national network of HUDCO, imparting training to entrepreneurs and their artisans, in addition to manufacturing and marketing the fly ash bricks and blocks.
Address	'FaL-G Mansion' 35 Shri Venkateswara Colony, Visakhapatnam 530 012 Andhra Pradesh, India
Contact person	Name of the Project Development Manager: Dr N Bhanumathidas, Director General; Alternate: Mr N Kalidas, Director
Telephone / fax	Phone: ++91-891-2516411 Fax: ++91-891-2517429
E-mail	Email: inswareb@md3.vsnl.net.in Web: www.fal-g.com
Project sponsors *(List all project sponsors)*	
Name of the project sponsor	**INSTITUTE FOR SOLID WASTE RESEARCH & ECOLOGICAL BALANCE (INSWAREB)**
Organizational category	Non Governmental Organization
Address (include web address, if any)	'FaL-G Mansion' 35 Shri Venkateswara Colony, Visakhapatnam 530 012 Andhra Pradesh, India Phone: ++91-891-2516411 Fax: ++91-891-2517429 Email: inswareb@md3.vsnl.net.in Web: www.fal-g.com
Legal status	Registered as a Society.
Main activities	Research on industrial solid wastes; Technology development and dissemination.
Summary of the financials (2002-2003)	Total Assets: Rs. 24,50,789 Revenue: Rs. 19,38,154 (for NGO it is not called profit)
Type of the project	
Greenhouse gases targeted	CO_2 & N_2O
Type of activities	Total abatement for not using any fuel of whatsoever nature
Field of activities	
a. Energy supply	Not applicable
b. Energy demand	Avoidance of coal, firewood, biomass, otherwise consumed in clay brick industry, by replacing clay bricks with FaL-G bricks where the latter is totally energy-free.

c. Transport	Not applicable
d. Waste management	Utilization of industrial wastes, emerged as by-products; fly ash from boilers; lime from acetylene industry (wherever lime is not available, mineral lime or cement is used to meet the process need); gypsum from chemical industries; stone dust from stone crushers (sand is used wherever stone dust is inaccessible).
e. Land Use Change and Forestry	Not applicable
Capacity to implement project	The sponsors of the project, INSWAREB, is headed by Dr N Bhanumathidas and Mr. N Kalidas who are the inventors of the FaL-G technology. INSWAREB is instrumental in catalyzing the proliferation of over 1200 FaL-G brick units as of now. INSWAREB has a training outfit, operating as Building Centre under the auspices of Housing & Urban Development Corporation (HUDCO). INSWAREB is associated by a corporate entity, Eco Carbon Pvt. Ltd., to take care of the techno-commercial dimensions of the project implementation.
Location of the project	
Region	South Asia
Country	India
City	Different locations
Description of the location of the plant	The tiny sector plants scatter throughout the country. For operational and audit convenience, if necessary, the bundling can be confined to two or three states or national regions.
Sector background	
General structure and organization	The total brick demand in the country is about 360 billion against which approx. 2 billion bricks are only manufactured in FaL-G route by over 1200 plants. So there is a great hiatus in the market. Wherever the product is introduced for the first time, there is resistance in the market for the first few months. But the technical virtues of FaL-G bricks over clay bricks facilitate sizeable penetration upon imparting due technical awareness and training. While the clay brick units are almost in unorganised sector, FaL-G units are to some extent in organised sector.
Sector policy / strategy	Govt. of India is greatly concerned about topsoil erosion through clay brick production to meet the rampant needs of rapid urban construction growth. Simultaneously there is concern about the need to use fly ash in value added manner for which brick and block are identified as formidable routes. Hence Public Interest Litigations have encouraged the courts to give directions to the Government. In result, Ministry of Environment has banned (1999) the production and use of clay brick within 50 km radius of each thermal plant. This is now proposed to be extended to 100 km radius and a draft notification is already issued (2002) by the Government to this effect. This draft also insists all the construction departments of Government to switch over to fly ash based brick, cement and

	concrete. Despite all these initiatives, the penetration remained below 1% that needs additional promotional effort.
Legal framework	The Project Sponsor, INSWAREB, is the technology source, training centre and a catalyst to facilitate the proliferation of fly ash based brick/block units. The entrepreneurs receive the technology and set up the units at various scales of production capacities. Being the direct source to abate CO_2 by virtue of producing fly ash bricks, these entrepreneurs or production units naturally become the owners of the CERs and give mandate to INSWAREB/Eco Carbon Pvt. Ltd., for bundling and delivering the CERs to the World Bank. To this effect an agreement would be suitably signed. The benefits drawn out of CERs would be transferred to entrepreneurs after meeting the costs of marketing strategies in promoting the activity.
Barriers and Constraints	The technology and knowledge dissemination in the country about FaL-G technology is still insufficient comparing to the magnitude of the potential. Tiny scale entrepreneurs do not gain the confidence of Financial Institutes and, hence, they set up the units with own finances or borrowed funds from the private financiers. These tiny sector entrepreneurs suffer working capital crunch whenever their bills are unduly delayed beyond 2-3 months by government departments and contractors. Commercial barriers are equally complex. The resistance does exist to take up new technology and, to use new products on account of mind-set. This can be overcome by technical awareness programs, workshops etc., conducted by INSWAREB, as part of its technology dissemination mission.
Expected schedule	
Earliest project start date	2004-05
Time required before becoming operational after approval of the PIN	Time required for financial commitments: 3-6 months Time required for legal matters: 02 months Time required for negotiations: 03 months Time required for construction: 12 months
Expected first year of CER delivery	Year 2005-06
Proposed crediting period for the project	10 years
Project lifetime	Number of years: 15 years
Current phase and status of the project and next major steps toward Design and Financial Closure of Underlying Project	A Description of the phase of the project : New tiny sector units to be started for enrollment for bundling under CDCF. Identification and pre-selection phase of entrepreneurs: Finished

	Opportunity study Finished Pre-feasibility study Finished Feasibility study Due Negotiations phase with PCF: Due Contracting phase: Due <u>A Description of the status of the project</u> : Environmental Impact Assessment: Not applicable Approval of the Board of the Project developer/sponsors: Available <u>Status of contracts/MOUs</u>: Upon signing an MOU with CDCF, sponsors would invite applications from competent entrepreneurs and necessary contracts would be signed.
Current status of Host Country acceptance	India is a signatory to Kyoto Protocol and thus qualified to endorse CDM projects. Papers for Letter of Endorsement would be moved with the Government once the MOU with CDCF is finalised.
The position of the Host Country with regard to the Kyoto Protocol	The Host Country a. According to status of various countries published by UNFCCC, the protocol got Accession on 26th August, 2002. b. The Government demonstrated a clear interest by approving some projects under CDM regime.

B. Expected environmental and social benefits

Estimate of Greenhouse Gases abated / CO_2 Sequestered (in metric tonnes of CO_2-equivalent)	Annual: 224,000 in metric tons of CO_2-equivalent Up to and including 2012: 1,568,000 tCO_2-equivalent Up to a period of 10 years: 2,240,000 tCO_2-equivalent
Baseline scenario	The production of fly ash bricks displaces equal quantity of burnt clay bricks produced in traditional kilns. Without promotion of fly ash bricks, production of burnt clay bricks would continue unabated, in ***business-as-usual*** scenario, causing air pollution because of unprocessed flue gases and topsoil erosion in. The project envisages bundling about 200 tiny and small scale units engaged in the production of fly ash bricks. Fly ash bricks have to penetrate into clay brick market that takes a long time to keep the baseline alive for a very long period. However, in the present logistics 15-25 years could be envisaged as the lifetime for the baseline. To draw the baseline methodology, the type of fuels used for clay brick production are analysed within the area of

	proposed fly ash brick plants. The resultant emission values would be constituted as the baseline for that area. As FaL-G bricks are produced in zero-thermal energy scenario, it is proposed to compute the emissions out of both fossil fuels and biomass in clay brick production as the baseline. CDCF need to analyze the rationality behind this approach in order to ratify the basis. No other uncertainties are foreseen, except change in fuel blend for sintering clay bricks from place to place that influences the estimated emission reductions. Each million burnt clay bricks consume about 200 tons of coal resulting in the emission of : • 270 tons of CO_2 by combustion; • 4.40 tons of CO_2 for transportation (from coal mine to burnt clay brick plant); • 1.16 tons of N_2O. The coal that goes to clay brick kilns is taken with 40% fixed C; 8% of FC as unburnt in the residual ash; and thus 36.8% is computed for carbon credit. Collection of fuel data from the operating clay brick kilns is the safe approach that can be counterchecked through a couple of operations. Thus, as the baseline studies are going to be regionalised, the scope for leakage are minimized if not totally avoided. *Technological barrier:* *FaL-G technology is relatively new (developed since 1988) and has slowly gained market acceptance over the last decade, by overcoming the traditional mindset of the consumers of burnt clay brick. The market penetration of FaL-G technology, in spite of technical superiority over the burnt clay brick, is negligible, not crossing even 1% over the last ten years of efforts, due to the perceived risks of a new product made out of industrial byproducts.* *Other barriers:* *Limited awareness of the benefits of FaL-G products in the public and private sectors, lack of capital resources at the small entrepreneur and brick manufacturing artisans are also significant barriers for absorbing the FaL-G technology and the absence of this project activity would allow the production of traditional burnt-clay bricks that results in unabated emission of GHGs.*
Specific global & local	Conservation of coal @ 200 tons/every million burnt clay

environmental benefits	bricks. Abatement of GHG emissions otherwise caused on account of operating traditional kilns devoid of processing flue gases. Conservation of topsoil @ 3500 tons/every million burnt clay bricks and, thus protecting the wetland for agriculture activity.
Which guidelines will be applied?	GHG hand book of World Bank.
Local benefits	Cleaner air and conservation of topsoil in the vicinity of the brick production. Especially for topsoil, in Indian context FaL-G bricks and blocks penetrate into clay brick market. Thus every billion FaL-G bricks help to avoid excavation of 3.5 million tons of topsoil, preventing the denudation of 100 hectares of fertile land. The envisaged project offers a cluster of 200 units with average production capacity of 3 million fly ash bricks that would prevent over 9000 hectares of land from denudation.
Global benefits	Contributing to overall emissions reductions at global level.
Stage of the Environmental review	Because of the tiny sector nature, these units may not probably require an Environmental review. However, Justifications for baseline and additionality have been submitted after due evaluations of the impacts on environment.
Socio-economic aspects What social and economic effects can be attributed to the project and which would not have occurred in a comparable situation without the project?	The taboo on burnt clay brick activity, through a ban by the Judiciary within 100 kilometer radius of a coal burning thermal power plant, is liable for loss of employment causing economic hardship to the low skilled workforce deployed in brick kilns. FaL-G brick activity can absorb the same workforce for the parallel skills involved in brick making. The Judicial ban may enforce shifting of burnt clay brick activity beyond the 100-kilometer radius of thermal plants, but the emissions are unabated and cannot be shifted from the environment. Burnt clay brick activity is a seasonal activity with 6-8 months of working whereas fly ash brick activity is prevalent all through the year ensuring dependable employment and income to the workforce. Ban on burnt clay brick activity within a radius of 100 km means increase in its marketing price on account of transportation from higher distances thus contributing to higher emissions from the transport vehicles. Fly ash brick activity can uphold the price line by offering product at parallel price with superior engineering properties. Management of fly ash disposal has become a gigantic task, attracting strictures from Judiciary on account of air and ground pollution. Utilization of fly ash eases the disposal costs to some extent.
Which guidelines will be applied?	Name and, if possible, the website location – No comments
What are the possible direct effects (e.g. employment creation, capital required, foreign exchange effects)?	Ensuring employment all through the year as against seasonal employment in burnt clay brick activity. With the FaL-G technological practices and training, fly ash

	brick production can help to achieve higher per capita productivity and contribute in improving the livelihood of the artisans. Avoidance of imported technology and imported equipment, which is otherwise required for fly ash brick activity prior to the advent of FaL-G technology. Minimizing the capital costs, by approximately 100:1, because of avoidance of heavy-duty press and autoclave, otherwise used to be deployed with imported fly ash brick/block technologies. Scattering tiny sector plants and facilitating brick distribution in localized areas, within a radius of about 30-50 km, saving on transport costs, otherwise required in mobilization of finished product, and resultant emissions. Turnover to capital ratio is very high at about 3:1 to 5:1 and hence capital risks are minimized with low break-even.
What are the possible other effects? For example: • Training/education associated with the introduction of new processes, technologies and products and/or • the effects of a project on other industries	INSWAREB imparts training to the entrepreneurs and artisans. The production of blocks equivalent to 4 to 6 bricks saves on joinery mortar and, thus, minimizing cement and relevant costs. The strength of fly ash bricks can be increased up to 40 MPa. Thereby, the scope can be enlarged to infrastructure applications such as canal lining, *khadanza* (brick on edge) pavements, arch dams etc., which are all currently executed with cement concrete. This results in cost savings and improved life-cycle costs, thus unleashing new spate of rural development activity on infrastructure front.
Stage of the Socio-economic review	The socio-economic aspects have already been studied and the outlines have been explained in the socio-economic aspects.
Environmental strategy/ priorities of the Host Country	India committed for banning burnt clay brick on account of ecological concerns. To this effect the highest authority of the Judiciary has given directions banning clay brick kilns in and around Delhi. Before similar directions come from Judiciary of other states, the government is keen to find viable alternate. Fly ash brick/block production through FaL-G technology has paved the way without disturbing the socio-economic and environment parameters otherwise prevalent on account of burnt clay brick activity. Now that India has become signatory to the Protocol and keen on taking advantage of CDM, this activity very well fits into the priorities of the government.

The process of stakeholder involvement	This is generally applicable for large industries with environmental impacts. For the tiny sector industries this exercise may not be required. However, in view of the contribution of this activity to employment generation and use of local materials, the stakeholders would certainly receive this project positively.

C. Finance

Total project cost estimate	
Development costs	0.00 US$ million
Installed costs	3.52 US$ million
Other costs	1.42 US$ million (Margin money for working capital)
Total project costs	4.94 US$ million (@ Rs. 45.5/US$)
Commercial strategy	This is a need-based technology in today's urge for Sustainable Development. Hence it draws a lot of support from Government and learned public. The positive aspect of this project is that the product is superior in quality and parallel in price over that of its competitor (clay brick) which, normally supposed to facilitate easy penetration and quick commercial success. However, this is not happening despite Herculean efforts. For the last one decade over 1200 operating plants of fly ash bricks have come up as against the target of 50,000 units.

Sources of finance identified	50% of the equity comes from entrepreneurs and balance 50% is proposed to be funded by Eco Carbon Pvt. Ltd., in order to tie up the emission credits of the production unit.

Source	US$ Millions	%	Status of Commitment
EQUITY	1.63		
Sponsor	0.815	16.5	Eco Carbon Pvt. Ltd.
Other Shareholders	0.815	16.5	The entrepreneurs are the shareholders.
Total Equity	**1.63**	**33.0**	
DEBT (long term + short term)	3.31	67.0	Long term (2.36) + Short term (0.95) Dialogue has been opened with IDFC.
Foreign bank loan	Nil		
Export credit	Nil		
Local bank (local currency) loan	Nil		
Total Debt	**3.31**	**67.0**	

TOTAL FINANCING	4.94	100.0	
Financing Gap (Project cost minus total financing)	Nil		

Credit Ratings:

Rating Agency*	Country	Company
S&P	NA	NA
Moody's	NA	NA
Fitch	NA	NA
OECD	NA	NA

See rating agency websites.

- http://www.moodys.com/moodys/cust/staticcontent/2000400000333838/SovRatList.pdf
- http://www.standardandpoors.com/RatingsActions/RatingsInquiries.html
- http://www.fitchibca.com/corporate/sectors/issuers_list_corp.cfm?sector_flag=5&marketsector=1&detail=
- http://www.oecd.org/oecd/pages/home/displaygeneral/0,3380,EN-document-349-nodirectorate-no-27-3937-9,FF.html
  (found by going to www.oecd.org, click on "finance and investment", click on "Export Credit Arrangement", click on "Country Risk Classification", click on PDF file "Country Risk Classification"

Credit Terms: What are current terms (interest rate, tenor, insurance requirements) for debt financing for projects of the proposed type in the proposed country?

Financial analysis *(cash flow for the project, along with the financial analysis, i.e. financial model presenting the expected cash flows from the perspective of the project, plus the NPV and IRR, and the assumptions used in the projections, must be provided with the PCN to the PCF in electronic form*). Note: Please assume a price of $3/tCO$_2$e on delivery in the expected revenue stream from the PCF and DO NOT assume any up-front payment from the PCF in the financial analysis. ***Please provide a spreadsheet to support these calculations-attached.***

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Cash flow (before ER)	0.54	0.69	0.73	0.68	0.64	0.60	0.58	0.57	0.57	0.56		
Cash flow (after ER)	1.16	1.35	1.41	1.36	1.31	1.28	1.26	1.25	1.24	1.23		
Net Present Value NPV (before ER)	0.325											
Net Present Value NPV (after ER)	4.397											
Estimated financial internal rate of return FIRR (before ER)	12.16%											
Estimated financial internal rate of return FIRR (after ER)	34.75%											

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Debt Service Coverage Ratio (before ER) *	NA	0.81	0.95	0.95	0.97	1.01						
Debt Service Coverage Ratio (after ER) *	NA	1.74	1.97	2.08	2.21	2.39						

* If this is information is considered confidential, please submit it in a separate document which can be covered by a confidentiality agreement with the PCF.

Please attach documentation as described in Annex 1- Financial Documentation Checklist.

Indicative CER Price (subject to negotiation and financial due diligence)	US$ 5 to 8 per ton of CO_2 eq. is desirable. However, the following computations have been made based on US$ 3/t CO_2, as advised by CDCF.
Total ERPA Value	For a quantity of approx. 224,137 tons of CO_2 eq. by way of both CO_2 and NO_2 from 200 units. @ 3 $ / tCO_2 = 672,411
A period until 2012 (end of the first budget period)	US$ (for 9 years) = 6,051,699
A period of 10 years	US$ 6,724,110

D. Risk, uncertainty and sensitivity

Risk/uncertainty[1] and sensitivity[2]	
The risk/uncertainty analysis	In the given conditions of National policy for banning clay brick and promotion of fly ash utilization, the perceived risks are hardly any. Fly ash is used both for cement and brick where the former renders high value addition for fly ash in comparison to value addition in brick. When market for fly ash utilization picks up overwhelmingly in cement segment, the fly ash procurement for brick segment may prove unaffordable in view of disparity in value addition. This scenario may happen only when cement segment picks up all the 170 million tons of fly ash expected to be generated by 2010.

[1] A risk and uncertainty analysis should reflect an unbiased estimate of expected values of the various most relevant project elements. In most cases, the expected value of a variable can be based on some central estimate, which is most likely to reflect past trends and averages. This implicitly assumes that the probabilities of possible future values are more or less normally distributed around this central estimate. If this is not the case, as, for instance, with variations in weather conditions, the occurrence of disasters, or price support systems, a special risk analysis will be necessary to obtain unbiased estimates of expected values.
Uncertainty with respect to estimates of project values is normally listed as contingency allowances. Such allowances usually cover expected but as yet unidentified items.

[2] A sensitivity analysis identifies the relative importance of the various most relevant project items, and to determine their effect on the attractiveness of a project. In this way, risk and uncertainty with regard to particular project items can better be identified, and their relative importance in the overall analysis be established.

Risk and uncertainty mitigation measures	Increasing the price of fly ash brick is the only mitigating way to withstand competition with cement segment, with regard to affordability of procurement-cost for fly ash.

ANNEX 1—FINANCIAL DOCUMENTATION CHECKLIST

Please provide for each sponsor and the project company (where applicable):

- Experience statement, including all the projects the firm has closed, their current status, and additional details on projects similar to those to be supported by the PCF.
- Any ratings and reports from D&B, S&P, Fitch, OECD (country only).
- Public filings, if any.
- Audited financial statements for most recent three years.
- Company ByLaws/Articles of Association.
- List of Directors and Managers of the Company.
- Shareholders Agreement.
- List of Company Subsidiaries, if not included in financial statements.
- List of Company Debts (maturities, interest rates, security) if not included in financial statements.
- Paper and electronic copies of company financial projections including assumptions, balance sheet, income statement, cash flow; include proposed projects and other planned investments.

Please provide for this project:

- Project Business Plan/Feasibility Study/Market Study.

Please provide as available, but no later than appraisal:

- Major Project Contracts (e.g. Engineering, Procurement and Construction).
- Purchase contracts (e.g. power).
- Concession/License and permits.
- Financing agreements, letters of intent or similar from banks, equity providers, other carbon finance sources, etc., expected to provide financing.
- Technical Assistance Agreements, if applicable.
- Laws governing project operations (e.g. Build, Operate, Transfer laws, and government decrees).
- Sources of major procurements.
- Paper and electronic copies of project financial projections including assumptions, per unit (e.g. $/mWh, $/ton) product costs and prices (tariffs), income statement, and cash flow.