Environmental Monitoring Report

Semestral Report
August 2016

BAN: Financing Brick Kiln Efficiency Improvement Project – Panchgaon Auto Bricks Limited

Prepared by Environment Specialist for the People's Republic of Bangladesh and the Asian Development Bank.

CURRENCY EQUIVALENTS
(as of 30 June 2016)

Currency unit	–	taka (Tk)
Tk 1.00	=	$0.0127632419
$1.00	=	Tk 78.350000

NOTES

(i) The fiscal year (FY) of the Government of Bangladesh ends on 30 June. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2011 ends on 30 June 2011.

(ii) In this report, "$" refers to US dollars.

Post Implementation Environmental Monitoring Report
Panchgaon Auto Bricks Limited
Panchgaon, Mirzapur, Tangail

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Under TA 8197

Dhaka August, 2016.

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Acronym

ADB	-	Asian Development Bank
DOE	-	Department of Environment
EC	-	Environmental Clearances (EC)
EDD	-	Environmental Due Diligence
EMP	-	Environmental Management Plan
FCK	-	Fixed Chimney Kiln
GDP	-	Gross Domestic Product
GOB	-	Government of Bangladesh
HHK	-	Hybrid Hoffman Kiln
HSBK	-	Horizontal Shaft Brick Kiln
IFCK	-	Improved Fixed Chimney Kiln
IZZK	-	Improved Zig Zag Kiln
OSH	-	Occupational Safety & Health
PFI	-	Participating Financial Intermediary
PPE	-	Personal Protective Equipment
TK	-	Tunnel Kiln
VSBK	-	Vertical Shaft Brick Kiln

1. Project Background

Brick kilns are major sources of greenhouse gas in Bangladesh, emitting annually 6 to 9 million tons of CO_2. Such high levels of emissions are a result of the use of age-old technologies and substandard fuels such as high sulphur coal, tires and wood used in the kilns.

To meet the increasing demand, brick fields are mushrooming all over the country with heavy concentration at the out skirts of urban area. This situation is being exacerbated by the growth of new brickfields every year., more and more paddy fields are being converted to brick fields thus putting tremendous pressure on the farm land depletion can have alarming prospect for food security. Topsoil from agricultural lands, river floodplains are used for making the green bricks which is burnt later at the kilns More over wood fuel is used as a secondary fuel for Brick making of the country. Most notable, is the impact of Brick making on land degradation and deforestation. The haphazard s growth of the brick fields is completely unsustainable

Despite its highly polluting and energy-intensive feature, the FCK continues to be the dominant technology. Other technologies such as the IFCK, IZZ, HSBK, VSBK, HHK and TK are substantially cleaner, consuming less energy and emitting lower levels of pollutants and greenhouse gases but their use is limited. These technologies are still being piloted though and are, therefore, at an early adoption stage; their technological efficiency and financial viability still need larger scale demonstration. The FCK technology, a sub-optimal one, and the hand moulding practice of making green bricks are both unsustainable and do not lend themselves to producing consistently good quality and well-shaped bricks. They also cause significant negative externalities. The industry is, in short, in need of a transformative change, change that will improve operational efficiency and make it less polluting, less wasteful and more resource efficient. This transformation process can be used to improve production efficiency, product quality and green downstream uses providing socially and environmentally sustainable “green jobs” that can fuel economic growth.

ADB proposed a financial package project consisting of two loans to brace the on-going technology dissemination efforts. The financial package contained in the Bangladesh Brick Sector Improvement Project is designed to support commercial financing of new technology kilns by providing loans to entrepreneurs through participating commercial banks (PFIs).

The loans to the government are intended to establish a credit facility of $50 million equivalent in local currency at Bangladesh Bank (Central bank) for relending to participating financial intermediaries for the construction of more energy-efficient and environmentally superior brick kilns. The funds are to be used the purpose of financing upgrades and constructing more energy-efficient and environmentally superior kilns.

The two components of the credit facility are

(i) Financing the upgrading of existing FCK kilns to a transitional design to preserve sector welfare while immediately reducing pollution, and
(ii) To finance and promote the most advanced brick kiln technologies in brick making and to demonstrate.

Panchgaon Auto Bricks Ltd is one of the Sub-projects that received the finance from ADB in the Advanced Brick Technology Category.

1.1 Purpose & objective

The purpose of the report is to record the post implementation environment compliance status of Panchgaon Auto Bricks Ltd subproject and to suggest a corrective action plan against non-compliant issues.

2. General Information of the Sub-Project

Panchgaon Auto Bricks Limited is situated at Mouza: Panchgaon, P.S: Mirzapur, District: Tangail, Bangladesh.

The general information of Panchgaon Auto Bricks Limited are furnished in the following table:

Table 2.1: General Information on Panchgaon Auto Bricks Limited

1. Name of the Company	**Panchgaon Auto Bricks Limited**
2. Name of the entrepreneur	Mr Md Azharul Islam
3. Contact Address	Mouza: Panchgaon, PS: Mirzapur, District: Tangail, Bangladesh
4. Name of the Brick Kiln 4.1 Trial Production Date 4.2 Start of Commercial Production	Panchgaon Auto Bricks Limited It is in the commercial production since 2014
5. Type of the Brick Kiln	Hybrid Hoffman Kiln (HHK)
5.1 Rated Capacity Production (Daily)	120,000 (two kilns)
5.2 Current Production (Daily)	60,000 (1 kiln is in operation)
6.Project Investment	373.645 TK (millions)
7. Location Address of the Brick Kiln	Mouza: Panchgaon, PS: Mirzapur, District: Tangail, Bangladesh
8. Current office address	Mouza: Panchgaon, PS: Mirzapur, District: Tangail, Bangladesh
9. Telephone/Fax	Cell: 01780385506
10. E-mail	pablbricks@gmail.com

2.1 Subproject Process Description

The project design combines a highly efficient kiln technology, the Hybrid Hoffman Kiln (HHK) with a unique technique of forming green bricks: granulated coal is injected for internal combustion. This approach results in lower energy usage, higher quality bricks and reduced pollution. Bricks of any size, shape and pigmentation can be produced at the plant with minor modifications. All bricks will be of uniform quality and will meet international standards for strength, quality and appearance.

The plant will produce 36 million pcs bricks of size 250 mm x 120 mm x 75 mm annually. The main features are as follows: 80% intestine combustion, raw material preparation with roller mill, shaping with vacuum extruder, tunnel drying and firing with annular kiln. Annual working days have been assumed to be of 300 days. Raw material preparation will be conducted each day in 2 shifts of 7.5 hours. Drying and firing in 3 shifts each of 8 hours. The raw materials (soil) shall be collected from digged ponds, soil suppliers and from river bed. Soil suppliers in general collect soils from river beds.

The HHK is a hybrid version of the Hoffman kiln. Structurally, it is built like the Hoffman but, unlike the traditional Hoffman, the fuel used is coal. The kiln can be made from firebricks or from green bricks. In the latter event, the green bricks get "cooked" during kiln operation. The inner kiln lining is made from refractory bricks and then plastered over by refractory cement. In this version, the firing chamber can be filled manually or automatically with green bricks, usually about 8,500 to 9,000 units at one time, in line stacks of around 1,000. Thus, there are 5 line stacks; and the firing time for each line stack is about half an hour. The fuel, granulated coal, is fed into the firing zone in the kiln through stoke holes on the roof. Air required for the combustion process is forced from behind; and, as it reaches the line to be fired, it is already preheated from the previous firing zone thus reducing firing time and energy usage. The temperature in the firing zone is about 800°C. The process is extremely simple and is carried out manually.

For the production process, the clay is excavated by hydraulic excavator or by hand from nearby river beds, pond digging, and inevitable river erosion soil and transported to the plant stacking yard by trucks. The clay is then crushed by means of roller mills, then by double-shaft mixer where water is added in such a manner as to ensure moisture content of 15%

The tempered material is fed into a vacuum extruder for continuous column production. The column is then cut with Cutter column and Cutter green to the required size. At the moment, green bricks are prepared manually and placed for sun drying in the brick field. But the dryer will be constructed in the near future.

Then the dried green bricks are loaded manually into the annular kiln. The speed of the firing is 1.25 m/h at a Sintering temperature of about 950 °C – 1050 °C. The fired brick are unloaded and conveyed manually in carts to the stacking yard.

2.2 Subproject Legal Requirement

I. National Regulatory Framework

Bangladesh environment Conservation Act'95 is the key Act in the environmental arena. Under this Act, it requires that no industry or project can be set up in the country without the clearance from Department of Environment (DoE). Bangladesh Environment Conservation Rules'97 provides the procedures how to obtain the environment clearance from DoE. According to this Rule, brick manufacturing projects fall under the **"Orange B Category".** According to ECR 1997, the project sponsor prepared a comprehensive Initial Environmental Examination (IEE) report including an Environmental Management Plan (EMP) and submitted those to DoE for obtaining Site Clearance and Environmental Clearance. **Brick Kiln Act 2013** is the latest legislation that the brick kiln owners has to comply. It regulates the technology and type of the kiln, location characteristics, source of soils/ earth, fuels etc.

II. ADBs Safeguards Policy and Requirements

ADB's Safeguard Policy Statement (2009) is a consolidated policy framework setting out policy objectives, principles and requirements for three safeguard areas: environmental, involuntary resettlement, and indigenous people.

The ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, financial intermediation loans, and private sector investment operations as per Environmental Operational Directives (2013-2020).

Environmental assessment is a process rather than a one-time report, and includes necessary environmental analyses and environmental management planning that take place throughout the project cycle.

III. Bangladesh Bank's Commitment

Bangladesh Bank's cherished goal is to achieve sustainable development in the overall economy. In the energy sector, it promotes cleaner and more environmentally friendly technologies, and thus is committed to avoid and mitigate adverse environmental impacts, if any, resulting from the projects it finances.

Bangladesh Bank has agreed upon with Environmental and Social Management System (ESMS) of ADB and committed that all sub projects financed by BB through ADB Letter of Credit (LoC) would be compliant to ADB Safeguard Policy Statement (SPS) 2009.

Currently, Bangladesh Bank is considering to finance the proposed subproject through the ADB LoC, therefore an Environmental Safeguard Due Diligence (ESDD) of the proposed subproject has been warranted.

3. Methodology & Approach for Post Implementation Monitoring

Post Implementation Environmental Monitoring was carried out in accordance with the guidance provided in the ESMS of ADB. These include: 1) review of all legal and technical documents and 11) site visit/ inspection of the sub project and stakeholder consultation.

3.1 Review of all legal & technical documents

- Review of Initial Environment Examination (IEE) report in favour of the sub project and Environment Management Plan (EMP) & Monitoring Plan (MP) suggested in Environmental due Diligence Report (EDDR)
- Review of recommendations made in the Environmental Due Diligence (EDD) report.
- Review of suggested Monitoring Plan laid down in the EDD.
- Review of updated Regulatory Documents including Renewal Clearance Certificates from DOE.
- Review of monitoring results (if any).

3.2 Site visit inspection & consultation

Visit to the plant

As a part of "loan 2865/2866 Ban: Financing Brick Kiln Efficiency implementation Project and TA 8197-BAN Supporting Brick Sector Development Program – Fielding Loan Review Mission (12-30 June 2016," the visit took place on 19th June 2016. The visit was organized in coordination with Bangladesh bank and PFI.

The Environment Consultant paid attention to the following environmental issues, in particular during the day long visit.

- Take a round in the operation of the plant and see whether the recommendations made in the EDD were implemented or not.
- Inspect all the machineries and equipment and their log-books.
- Inspect the quality of the bricks.
- Inspect the clay store depot and coal store depot as well as carrying conditions of clay and coal.
- Observe the noise from generator, dust generation from different processes, smoke emission from the chimney and the status of PPE usage.

- Observe overall environment management including solid & liquid wastes, sanitation facilities etc
- Observe landscaping & greening efforts

Consultation with Stakeholders

- Discussion with the sector specific team with Bangladesh Bank involved in the appraisal and loan processing of the sub project.
- Consultation with the owner/plant manager and staff and workers about the need and scope of safeguard
- Discussion with the neighbourhood people.

4. Current development status of the subproject

The plant continues with natural drying process and is operational with one kiln only. The installation of Dryer is near completion. During the visit, it was learnt that the dryer shall be in operation within 2 months. Current production per day is around 40,000 to 60000 bricks depending on the market. There is no boundary wall for the sub project area demarcation as yet and as such there is no landscaping or greening that has taken place.

5. Presentation of Post implementation monitoring findings *(Status of implementation of Environmental Compliances)*

In the post implementation audit report, some gaps were identified on few environmental aspects. In below table 5.1, the status of implementation has been depicted:

Table 5.1: Status of implementation of Environmental Compliances

Aspect	Issues	Comment/Suggestion made in the EDDR	Compliance Status	Reasons of inadequacy
A. Regulatory Compliance	a) NOC from Local administration b) Site Clearance from DoE c) Environmental Clearance Certificate (ECC) from Department of Environment (DoE) d) Brick Burning License from the Office of the	The sub-project meets the requirements of appropriate Bangladesh legislations in consideration of obligations and guidelines from Regulatory Authorities	Fully Complied	NA

Aspect	Issues	Comment/Suggestion made in the EDDR	Compliance Status	Reasons of inadequacy
	Deputy Commissioner			
B. Environment Management	a) Solid waste	i. solid waste to be segregated properly ii. waste clay, misshaped or broken under burnt or over burnt bricks to be sold to the traders	i. Partially Complied ii. Fully Complied	i. Segregation of solid waste is not properly done
	b) Noise & vibration	Adequate abatement measures for generator noise	Not Complied	PPEs are not provided
	c) Air pollution	a) High grade coal to be used b) Well planned water spraying system in dust pollution places	Partially complied	High grade coal is not used Adequate water spray is not done
C. On Site Environment Management	a) Coal transportation & grinding	Coal transportation to be made in covered truck. Unloading and coal grinding are to be carried out in closed shed	Fully complied	
	b) Clay transportation & storing	Clay transportation to be done in covered trucks and storing to be done in under shade	Not Complied	Clay transportation is done in open trucks and Storing is done in open shade
	c) Landscaping & greening	Create buffer zone and planting trees.	Fully Complied	NA
D. Occupational Health & Safety	a) Supply & use of PPE	Protective clothing, goggles, helmets, shoes and accessories to be adequately provided to the workers.	Not complied	Absence of PPEs

Aspect	Issues	Comment/Suggestion made in the EDDR	Compliance Status	Reasons of inadequacy
	b) Sanitation diseases hazard	Provision of drinking water, separate toilets for male and female workers	Fully complied	NA
	c) Dusts inhalation hazard	Strict enforcement on the use of PPE's including awareness raising	Not Complied	PPEs not provided by the management
	d) Accident risks in work place	Periodic drill and use of protective gears & clothing	Not Complied	The drills don't happen and workers are are not equipped with PPE, there are likely chances of accident
	e) Noise & vibration hazard	Adequate abatement measures for generator noise	Not complied	PPE not provided
E. Air Quality Monitoring	Measurement of emissions of particulate matters & flue gases (SPM, PM_{10}, $PM_{2.5,}$ CO, NO_X)	Develop a plan and arrangements for regular monitoring of air quality and occupational health issues	Not Complied	Emission tests have not been carried out.
F. Maintenance of Equipment	Regular maintenance and repair of kiln, dryer & equipment	Implementation of a schedule for regular maintenance and repair of kiln, dryer & equipment	Fully complied	NA
G. Institutional Arrangements	a) Deployment of adequate human resources	Recruitment of adequate human resources for brick kiln operation and EHS management	Partially complied	It has skilled technical hands, but overall management is poor. No supervisor is allocated against the tasks on environmental health and

Aspect	Issues	Comment/Suggestion made in the EDDR	Compliance Status	Reasons of inadequacy
				safety
	b)Deployment of financial resources for environment management and occupational health & safety (OHS)	Adequate financial resources for environment management and occupational health & safety (OHS)	Not Complied	Lack of interest regarding the need for occupational health & safety (OHS)
H. Employment and Business Opportunities	a) Local	Local employment and business to be promoted	Fully complied	NA
	b) National	To produce standard quality bricks	Fully complied	NA
I. Impact on Neighbourhood	a) Severance	Appropriate traffic management for the incoming and outgoing trucks	Fully complied	No complains from the neighbourhood
	b) Air pollution	Emission tests to be carried out	Not complied	Lack of interest and initiative interest to carry out tests

6. Corrective Action Plan

Corrective action plan for all the PARTIALLY COMLIED and NOT COMPLIED issues (listed in the above table 5.1) are suggested as follows:

Table 6.1: Correct Action Plan for different non-compliance environmental issues

Issues	Comment/Suggestion made in the EDDR	Reasons of inadequacy	Corrective Measures	Required committed time period
a)Solid waste	Solid waste to be segregated properly ii. waste clay, misshaped or broken under burnt or over burnt bricks to be sold to the traders	Segregation of solid waste is not properly done	Adopt 3r (Reduce, Reuse, Recycle) Principle	31st Dec 2016
b) Noise & vibration	Adequate abatement measures for generator noise	PPEs are not provided	Provide PPEs	Do
c)Air pollution	a) High grade coal to be used b) Well planned water spraying system in dust	a) It is not always available b) Adequate water spray is not	a) The management is to maximize it's	Do

Issues	Comment/Suggestion made in the EDDR	Reasons of inadequacy	Corrective Measures	Required committed time period
	pollution places	done	effort b)Implement adequate water spray in the dust generation place	
d) Clay transportation & storing	Clay transportation to be done in covered trucks and storing to be done in under shade	Clay transportation is done in open trucks and Storing is done in open shade	Transport Clay in covered trucks and store under the shade	Do
e)Supply & use of PPE	Protective clothing, goggles, helmets, shoes and accessories to be adequately provided to the workers.	PPEs not provide	Provide adequate PPEs. Develop a team to look after & enforce EHS measures	30 June 2017
f)Dusts inhalation hazard	Strict enforcement on the use of PPEs	Insufficient PPE's and lack of awareness	Develop a team to look after & enforce EHS measures	Do
g) Accident risks in work place	Preparedness drill to be done on a regular basis and PPEs are to be used	Drills don't take place and workers are not equipped with PPE,s	Develop a team to look after & enforce EHS measures	30 Dec 2016
h)Emission of particulate matters & flue gases (SPM, PM_{10}, $PM_{2.5,}$ CO, NO_X)	Develop a plan and arrangements for regular monitoring of air quality and occupational health issues	Emissions tests have not been carried out	To make arrangements with DoE for conducting tests.	30 June 2017
i)Deployment of adequate human resources	Deployment of adequate human resources for brick kiln operation and EHS management	It has skill technical hands, but overall management is poor. No supervisor is	Dedicate one officer or a supervisor for EHS management	Do

Issues	Comment/Suggestion made in the EDDR	Reasons of inadequacy	Corrective Measures	Required committed time period
		allocated against the tasks on environmental health and safety		
j)Deployment of financial resources for environment management and occupational health & safety (OHS)	Adequate financial resources for environment management and occupational health & safety (OHS)	Lack of commitment and interest to spend money on occupational health & safety (OHS) and environment management	The management is to be compelled to allocate financial resources	Do

7 Conclusions

The sub-project is in full regulatory compliance. However, in terms of environment management and OHS management it is in bad shape. Workers have been observed to work barefoot and without PPE's. All the non compliance issues have been recorded and a time bound Correction Action Plan is provided to improve the overall environmental performances.

Pictures Taken during Site Visit

Sun drying of Green Bricks

Dried Bricks transported to Brick Kiln for Firing

Brick Kiln

Top of Brick kiln showing holes for coal feeding

Front Gate with security Guard