Environmental Monitoring Report

Semestral Report
August 2016

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

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.

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Post Implementation Environmental Monitoring Report
Tradexcel Auto Bricks Limited
Angutia, Mirzapur, Gazipur

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ADB Environment Consultant
Under TA 8197
Dhaka August, 2016
Table of Content

Chapter Name                                                                 | Page No |
---                                                                         |---------|
1.  Project Background                                                     | 01      |
    1.1 Purpose & objective                                                | 02      |
2.   General Information of the Sub-Project                                | 02      |
    2.1 Subproject process description                                   | 03      |
    2.2 Subproject legal requirement                                      | 04      |
3.   Methodology & Approach for Post Implementation Monitoring            | 05      |
    3.1 Review of all legal & technical documents                         | 05      |
    3.2 Site visit/ inspection & consultation                             | 05      |
4.   Current development status of the subproject                          | 06      |
5.   Presentation of Post Implementation Monitoring findings (Status of implementation of environmental compliances) | 07      |
6.   Corrective Action Plan                                               | 09      |
7.   Conclusion                                                           | 11      |

Attachments

1. Pictures taken during site visit                                       | 12      |
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>DOE</td>
<td>Department of Environment</td>
</tr>
<tr>
<td>EC</td>
<td>Environmental Clearances (EC)</td>
</tr>
<tr>
<td>EDD</td>
<td>Environmental Due Diligence</td>
</tr>
<tr>
<td>EMP</td>
<td>Environmental Management Plan</td>
</tr>
<tr>
<td>FCK</td>
<td>Fixed Chimney Kiln</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GOB</td>
<td>Government of Bangladesh</td>
</tr>
<tr>
<td>HHK</td>
<td>Hybrid Hoffman Kiln</td>
</tr>
<tr>
<td>HSBK</td>
<td>Horizontal Shaft Brick Kiln</td>
</tr>
<tr>
<td>IFCK</td>
<td>Improved Fixed Chimney Kiln</td>
</tr>
<tr>
<td>IZZK</td>
<td>Improved Zig Zag Kiln</td>
</tr>
<tr>
<td>OSH</td>
<td>Occupational Safety &amp; Health</td>
</tr>
<tr>
<td>PFI</td>
<td>Participating Financial Intermediary</td>
</tr>
<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
</tr>
<tr>
<td>TK</td>
<td>Tunnel Kiln</td>
</tr>
<tr>
<td>VSBK</td>
<td>Vertical Shaft Brick Kiln</td>
</tr>
</tbody>
</table>
1: Project Background

Brick kilns are major sources of greenhouse gas in Bangladesh, emitting annually 6 to 9 million tons of CO₂. 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 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, IZZK, 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.

Tradexcel 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 Tradexcel Auto Bricks Ltd subproject and to suggest a corrective action plan against non-compliant issues.

2. General Information of the Sub-Project

Tradexcel Auto Bricks Limited, situated at Mouza: Angutia, Upazila: Gazipur Sadar, District: Gazipur, Bangladesh.

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

Table 2.1: General Information on Tradexcel Auto Bricks Ltd.

<table>
<thead>
<tr>
<th>1. Name of the Company</th>
<th>Tradexcel Auto Bricks Limited</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Name of the entrepreneur</td>
<td>Rezwan Rahman</td>
</tr>
<tr>
<td>3. Contact Address</td>
<td>Green Square (4th Floor), House # 1/B, Road # 8, Gulshan -1, Dhaka-1212, Bangladesh</td>
</tr>
<tr>
<td>4. Name of the Brick Kiln</td>
<td>Tradexcel Auto Bricks Limited</td>
</tr>
<tr>
<td>4.1 Trial Production Date</td>
<td>March 2016</td>
</tr>
</tbody>
</table>
4.2 Start of Commercial Production 20th May 2016

5. Type of the Brick Kiln
5.1 Rated Capacity Production (Daily) Tunnel Kiln (TK)
5.2 Current Production (Daily) 80,000

6. Project Investment 70 Crore

7. Location Address of the Brick Kiln Angutia, Mirzapur, Gazipur

8. Current office address Green Square (4th Floor), House # 1/B, Road # 8, Gulshan-1, Dhaka-1212, Bangladesh

9. Telephone/Fax Tel:+88028833180 Fax: +88028833104

10. E-mail rr@tgl.com.bd

2.1 Subproject Process Description

The project design combines a highly efficient kiln technology, the Tunnel Kiln (TK) with a unique technique of forming green bricks: powdered coal is injected for internal combustion. This approach results in lower energy usage, higher quality bricks and reduced air pollution. Bricks of any size, shape (including perforated and hollow brick) 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 80,000 bricks of size 240 mm x 120 mm x 70 mm daily. The main features are as follows: 95% 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) mostly shall be collected from digged ponds and river beds.

Tunnel Kilns are most common in developed countries, since their intervention tunnel kilns have now become highly automated and are for large brick production, but unlike the Hybrid Hoffman Kiln, 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. Clay is premixed with powdered coal and then extruded to produce the green bricks. This is a unique process and fundamental to the energy efficiency. Almost 98% of the total energy required is injected into the bricks and only about
2% is fed externally into the firing chamber to assist firing in the kiln. Most of the fuel mixed into the bricks, over 95%, of which is completely burnt during firing.

For the production process, the clay is excavated by hydraulic excavator or by hand from nearby river beds, pond digging 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. The green brick is set on drying cart by manual loading for drying.

The green bricks are then manually loaded on to the drying cart which is then transported into the drying tunnel by means of a hydraulic pusher. Hot air for drying is funneled into the tunnel from the tunnel kiln. The drying cycle is about 26 hours.

The dried green bricks are unloaded manually into the Tunnel kiln. The speed of the firing is 1.25m/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 22.6.2016. 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 report 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 neighbouring people.

4. Current development status of the subproject

Entire construction work including installation of kiln & dryer have been completed. It’s now a full operational plant with an efficient management team. Commercial production has started since May-2016). It has a total strength of staff & workers about 175. Management of the subproject is providing accommodation facilities (built & rented) to most of its key staff & workers. It has reached to its rated capacity (according to the management) within this short period and the quality of the bricks appears excellent.

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

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Issues</th>
<th>Comment/Suggestion made in the EDDR</th>
<th>Compliance Status</th>
<th>Reasons of inadequacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Regulatory Compliance</td>
<td>a) NOC from Local administration</td>
<td>The sub-project meets the requirements of appropriate Bangladesh legislations in consideration of obligations and guidelines from Regulatory Authorities</td>
<td>Fully Complied</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>b) Site Clearance from DoE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) Environmental Clearance Certificate (ECC) from Department of Environment (DoE)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>d) Brick Burning License from the Office of the Deputy Commissioner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aspect</td>
<td>Issues</td>
<td>Comment/Suggestion made in the EDDR</td>
<td>Compliance Status</td>
<td>Reasons of inadequacy</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>-------------------------------------</td>
<td>-------------------</td>
<td>-----------------------</td>
</tr>
</tbody>
</table>
| **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 | Fully Complied | NA |
| | b) Noise & vibration | Adequate abatement measures for generator noise | Fully Complied | NA |
| | c) Air pollution | a) High grade coal to be used  
b) Well planned water spraying system in dust pollution places | a. Fully Complied  
b. Partially complied | Adequate water spray is not done |
<p>| <strong>C. On Site Environment Management</strong> | a) Coal transportation &amp; 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 &amp; 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 &amp; greening | Create buffer zone and planting trees. | Fully complied | |
| <strong>D. Occupational Health &amp; Safety</strong> | a) Supply &amp; use of PPE | Protective clothing, goggles, helmets, shoes and accessories to be adequately provided to the workers. | Partially complied | There are supplies of PPE. But, it is rarely used. No enforcement from the authority |
| | b) Sanitation diseases hazard | Provision of drinking water, separate toilets for male and female workers | Fully complied | NA |</p>
<table>
<thead>
<tr>
<th>Aspect</th>
<th>Issues</th>
<th>Comment/Suggestion made in the EDDR</th>
<th>Compliance Status</th>
<th>Reasons of inadequacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>c)</td>
<td>Dusts inhalation hazard</td>
<td>Strict enforcement on the use of PPE’s including awareness raising</td>
<td>Not Complied</td>
<td>Lack of enforcement from the authority</td>
</tr>
<tr>
<td>d)</td>
<td>Accident risks in work place</td>
<td>Periodic drill and use of protective gears &amp; clothing</td>
<td>Not Complied</td>
<td>The drills don’t happen and workers are not equipped with PPE, there are likely chances of accident</td>
</tr>
<tr>
<td>e)</td>
<td>Noise &amp; vibration hazard</td>
<td>Adequate abatement measures for generator noise</td>
<td>Fully complied</td>
<td>NA</td>
</tr>
</tbody>
</table>

**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

There is no facility available to them for the purpose

**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

Fully complied

**H. Employment**

a) Local

Local employment

Fully

NA
6. Corrective Action Plan

Corrective action plan for all the PARTIALLY COMPLIED 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

<table>
<thead>
<tr>
<th>Issues</th>
<th>Comment/Suggestion made in the EDDR</th>
<th>Reasons of inadequacy</th>
<th>Corrective Measures</th>
<th>Required committed time period</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Air pollution</td>
<td>a) Well planned water spraying system in dust pollution places</td>
<td>a) Adequate water spray is not done</td>
<td>a) Implement adequate water spray in the dust generation place / The problem of dust emission in the production process are to be tackled through installing appropriate air treatment plant (ATP)</td>
<td>30 Dec 2016</td>
</tr>
<tr>
<td>b) Clay transportation &amp; storing</td>
<td>Clay transportation to be done in covered trucks and storing to be done in under shade</td>
<td>Clay transportation is done in open trucks and Storing</td>
<td>Transport Clay in covered trucks and Storing</td>
<td>Do</td>
</tr>
<tr>
<td>Issues</td>
<td>Comment/Suggestion made in the EDDR</td>
<td>Reasons of inadequacy</td>
<td>Corrective Measures</td>
<td>Required committed time period</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------------</td>
<td>------------------------</td>
<td>---------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>is done in open shade</td>
<td>store under the shade</td>
<td></td>
</tr>
<tr>
<td>c) Supply &amp; use of PPE</td>
<td>Protective clothing, goggles, helmets, shoes and accessories to be adequately provided to the workers.</td>
<td>There are supplies of PPE. But, it is rarely used. No enforcement from the authority</td>
<td>Develop a team to look after &amp; enforce EHS measures</td>
<td>Do</td>
</tr>
<tr>
<td>d) Dusts inhalation hazard</td>
<td>Strict enforcement on the use of PPEs</td>
<td>There are supplies of PPE. But, it is rarely used. No enforcement from the authority</td>
<td>Develop a team to look after &amp; enforce EHS measures</td>
<td>Do</td>
</tr>
<tr>
<td>e) Accident risks in work place</td>
<td>Preparedness drill to be done on a regular basis and PPEs are to be used</td>
<td>Drills don’t take place and workers are not equipped with PPEs</td>
<td>Develop a team to look after &amp; enforce EHS measures</td>
<td>Do</td>
</tr>
<tr>
<td>f) Emission of particulate matters &amp; flue gases (SPM, PM&lt;sub&gt;10&lt;/sub&gt;, PM&lt;sub&gt;2.5&lt;/sub&gt;, CO, NO&lt;sub&gt;X&lt;/sub&gt;)</td>
<td>Develop a plan and arrangements for regular monitoring of air quality and occupational health issues</td>
<td>Emissions tests have not been carried out.</td>
<td>Conduct environmental monitoring according to EDDR’s EMP</td>
<td>30 June 2017</td>
</tr>
</tbody>
</table>

7. Conclusions

The sub-project is in full regulatory compliance. The emission level through the exhausts of the sub-project has been observed to be minimal. It is expected to meet the regulatory standard limit. It is also doing fairly good in terms of overall environmental management and occupational health & safety (OHS). Suggested EMP & OHS plans are in the process of implementation. However, suggested air quality monitoring plan is yet to be taken care of.
Sub-project in pictures during site visit

Security Guard at the front gate
Tradexcel Auto Bricks Limited
Angutia, Mirzapur, Gazipur

- Dryer for the green bricks
- Green Bricks entrance and exit in Dryer by mechanical control panel
- Manual Stacking of Dried Bricks for firing
- Automatic coal feeding in the Kiln
Snap shot of table and curve of tunnel kiln temperature (firing tunnel) from the control room
Tradexcel Auto Bricks Limited
Angutia, Mirzapur, Gazipur

- Hollow Brick stack
- Fire extinguisher mounted on the wall
- Proper guard rail for the operator working at height
Discussion with the entrepreneur during the site visit