

FACT SHEET

Brick sector in Bangladesh



Sector overview

Number of brick kilns (2017 & 2019)	7,000 ¹ –7,200 ²
Annual brick production ³ (2017 & 2019)	23 billion ⁴ bricks to >32.4 billion ⁵ bricks (more than 90% bricks produced in FCK)
Annual domestic consumption	100% bricks
Annual brick demand (2017)	Estimated growth of 2–3 percent ⁶ annually for the next ten years
Animals utilized	Not available
Number employed (2017)	>1 million people ⁷
Men employed	85% men
Women employed (2014)	15% women ⁸
Admin and others	6% ⁹ of total employed
Moulding	49% of total employed
GB transport	25% of total employed
Firing	13% of total employed
Fired brick transport	7% of total employed
Sector investment (2017 & 2019)	BDT 47.96 billion (USD 575.5 million) ¹⁰
Value of sales (2017)	BDT 210.82 billion ¹¹ (USD 2.53 billion)
GDP contribution	1 % ¹²
Tax contribution	Not available
Coal consumption for firing bricks per annum	5.68 million ¹³ tonnes (2017) 3.65 million ¹⁴ tonnes (2019)
Annual coal expenses	BDT 70 billion ¹⁵ (USD 840 million) ¹⁶ BTK 45.6 billion ¹⁷ (USD 547.26 million) ¹⁸
Estimated consumption of other fuels (natural gas, sawdust, bagasse, rice husk, firewood) and annual expenses	1.9 million tonnes of wood worth BDT 19 billion ¹⁹ (228.01 million USD) ²⁰ Natural gas – Not available
Annual clay consumption	3350 million cubic feet
Annual CO ₂ emission	15.67 million tonnes
Annual SPM emission	

¹National Strategy for Sustainable Brick Production in Bangladesh, Department of Environment, Ministry of Environment and Forest, Government of the People's Republic of Bangladesh, May 2017.

²About 80% of the bricks are produced by the indigenous Fixed Chimney Bull's Trench Kilns (FCBTK).

Calculation provided by Bangladesh brick sector experts

³Brick production is confined to the dry season, which lasts 5–6 months

⁴National Strategy for Sustainable Brick Production in Bangladesh.

⁵Sector experts estimate that since a FCK would produce 4.5 million bricks in a season, 7200 FCKs would produce (4.5 x 7200) million = 32.4 billion bricks in a season

⁶National Strategy for Sustainable Brick Production in Bangladesh. Based on the growth rate of 5–6 % in the previous decade.

⁷National Strategy for Sustainable Brick Production in Bangladesh.

⁸UNDP 2014, Gender in Focus: Piloting Gender Support in Energy Efficient Brick Kilns.

⁹Since the technology and working practices are similar across the South Asian countries, this % has been derived from Nepal and data for Nepal has been derived from interviews with brick entrepreneurs in 2019.

¹⁰Exchange rate of USD 1 = BDT 83.33 on 4 April 2018. Calculated based on kiln number from table 2.2 of the National Strategy for Sustainable Brick Production in Bangladesh Investment per unit is based on "Introducing Energy-efficient Clean Technologies in the Brick Sector of Bangladesh", June 2011, World Bank. Investment for tunnel kiln is not included in the sector investment.

¹¹USD 2.53 billion value is taken from the National Strategy for Sustainable Brick Production in Bangladesh; BDT value is calculated using the conversion rate of USD 1 = BDT 83.33.

¹²National Strategy for Sustainable Brick Production in Bangladesh.

¹³National Strategy for Sustainable Brick Production in Bangladesh.

¹⁴Calculated based on data provided by the expert (new specific energy consumption and CV).

¹⁵Calculated by country sector experts and USD 840 is derived from the exchange rate of 1 USD = 83.33 BDT.

¹⁶Coal price @ BDT 12,500 per tonne.

¹⁷Calculated from new coal consumption and coal price given by the expert.

¹⁸Health hazards of child labour in brick kilns of Bangladesh, International Labour Organization, 2014.

¹⁹Calculated based on the Dhaka market price of BDT 10,000 per tonnes of wood.

²⁰<http://www.devpolicy.org/greening-the-brick-industry-in-bangladesh-opportunities-for-south-south-cooperation-20150818/>



Spatial distribution

- Bangladesh is the fourth largest brick producer in the world.
- The brick kilns are situated in all of the seven divisions of the country and in almost every district. Most are concentrated in the Greater Dhaka Region and particularly in Gabtali, Savar, Ashuliya, Keraniganj, Narshingdi, Gazipur and Manikganj, Barisal, Chittagong, Khulna, Rangpur, Rajshahi, Sylhet.
- Land requirement for FCBTK or a zig-zag kiln is about 2.5 acres whereas a Hoffman or tunnel kiln requires about 10 acres because of its greater production capacity. The major portion of the land requirement is for forming and drying. There are restrictions on operations of industries in areas declared ecologically critical, as per the Environment Conservation Act (ECA) 1995.

Policy overview

EXISTING POLICIES

- Bangladesh Environment Conservation Act (ECA), 1995
- Environment Conservation Rules (ECR), 1997
- National Land Use Policy, 2001
- Ecologically Critical Area Management Rules, 2016
- Bangladesh Labour Act, 2013
- Labour Law, 2006 (Clause 3 prohibits child labour)
- Industrial Relations Ordinance 2002
- Factory Act, 1934
- National Environmental Quality Standards 2000 not be allowed.

BRICK KILN SPECIFIC POLICIES

- Brick Kiln Policy, 2008
- Brick Manufacturing and Brick Kiln Establishment



Technology

Technology	Emission standards mg/Nm ³	Number	Energy consumption (tonnes) ²¹	Number employed ²²
FCBTK (natural and forced/induced draft) ²³	1000	2373	1.49 million	474,600
Zigzag FCBTK (natural draft)		4247	2.16 million	
Zigzag FCBTK (forced/induced draft)				
Tunnel kiln		58	0.22 million	
Hybrid Hoffmann Kiln (HHK)		61	0.221 million	
Hoffmann kiln				
Others		5		

Emissions and the environment

- Emissions from FCKs and zig-zag kilns were significant in CO, SO₂ and SPM, although zig-zag kilns produce fewer emissions than FCKs. In producing 100,000 bricks, an FCK releases 3996 kg of SO₂, 2971 kg of CO, 1190 kg of SPM into the atmosphere.
- The total emissions from the brick kilns in the Greater Dhaka region has been estimated at 53,333

tonnes of PM₁₀; 17,557 tonnes of PM_{2.5} and 59,221 tonnes of SO_x, contributing approx. 91% and 84% of total annual PM₁₀ and PM_{2.5} respectively. The airborne particulates and associated trace metals have been associated with both acute and chronic adverse health effects, mainly respiratory disease, lung cancer, heart disease, and damage to other organs.²⁴ Various gaseous and particulate pollutants from brick kilns show negative impacts on the adjacent vegetation and have direct and indirect effects on agriculture.

²¹Calculated based on Table 2.2 of the report on National Strategy for Sustainable Brick Production in Bangladesh, 2017.⁸Rahman et al, 2012, Status of Occupational Health and Safety in Brick Kiln Industries at Hatter Industrial Estate Haripur, Pakistan, https://www.scientificjournals.co.uk/web_documents/4010209_health_safety_brick_industries.pdf

²²Assuming average 300 workers per kiln taken from “Particulate pollution from brick kiln clusters in the Greater Dhaka region, Bangladesh,” Sarath K. Guttikunda & Bilkis A. Begum & Zia Wadud, 2012.

²³Despite being Banned in September 2010, many FCBTKs are still operating.

²⁴Prieditis H, Adamson IYR. (2002). Comparative pulmonary toxicity of various soluble metals found in urban particulate dusts. Exp. Lung Res. 28: 563-576



Labour and working conditions

- Migrant labourers, mainly from areas in northern Bangladesh such as Khulan, Bagerhat, Shatkhira, and Jessore work in kilns around cities while local labourers are employed in rural areas.
- There is a prevalence of child labour. About 32.90% (n = 160) children were found to have started working in brick kilns between the ages of 8 and 10 years.²⁹ Despite this, there are no clauses regarding child labour in the Brick Manufacturing and Brick Kiln Establishment (Control) Act, 2013.
- The Bangladesh Labour Act, 2013 deals with relations between workers and employers, determination of minimum wages, payment of wages and compensation for injuries to workers, formation of trade unions, raising and settlement of industrial disputes, health, workplace safety, welfare and working conditions of workers, and apprenticeship.

Industry promotion, monitoring and enforcement

- Levels of emissions attributed to brick kilns in Dhaka appear to be fluctuating. A 2017 report indicated that 58% of pollution (PM_{2.5}) in Dhaka's air is due to 1200 brick kilns in the vicinity.²⁵ In 2015, 38% of particulate matter pollution was attributed to brick kilns.²⁶ A study in 2013 traced 40% of fine particle matter pollution to brick kilns and estimated that this causes 5,000 premature deaths annually.²⁷
- The emission standard for particulate matter from brick kilns was set at 1000 mg/Nm³ in 2002.
- The government's directive of 2002 allows a maximum chimney height of 37 m.²⁸
- Modern technology brick kilns are mandated to produce at least 50% hollow bricks.
- There are prescribed standards for coal regarding sulphur, mercury and ash contents.
- Environmental jurisdiction: Mandatory IEE for location clearance. Environmental Clearance Certification is required from the Department of Environment to set up brick factories.
- The sector is categorized under small and medium enterprises (SME).
- Registration and jurisdiction: To register and operate a brick kiln, one needs to obtain a mandatory environmental clearance certificate and then apply for a license from the District Commission Office. A license is mandatory for operating kilns/firing bricks.
- As mandated, the Department of Environment (DOE) conducts compliance monitoring to enforce laws and rules in accordance with the ECA and ECR, e.g., checking of environmental clearance certificates and environmental quality standards. The DOE has carried out enforcement drives and imposed penalties/compensation from polluting, non-conforming enterprises as well as taken action against illegal brick kilns (operating without ECC and licenses) under the Mobile Court Act.
- Representative bodies: Bangladesh Brick Making Owners Association (BBMOA) with 4000 members.

²⁵http://youthenvop.weebly.com/youth-blog/brick-sector-of-bangladesh-development-associated-with-concerns-dabaraj-dey-journals.co.uk/web_documents/4010209_health_safety__brick_industries.pdf

²⁶<http://www.devpolicy.org/greening-the-brick-industry-in-bangladesh-opportunities-for-south-south-cooperation-20150818/>

²⁷UrbanEmissions.info "Impact Analysis of Brick Kilns on the Air Quality in Dhaka, Bangladesh Update: November 2013.

²⁸<https://cdn.cseindia.org/docs/photogallery/slideshows/TP-cleaner-brick-production-20171211-15-Overview-of-Brick-Kiln-Sector-Environmental-issues-Nivit-Kuma.pdf>

²⁹Health hazards of child labour in brick kilns of Bangladesh, International Labour Organization, 2014



Good practices

Technology

- As of February 2017, 4,227 out of the 6,646 brick kilns had been converted into 4,108 zig-zag or improved zigzag; the remaining kilns are HHK and tunnel kilns.³⁰
- These changes are attributed to financing schemes made available through banks and financial institutions facilitated by different projects, e.g., ADB, UNDP and World Bank.

Industry promotion, monitoring, and enforcement

- With the ADB's support, in September 2012 Bangladesh Bank introduced refinanced loan schemes worth USD 50 million through banks and financial institutions (including the state-run Infrastructure Development Company Ltd)³¹ to encourage environment-friendly and environment-friendly brick production. This has increased the pace of investment in modern and automatic tunnel kilns.

- A key rule under the new regulations is that traditional brick kilns have to be replaced by tunnel kilns, improved zig-zag kilns, or hybrid Hoffman kilns. The Environment Ministry has taken action against brick kilns that have not followed new regulations. News published in 2016 quoting the Environment Ministry states that “seven brickfields have been demolished in the Khulna area. Environmental mobile courts [are] operating in Barisal and Patuakhali.”

Labour and working conditions

- The new tunnel and hybrid Hoffman kiln technologies allow for better working conditions and promote women's employment.

Issues and opportunities

Technology

- Policies (along with financing opportunities) promoting conversion of all the remaining 2373 FCBTKs to zigzag technology can potentially reduce 591,933 tonnes of CO₂, substantial volumes of dust

³⁰<https://www.thedailystar.net/business/eco-friendly-brick-kilns-growing-numbers-1383931>

³¹<https://www.thedailystar.net/business/eco-friendly-brick-kilns-growing-numbers-1383931>

³²Estimated based on “Particulate pollution from brick kiln clusters in the Greater Dhaka region, Bangladesh,” Sarath K. Guttikunda & Bilkis A. Begum & Zia Wadud, 2012.

³³Exchange rate of USD 1 = BDT 83.33 on 4 April 2018.

particles (SPM),³² and save 240,135 tonnes of coal valued at BDT 3 billion (USD 36 million)³³ annually.

- Transitioning to Improved zigzag kiln (IZK) has many positive effects on the environment, economy and the social life of workers. The relatively low investment required for transformation makes IZK affordable for small and medium kiln enterprises while tunnel and hybrid Hoffmann (HHK) will be suitable for large-scale enterprises. Technologies such as VSBK, tunnel and HHKs can make year-round operations possible, contributing to modernization of the sector.
- Technology switch, changes in firing practices, use of good quality coal and utilizing resource-efficient bricks (e.g., hollow/perforated bricks, use of internal fuels such as boiler, fly ash, etc.) are major strategies that can be adopted to improve energy efficiency as well as reduce harmful emissions.

Emissions and the environment

- Technology-based standards enable industry regulation, but operating practices largely determine environmental performance. Establishment of uniform emission-based standards for permitted technologies would help enforce standards.
- Long-term and time-bound emission reduction plans can pave the way for smooth technology transformation without posing investment risks.
- A systematic mapping of clay resources allows for sustainable use of clay, resulting in better quality bricks and less competition with agriculture.

Labour and working conditions

- Although there is a law specific to brick kilns, it does not have a clause regarding child labour³⁴ despite brick kilns being listed in an ILO study on hazardous child labour in Bangladesh. A clause on child labour can be included in the Act related to brick kilns.
- Adolescents can be provided with skill-based high school education to help limit employment of child workers, address unemployment and skilled labour shortages.
- Introduction of selective mechanization (e.g., heavy work of moulding, transportation, loading and unloading) in the brick industry will help keep the jobs, reduce drudgery and hazards, and produce quality bricks.
- Enforce mitigation measures to ensure a safer

working environment and reduce workplace hazards and risks such as first aid box, insurance coverage, drinking water facilities, occupational health and safety training and reporting mechanism.

Industry promotion, monitoring and enforcement

- Prepare guidelines and tools and make them available, and provide field-based technical assistance to boost the confidence of brick makers and help ensure a smooth transitioning process. Training on the entire brick production cycle at various levels, e.g., technical training for the workforce, production management training for supervisors and business management training for owners, will aid the transformation.
- Capacity building of regulatory authorities along with availability of necessary equipment for emission measurement, environment monitoring, clay resource management etc. will enhance effectiveness in enforcement.
- Establish brick information services in order to facilitate the decision-making process for government authorities as well as brick kiln owners
- Research and development facilities should be developed in relevant research organizations, e.g. Housing and Building Research Institute.
- Policies and strategies to promote resource efficient bricks, e.g., hollow and perforated bricks should be developed and enforced.
- Ensuring that the brick kilns transition from seasonal and intermittent production to industrial brick production with continuous brick-firing kilns and year-round production can usher a cleaner brick industry as well as contribute to the industrialization of the sector.
- Create an enabling environment through institutional anchoring, scaling up and dissemination of solutions, techniques and programmes.
- A platform of major stakeholders (brick kiln owners including small-scale producers and government) for exchange and cooperation can help facilitate an effective transformation process for sustainable brick making, as it cannot entirely be left to individual decisions of small-scale producers.
- Improve access to commercial financing through linkages, risk sharing mechanisms for credit lending, financial packages for banks and low interest with revolving funds.

³⁴Health hazards of child labour in brick kilns of Bangladesh, International Labour Organization, 2014

SUPPORTED BY



IN COLLABORATION WITH



ICIMOD gratefully acknowledges the support of its core donors: the Governments of Afghanistan, Australia, Austria, Bangladesh, Bhutan, China, India, Myanmar, Nepal, Norway, Pakistan, Sweden, and Switzerland.