

FACT SHEET

Burnt clay brick sector in India



Sector overview¹

Number of brick kilns (2017)	140,000–210,000 brick kilns
Annual brick production (2017)	260 billion bricks
Annual domestic consumption	100% bricks
Annual brick demand ² (2017)	200–250 billion bricks. Expected to increase to 778 billion bricks per year during the period of 2032–37 with rural–urban demand ratio of 30:70
Animals utilized (2017)	380,000 animals
Number employed (2017)	10 million people
Men employed	75–84% men
Women employed	16–25% women
Admin and others	6% 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 (2014)	USD 1.92 billion–3.06 billion
Value of sales (2017)	INR 100,000 crore (annual turnover)/USD 14.29 billion ³
GDP contribution (2017)	2%
Tax contribution (2017)	INR 200 crore (USD 28.57 million) in Uttar Pradesh INR 2000–3000 crore/year
Coal consumption for firing bricks per annum (2017)	29–35 million tonnes ⁴
Annual coal expenses	INR 232–280 billion (USD 3.31 to 3.99 billion) ⁵
Estimated consumption of other fuels (sawdust, agriculture residue, rice husk, firewood) and annual expenses (2017)	12–16 million tonnes of biomass; USD 518–691 million
Annual clay consumption (2017)	700–750 million tonnes
Annual CO ₂ emission (2017)	60–65 million tonnes

Spatial distribution

Kiln type	Regional spread	Approximate contribution in burnt clay brick production
Clamp kilns	Central, West, and Southern India	28,000–35,000
Fixed Chimney Bull's Trench Kilns (FCBTK)	Indo-Gangetic plains (North and East India) and several clusters in South and West India	98,000 (70%)
Zigzag kilns	West Bengal, Bihar, National Capital Region, Haryana, Punjab	8,000–9,000
VSBK, Hoffman kilns, DDK, tunnel kilns, etc.	Central and South India	4,200–5,600 (3–4%)

¹Data for 2017 are taken from the strategy paper titled "Resource Efficient Burnt-Clay Bricks in India", prepared and submitted to ICIMOD by Greentech Knowledge Solutions Pvt. Ltd, New Delhi.

³Exchange rate of INR 70 to USD 1 on 31 March 2019.

⁴Data do not cover the additional number of brick kilns reported in 2019 in the table below under the heading "Technology".

⁵Coal price is assumed to be USD 114 per tonne.



Policy overview

EXISTING POLICIES

- Forest Conservation Act, 1980
- Water (Prevention and Control of Pollution) Act, 1974
- Air (Prevention and Control Pollution) Act, 1981
- Mines and Minerals (Development and Regulation) Act, 1957
- Interstate Migrant Workmen Act, 1979
- Child Labour (Prohibition and Abolition) Act, 1986
- Contract Labour (Regulation and Abolition) Act, 1970
- Minimum Wages Act, 1948
- Employees' State Insurance Act, 1948
- Maternity Benefit Act,
- Workmen's Compensation Act, 1923
- Factories Act, 1948
- Employees Provident Funds Act, 1952
- Regulation for Fly Ash Utilisation, 2016
- Bonded Labour System Abolition Act, 1976

POLICIES SPECIFIC TO THE BRICK SECTOR

- Standards on Emission and Stack Heights for Brick Kilns, 2009

POLICIES IN THE PIPELINE:

- Uniform particulate matter emission standards – 250 mg/Nm³ – for all the main brick kiln technologies
- Revision of the Regulation for Fly Ash Utilisation (1999)
- State/region specific regulations for mandatory conversion to cleaner brick kiln technologies (e.g., Bihar, Punjab, NCR)



Technology

Technology	National standard – 2009 ⁶ (mg/Nm ³)	Number ⁷	Energy consumption (tonnes) ⁸	Number employed
FCBTK (production capacity < 15,000 bricks/day)	1,000	35,000	31,840,247.13	Data disaggregated by technology is not available
Zigzag FCBTK (natural draft)	750	1,000	701,677	
Zigzag FCBTK (forced/induced draft)		7,000	4,772,727	
VSBK	250	110	31,774.05	
Hoffmann		500	360,105.91	
HHK				
Tunnel kiln		5	14,827.89	
Clamps		100,000	13,901,147.40	
DDK	1,200	300	94,368.93	

⁶Total PM emission limit (mg/Nm³ measured at stack port); exchange rate of INR 70 to USD 1 as on 31 March 2019

⁷Factsheet about Brick Kilns in South and Southeast Asia, Greentech Knowledge Solutions Pvt. Ltd., March 2014. Data for zigzag natural draft and induced draft is from 2019 and was provided by national brick sector experts.

⁸Ibid; calculated with the assumption that average brick weight is 3 kg and average CV of coal is 5,500 kcal/kg.

Emissions and the environment

- India is the second largest producer of bricks after China.
- The Global Burden of Disease report says outdoor air pollution was the reason for 627,000 premature deaths in India in 2010. More than 1,000 brick kilns around Delhi are considered to be significant contributors (10% of total air pollution)⁹ in Delhi/ National Capital Region (NCR) region.¹⁰ Black carbon emissions from brick kilns in India are estimated to be over 1,00,000 tonnes/year.¹¹
- Jurisdiction: The Ministry of Environment, Forest and Climate Change sets emission standards and issues directives on clay mining.
- Based on the acts, the state government sets the criteria for land use. For example, the Government of Orissa prohibits the operation of kilns on agricultural land and forestland and allows construction of kilns only at a certain minimum distance from highways, village settlements, and towns, with at least 1 km distance between two kilns.
- Based on directives from the Central Pollution Control Board, State Pollution Control Boards regulate kilns, e.g., establishment, operation and closing of unauthorized kilns, shifting of technologies, mining leases of minor materials (clay), and annual renewal of the No Objection Certificate (NOC).
- The District Level Expert Appraisal Committee (DEAC) and District Level Environment Impact Assessment Authority (DEIAA) appraise and grant environmental clearances for Category "B2" projects for mining of clay with restrictions on the depth and distance between mining sites.

Labour and working conditions

- In India, there are about 44 central labour laws and 200 state laws (Datta & Sil, 2007) governing every aspect of labour. The Contract Labour (Regulation and Abolition) Act 1970 is directly applicable to contract workers and governs the contract labour system.¹²

- Accompanied and unaccompanied child labour and bonded labour is prevalent in India. Around 1.7 million children are engaged informally as labourers.¹³ And 65–80% of children aged 5–14 years were found to be working.¹⁴ Employment of children below 14 years is prohibited. Adolescents aged 14–18 years cannot be employed in any hazardous occupation.

Industry promotion, monitoring, and enforcement

- Unorganized sector and under the “small scale industry” category
- Jurisdiction: The Ministry Of Micro, Small and Medium Enterprises at the centre; Directorate of Industries (Department of Industries) at the state level
- Every state in India has an industrial promotion policy that outlines the priority sectors for industrial development, providing subsidies and incentives in these sectors.¹⁵
- Representative bodies – State, district, and cluster-level brick kiln owners associations; All India Brick and Tiles Manufacturers Association; Brick Workers’ Cooperative Societies under the Micro, Small and Medium Enterprises Department in Tamil Nadu

Good practices

Technology

As per directives of the Central Pollution Control Board (CPCB), State Pollution Control Boards (e.g., Haryana, Uttar Pradesh, Rajasthan, Uttarakhand, Punjab), issued the following notifications:

- Convert existing FCBTK brick kilns to zig-zag kilns.
- The Environmental Pollution (Prevention and Control) Authority for NCR (EPCA), has called for all 4,000 brick kilns in the Delhi–NCR to shift to “zigzag setting”.

⁹<https://www.downtoearth.org.in/news/brick-kilns-major-source-of-air-pollution-in-south-asia-48956>

¹⁰S.K. Guttikunda and G. Calori. (2013). A GIS based emission inventory at 1 km x 1 km spatial resolution for air pollution analysis in Delhi, India, *Atmospheric Environment* 67, pp. 101–111.

¹¹Cheryl Weyant et al. (2014). Emissions from South Asian brick production, *Environ. Sci. Technol.* 48 (11), pp. 6477–6483

¹²Pankaj Kumar. (2015). Who benefits from the law? Reminisces from fieldwork on contract (agency) workers in India. <http://www.labourlawresearch.net/sites/default/files/papers/LLRN%20paper-%20Who%20benefits%20from%20the%20law-Pankaj%20Kumar%2C%20JNU%2C%20India%20%281%29%20copy.pdf>

¹³International Labour Office, IPEC – Geneva. (2014). A health approach to child labour - Synthesis report of four country studies on child labour in the brick industry.

¹⁴Anti-Slavery International Volunteers for Social Justice. (September 2017). Slavery in India's brick kilns & the payment system: Way forward in the fight for fair wages, decent work and eradication of slavery.

¹⁵Enabling Policies in the Indian Brick Sector - Current Status and Future Trends, Development Alternatives, 2012



- Bihar State Pollution Control Board (BSPCB) directed all brick kilns located in five blocks adjoining the city of Patna to shift to cleaner brick kiln technologies in 2016 and all kilns throughout the state to do the same by August 2017.

Emissions and environment

- The Regulation for Fly Ash Utilisation (2016) requires all brick manufacturing units within the 300-km radius of a thermal power plant to use fly ash for manufacturing bricks.
- All cities with a population of more than 1 million shall amend building by-laws to make the use of fly ash bricks mandatory.
- Use of fly ash-based bricks and products have been made mandatory in all government schemes or programmes.

Labour and working conditions

- NGOs and multilateral organizations (e.g., ILO) in collaboration with different state governments, owners associations and trade unions are organizing brick kiln workers in unions and carrying out

activities aimed at raising workers' awareness, ensuring continued education (also tuition within kiln premises), and improving access to welfare schemes and insurance in Tamil Nadu and Hyderabad, Andhra Pradesh.¹⁶

- In consultation with the labour departments and brick kiln owners of Odisha and Telangana, the Tata Trust has developed a proposal to establish a migrant labourers' cooperative society that will act as a bridge between employers and labourers and check exploitation and debt bondage and ensure minimum wage.¹⁷

Industry promotion, enforcement and monitoring

- Several SPCBs issued notifications that no unauthorized brick kiln is allowed to operate.
- The Environment Pollution (Prevention and Control) Authority (EPCA) has given unauthorized kilns in Delhi–NCR one last window to operate (March to June 2018) before they are shut down permanently.
- Odisha has promulgated a promotion policy for fly ash bricks.¹⁸

¹⁶<https://www.theguardian.com/artanddesign/architecture-design-blog/2014/jan/08/blood-bricks-india-urbanisation-human-rights-slave-labour> and https://www.ilo.org/global/topics/forced-labour/WCMS_143822/lang-en/index.htm

¹⁷<https://www.thehindu.com/news/national/telangana/coop-society-for-brick-kiln-workers-in-karimnagar/article19530942.ece>

¹⁸[http://www.msmeodisha.gov.in/PDF/FINALbyDI\(O\)-Odisha_MSME_Dev_Policy.pdf](http://www.msmeodisha.gov.in/PDF/FINALbyDI(O)-Odisha_MSME_Dev_Policy.pdf)

Issues and opportunities

Technology

Transitioning from FCBTK to a zig-zag kiln requires a modest investment with the internal rate of return of 100–250% along with the provision of technical support, provided policy and regulatory provisions are already in place, e.g., in Patna district and Delhi–NCR. Conversion of the remaining 98 brick kilns to zigzag in Patna alone can potentially reduce 1491.84 tonnes of PM and 16,458.96 tonnes of coal consumption valued at about USD 2.58 million annually. Similarly, technical assistance to 4,000 brick kilns in the NCR can reduce 60,891.43 tonnes of PM and 671,794.23 tonnes of coal consumption.

Emissions and the environment

- Establishing uniform emission standards for all permitted technologies would help promote cleaner technologies.
- Supporting transition (technical, business, and market development) from manually moulded solid bricks to perforated or hollow bricks to cater to large urban centres enables resource-efficient brick production and reduces the dead load of buildings and speeds up construction.
- The Bureau of Energy Efficiency is planning to launch a pilot programme on “Energy Efficient Quality Brick Labelling” in 2019.

Labour and working conditions

- Scale-up technical training programmes through the establishment of skill councils, as initiated by Tripura
- Industry promotion, monitoring, and enforcement
- A dedicated fund for facilitating access to debt financing to meet high investment demands would expedite the transition to resource-efficient brick production. Lessons from Bangladesh on such funding schemes could prove useful at the starting phase.
- State-level plans for building human and institutional capacity for implementing environment regulations and transitioning to resource-efficient brick production will aid monitoring and enforcement.



In response to the Bihar SPCB's directives, around 1,500 brick kilns have now shifted to zigzag technology in Bihar, which has led to a reduction of 22,853 tonnes of particulate matter and 252,127 tonnes of coal consumption by early 2019.

Policy amendment

- Strict emission standards for brick kilns (MoEFCC)
- Regulation for fly ash utilization (MoEFCC)
- Model building by-laws (TCPO, MoHUA)
- Update or set new BIS standards for all kinds of resource efficient bricks (BIS)
- Inclusion of different types of resource efficient bricks in the schedule of rates of different government construction agencies (CPWD, MoHUA)
- Inclusion of resource efficient bricks under the PMAY programme (BMTPC, MoHUA)
- Programme on research and development and technology transfer in the area of resource efficient brick production in collaboration with the Department of Science and Technology and BMTPC
- Establish a sector skill council for the brick industry and start country-wide skilling initiative on both the production and application of resource efficient bricks

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