

OVERVIEW OF CLEANER TECHNOLOGY OPTIONS



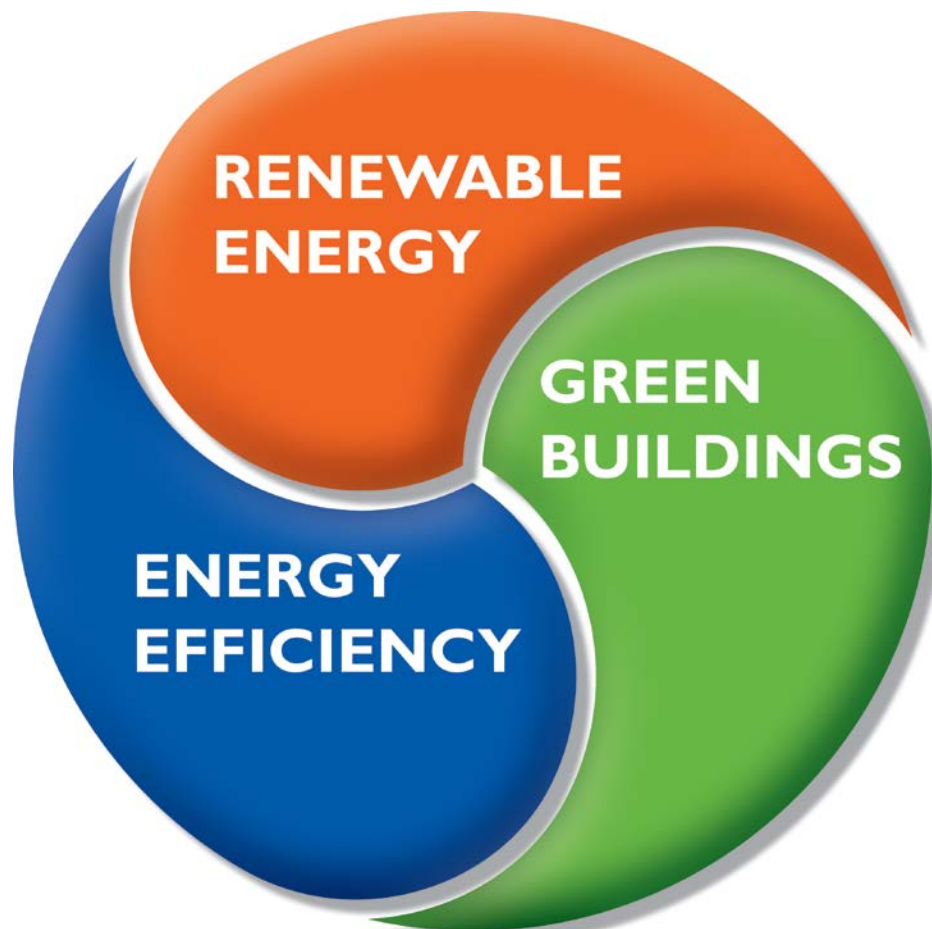
Greentech Knowledge
Solutions Pvt. Ltd.

DR SAMEER MAITHEL

GREENTECH KNOWLEDGE SOLUTIONS

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Clean Energy Research and Advisory



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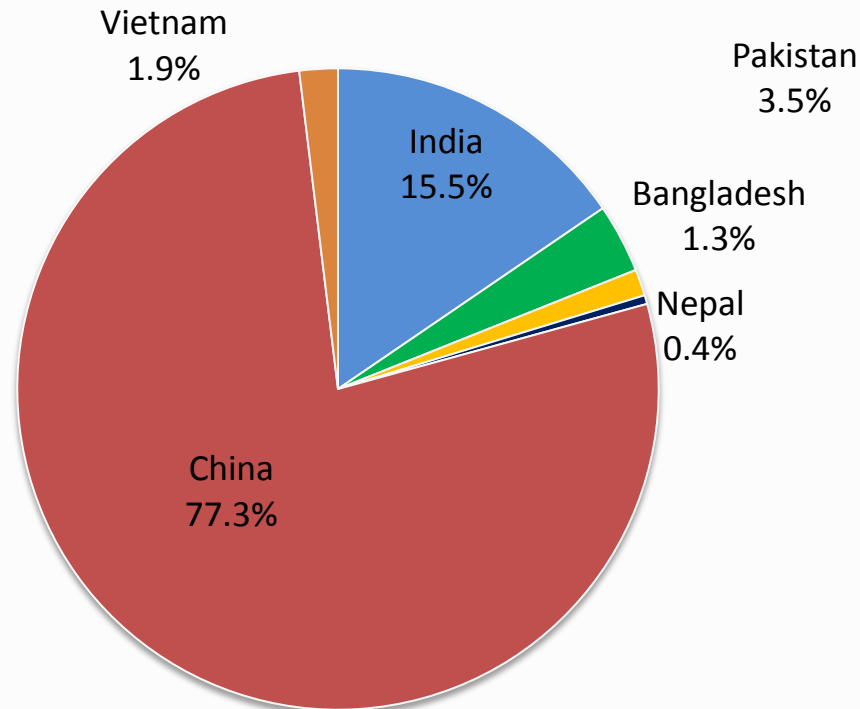
Clean Energy Research and Advisory



- Brick Sector Experience
 - Around 20 years of sectoral experience
 - Performance measurement of brick kilns
 - Energy, air pollution, black carbon,...
 - Technology assessment
 - Formulation and implementation of cleaner brick production programmes
 - Knowledge products
 - Training and capacity building
 - Experience in Asia & Africa
 - India, Vietnam, Nepal, Bangladesh, Rwanda, South Africa



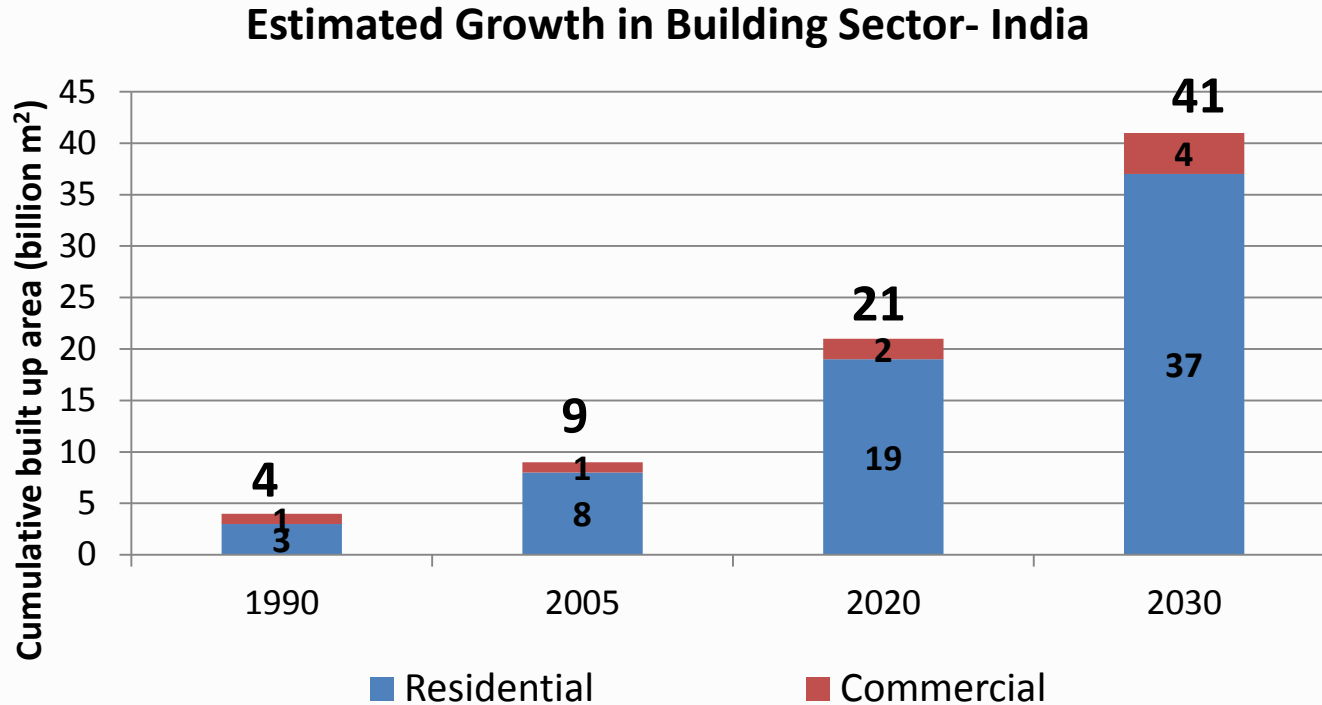
Brick Production Scenario - Asia



Total brick production in Asia: 1300 billion bricks/year

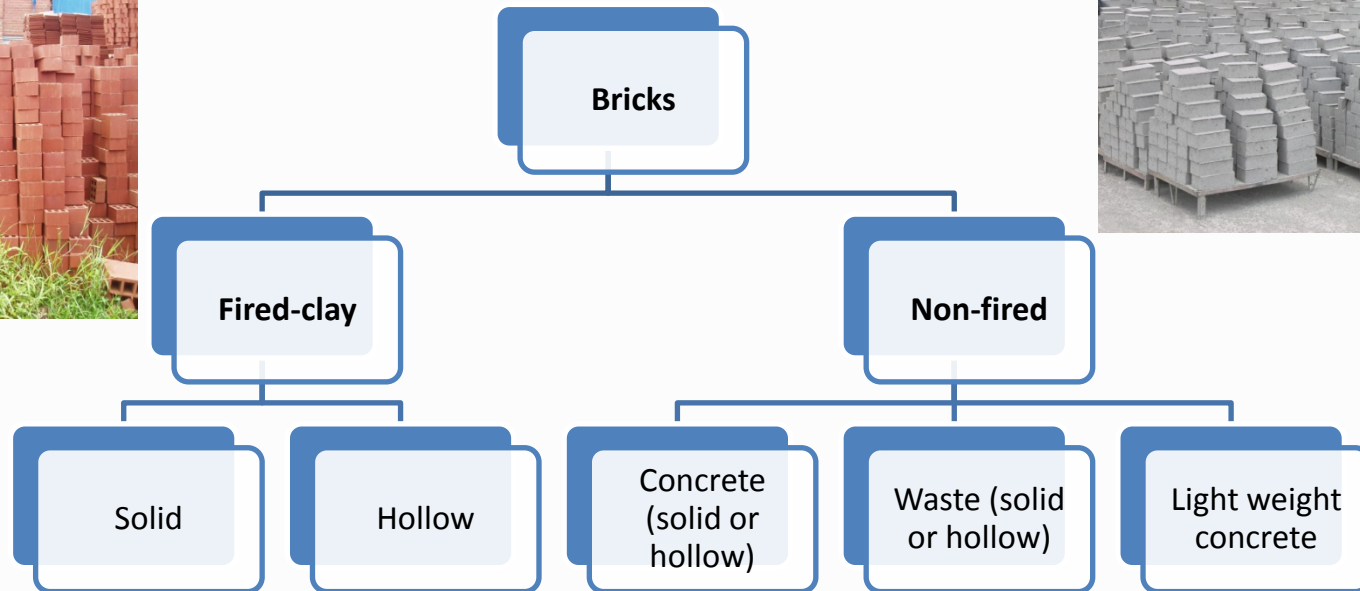
Asia is the most populous continent. It is estimated that 80% of the global brick production takes place in Asia. Highly populated regions - China & South Asian countries are some of the major producers of bricks.

India – Building sector growth



The building sector is growing rapidly – population growth, economic growth, urbanisation, smaller family size etc. The building stock in India is expected to double in next two decades and so would be the demand for bricks/walling materials.

Types of Bricks & Products



Bricks can be of many types. Traditionally solid clay (both fired and non-fired) were the main types. Now a variety of bricks made from cement, waste materials (e.g. flyash from power plants) along with hollow fired clay bricks are being used. The share of non fired bricks is $\sim 10\%$ of the total fired clay brick production

Fired Clay bricks manufacturing in India



Brick Firing Technologies

Traditional Technologies



Bulls Trench Kiln



Down-draught Kiln



Clamp

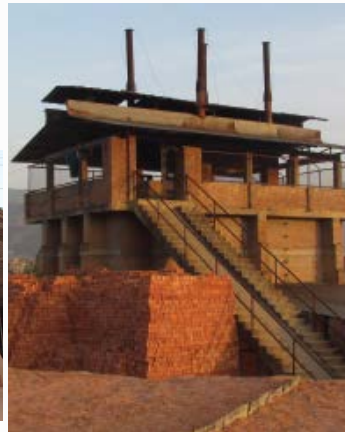
Alternate Technologies



Zigzag Kiln



Hoffman Kiln

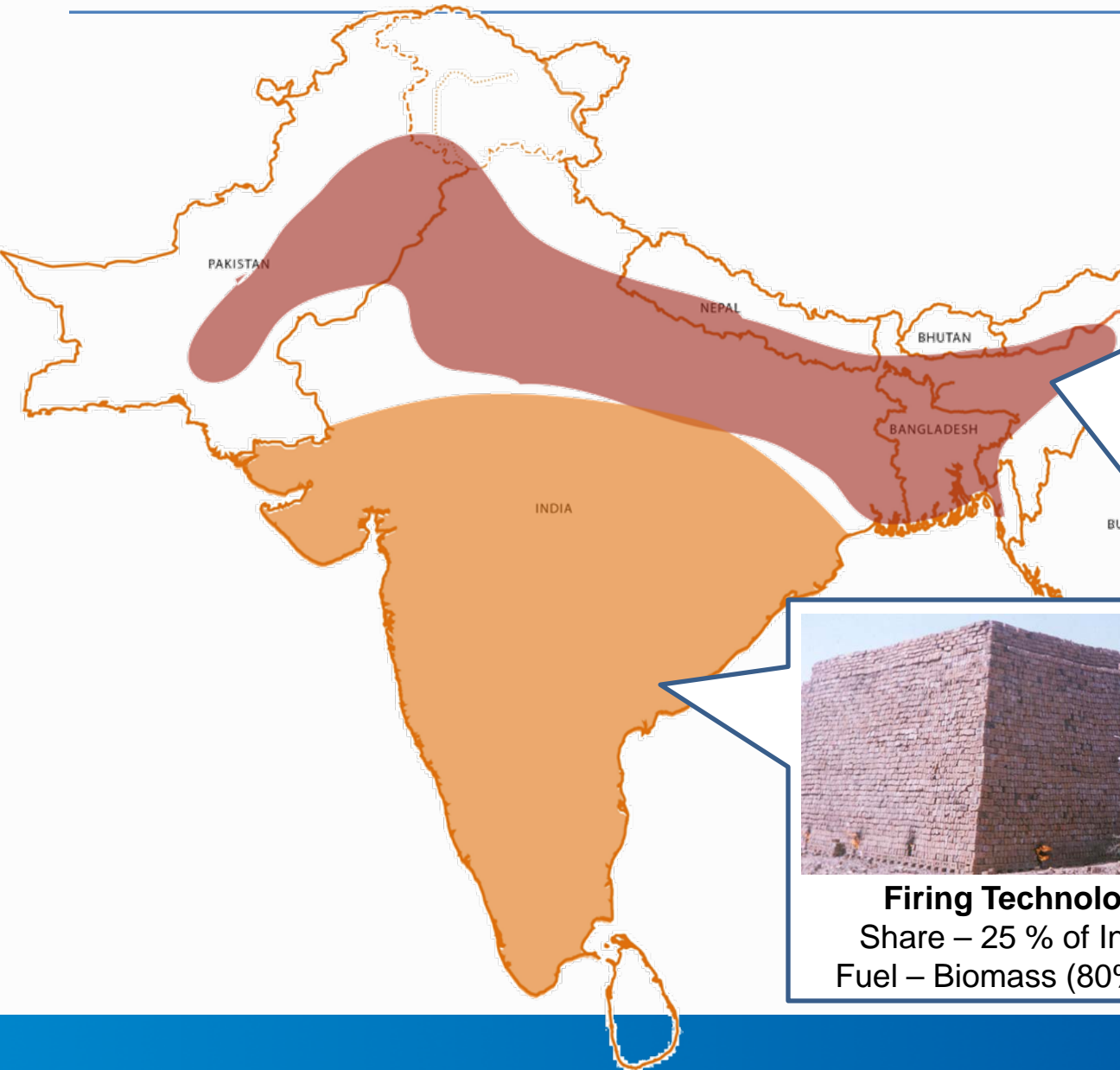


Vertical Shaft Kiln



Tunnel Kiln

Prevalent Brick Firing Technologies

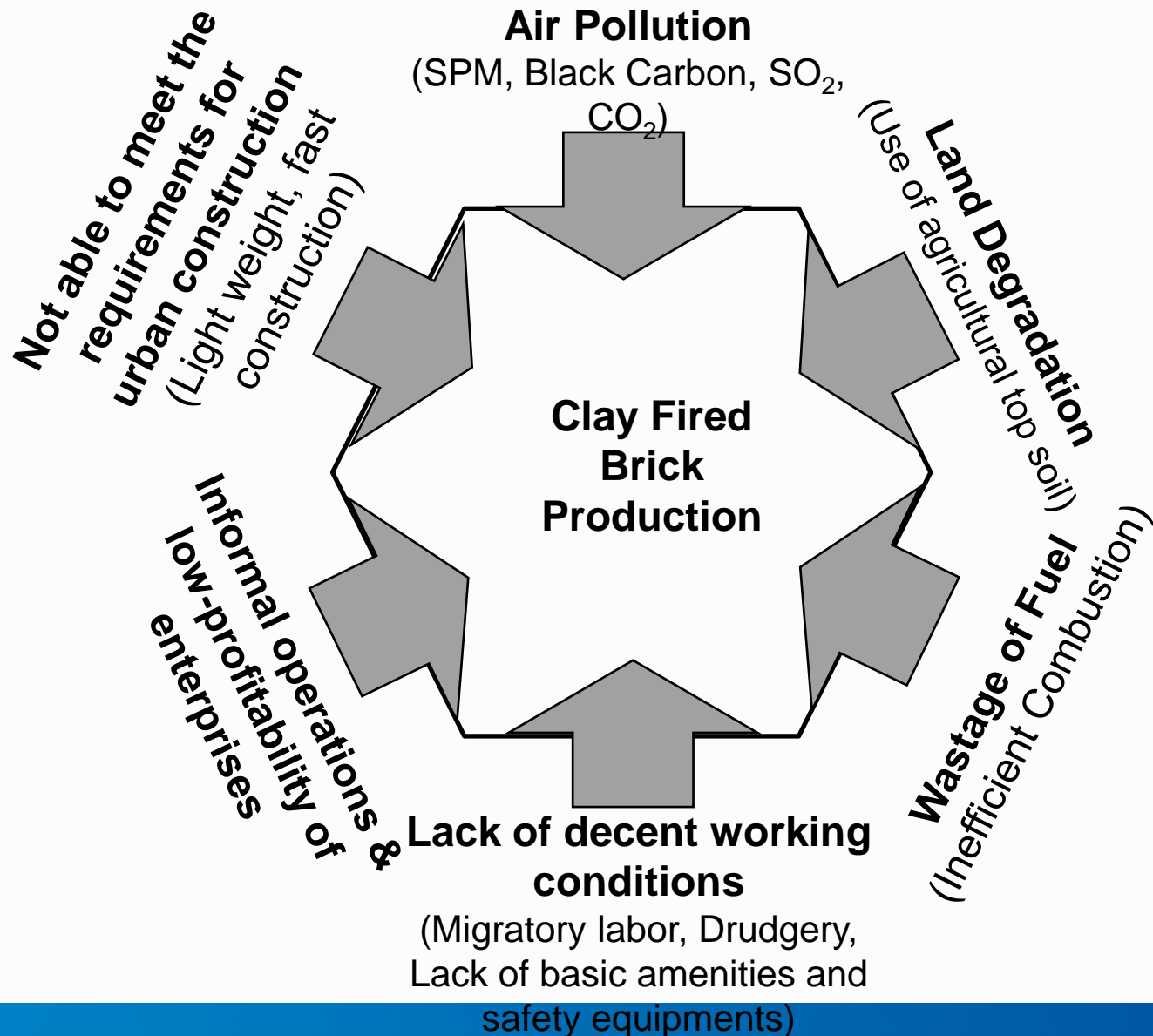


Firing Technology - Fixed Chimney Bulls Trench Kilns
75% of production of India (30,000 – 40,000 brick kilns in India)
Coal (80%) & Biomass (20%)

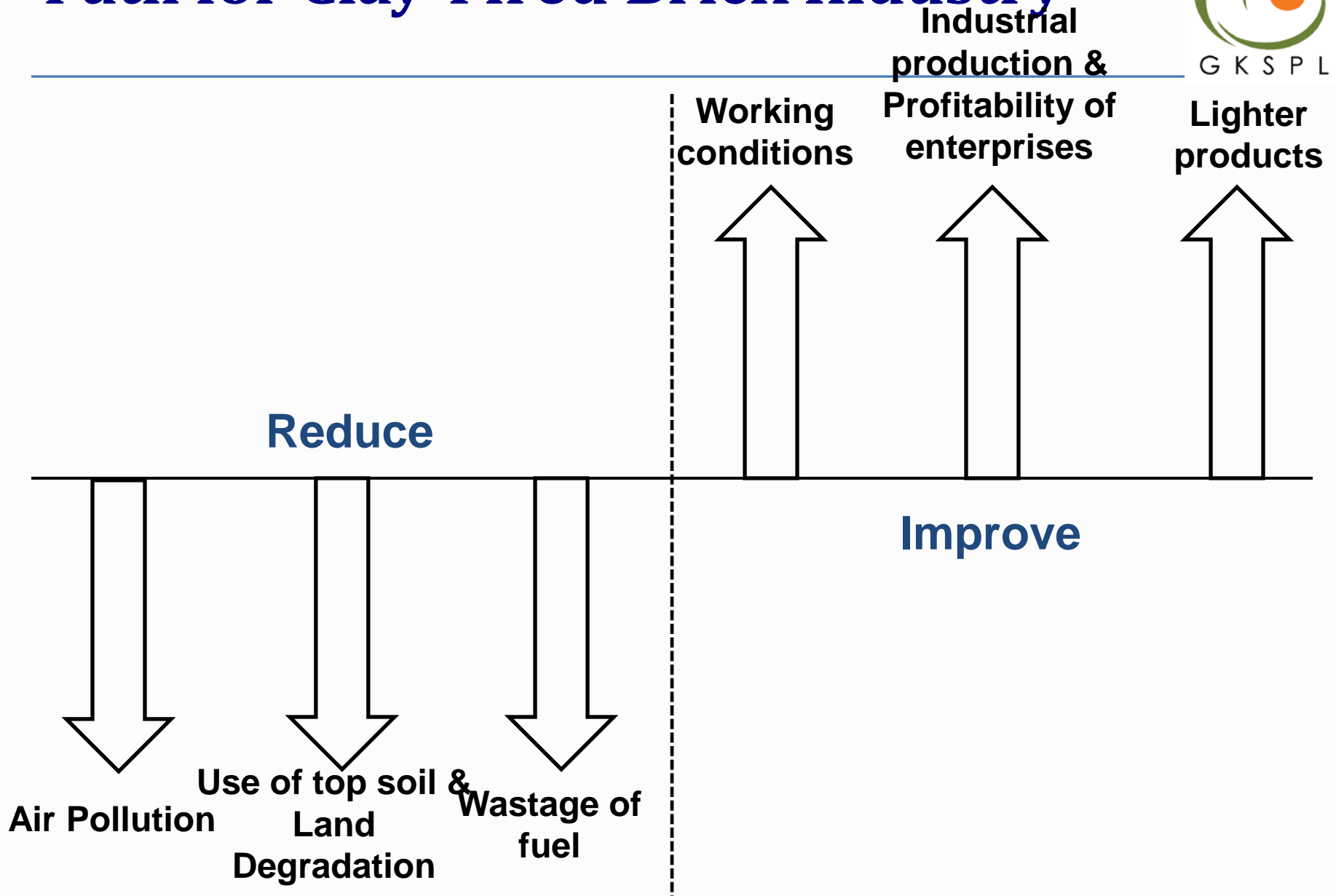


Firing Technology - Clamps
Share – 25 % of India production
Fuel – Biomass (80%) & Coal (20%)

Issues in Clay fired brick production

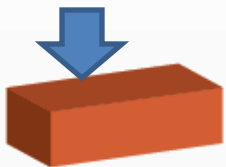


Path for Clay-Fired Brick Industry



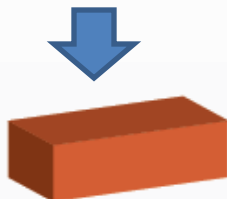
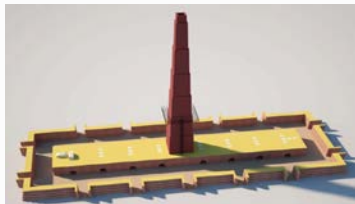
Technological ladder for Cleaner Clay-Brick Production

**Baseline –
Fixed
Chimney Bulls
Trench Kiln &
Solid Bricks**



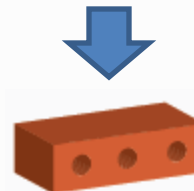
**Zigzag firing &
Solid Bricks**

- Retrofitting of FCBTK to Zigzag
- Other processes remain same



**Zigzag firing &
Perforated Bricks**

- Use of extruders for moulding
- Drying in shade

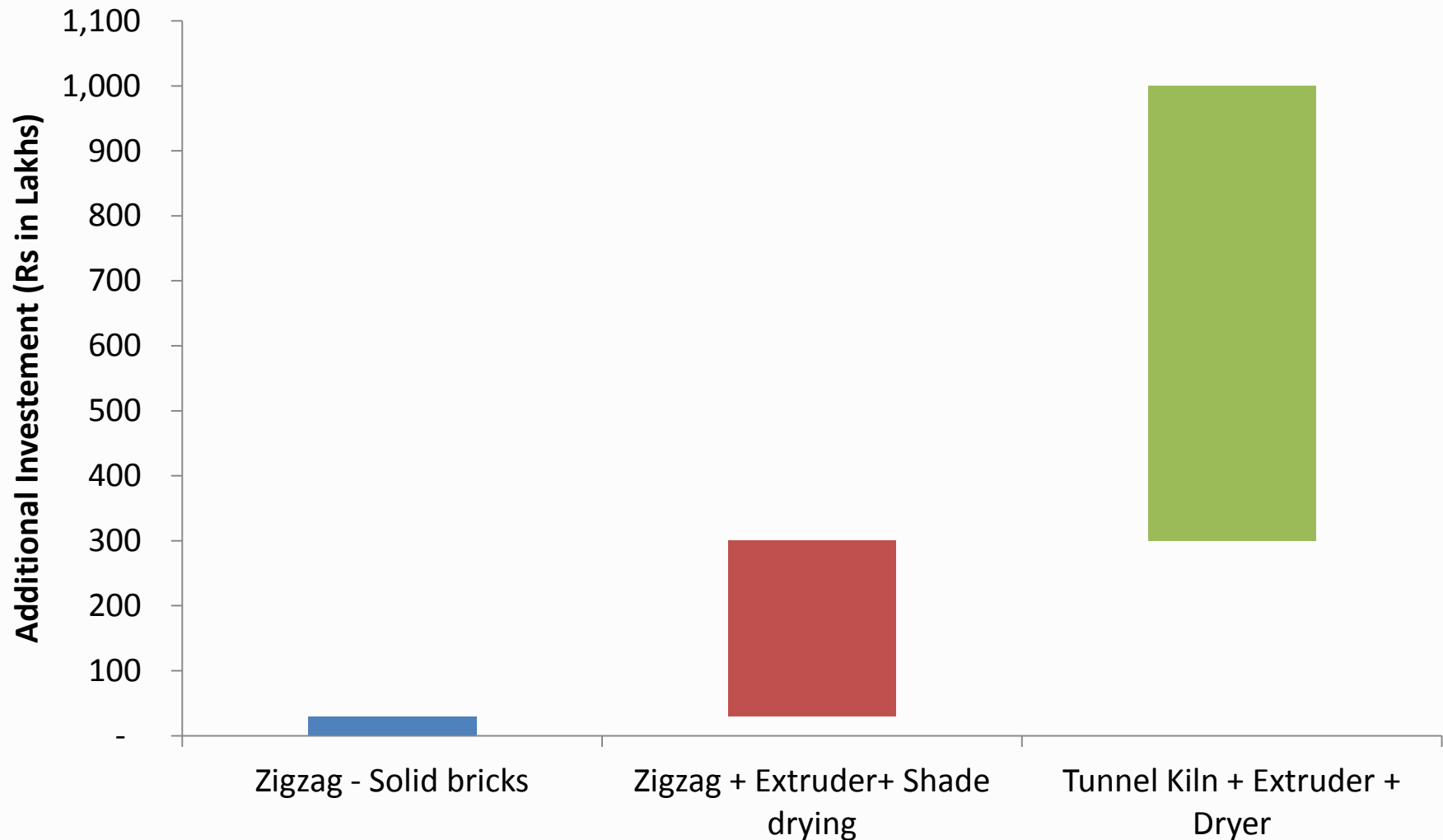


**Tunnel Kiln &
Hollow Block**

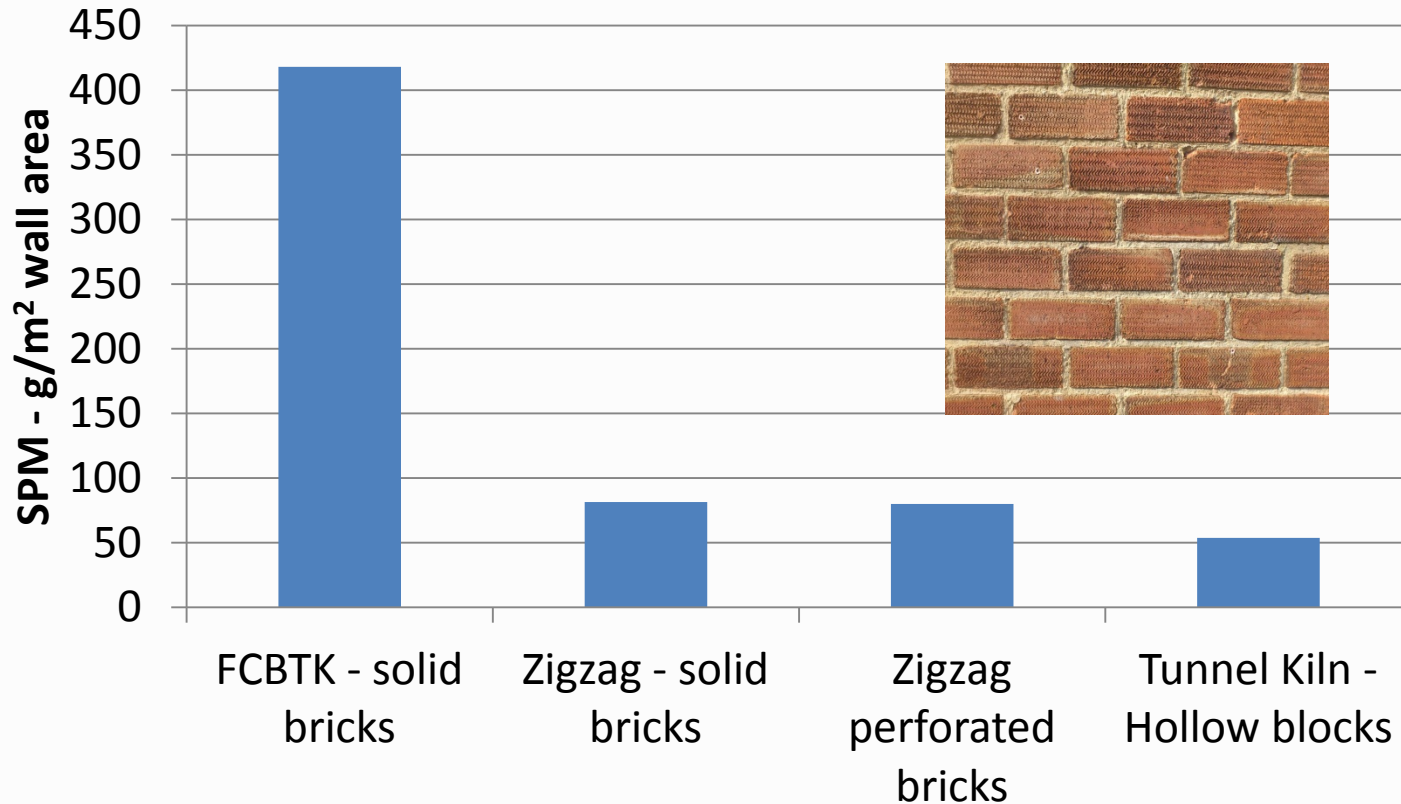
- Use of extruders for moulding
- Use of artificial Dryers
- Fully mechanized process



Investment required

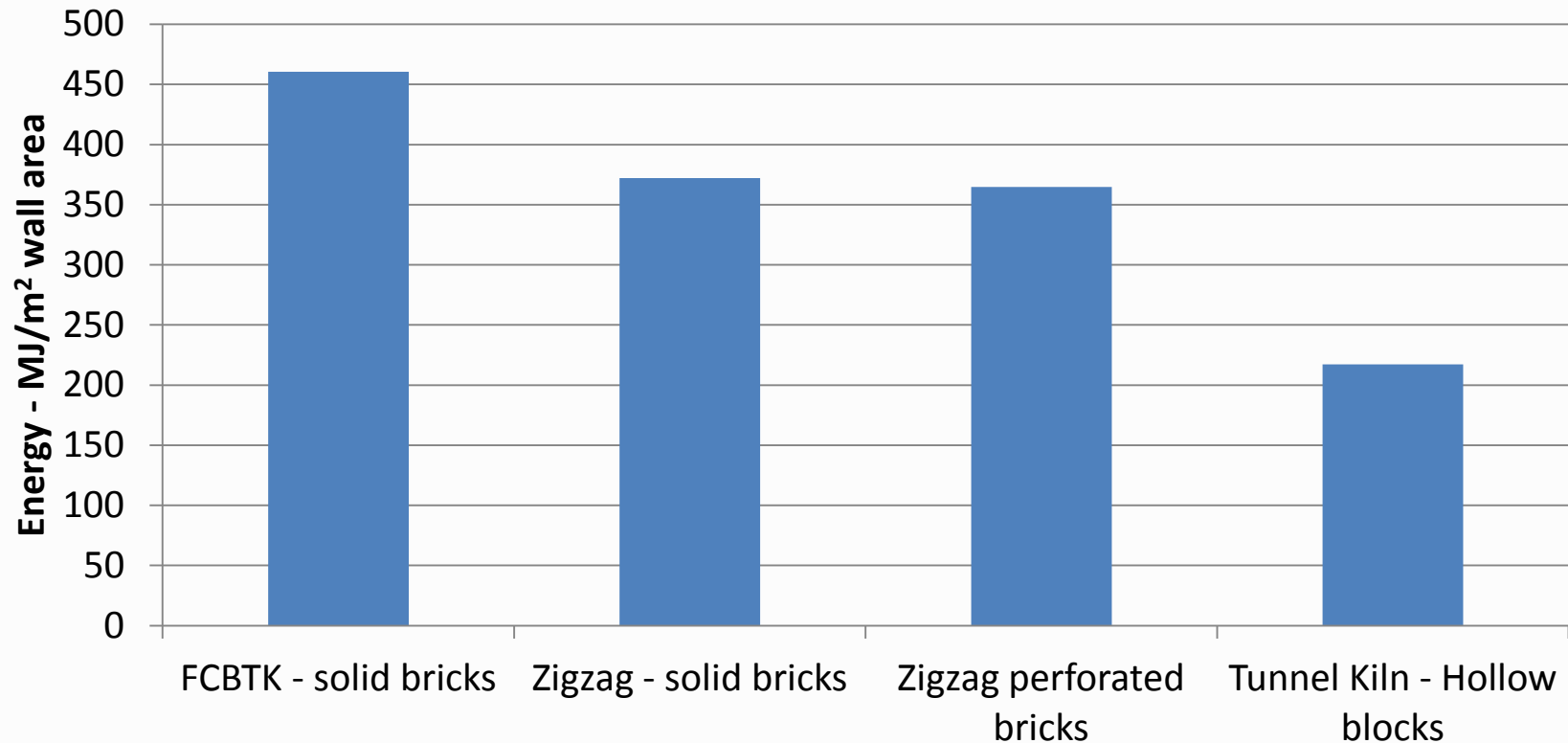


Suspended Particulate Matter



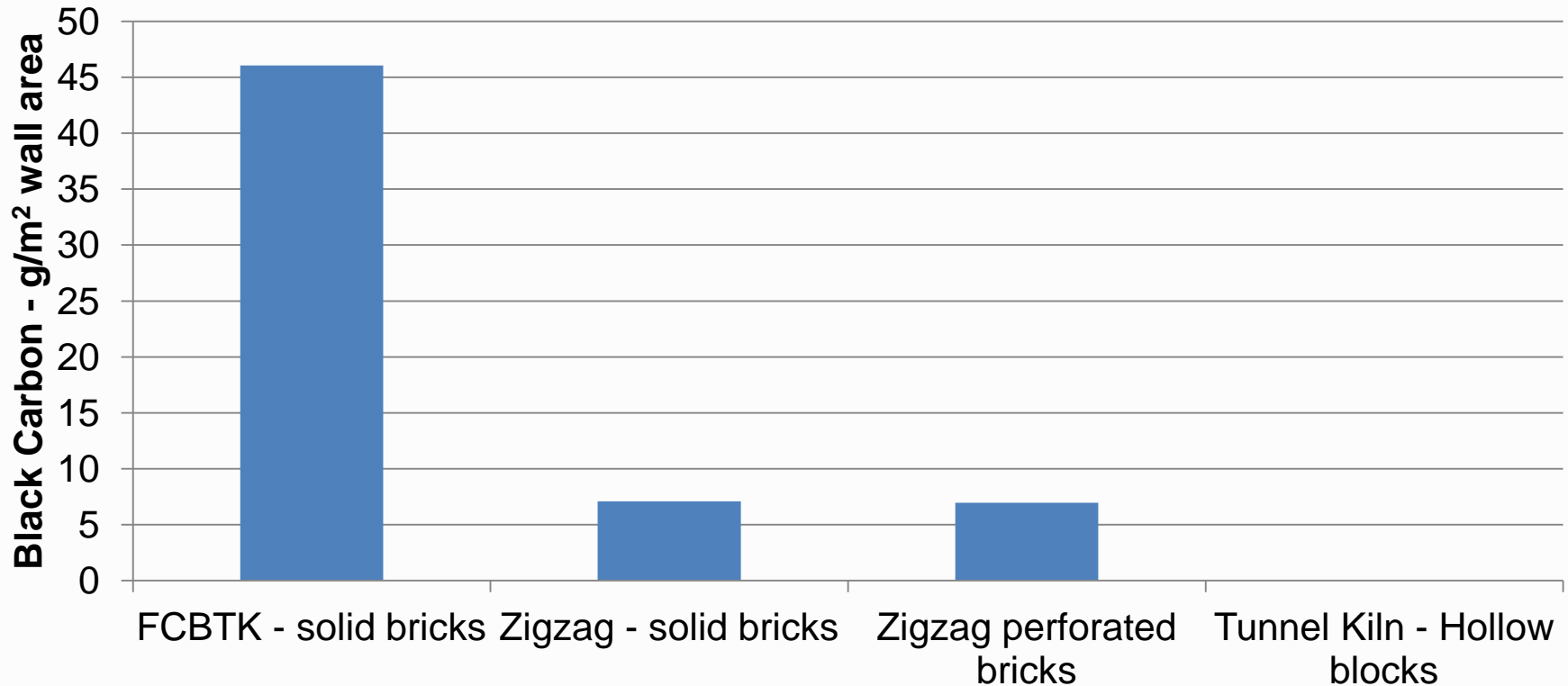
Conversion from FCBTK to well designed and well operated Zigzag firing technology will reduce the SPM emissions by more than 80%.

Energy Consumption



More than 40% reduction in energy consumption from current baseline to hollow block production.

Black Carbon emissions



Conversion of FCBTK to Zigzag firing can reduce 85% of the Black Carbon emissions from brick production

Issues Addressed

Parameters	Technological solutions		
	Zigzag kiln, solid brick	Zigzag perforated brick	Tunnel kiln, Hollow Blocks
Less Air Pollution	✓	✓	✓
Less Land Degradation	X	Partial	✓
Less wastage of fuel	✓	✓	✓
Decent working conditions	X	Partial	✓
Profitability	✓	?	?
Lighter products	X	X	✓

Conclusions

- Technological solutions exists and a step-wise approach to technology change may be adopted
 - Improved kilns
 - Use of waste materials & internal fuel
 - Hollow products
- Need for a national mission to transform brick industry
 - Building regulations in large urban centres that promote use of hollow clay-fired & non-fired bricks
 - Support to brick makers for making available technology, finance and dedicated zones for building materials production
 - Brick industry has contributed ~Rs 1000 crore in the National Clean Energy Fund – this needs to be utilised for the transformation of the brick industry

Thank You !
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