OVERVIEW OF CLEANER TECHNOLOGY OPTIONS

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• **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
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.
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.

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

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

Air Pollution (SPM, Black Carbon, SO₂, CO₂)

Clay Fired Brick Production

Land Degradation (Use of agricultural top soil)

Wastage of Fuel (Inefficient Combustion)

Lack of decent working conditions (Migratory labor, Drudgery, Lack of basic amenities and safety equipments)

Informal operations & low-profitability of enterprises

Not able to meet the requirements for urban construction (Light weight, fast construction)

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Path for Clay-Fired Brick Industry

Reduce

Air Pollution
Use of top soil & Land Degradation
Wastage of fuel

Improve

Working conditions
Industrial production & Profitability of enterprises
Lighter products
Technological ladder for Cleaner Clay-Brick Production

Baseline – Fixed Chimney Bulls
Trench Kiln & Solid Bricks

• Retrofitting of FCBTK to Zigzag
• Other processes remain same

Zigzag firing & Solid Bricks

• Use of extruders for moulding
• Drying in shade

Zigzag firing & Perforated Bricks

Tunnel Kiln & Hollow Block

• Use of extruders for moulding
• Use of artificial Dryers
• Fully mechanized process
Investment required

Additional Investment (Rs in Lakhs)

- Zigzag - Solid bricks
- Zigzag + Extruder + Shade drying
- Tunnel Kiln + Extruder + Dryer
Conversion from FCBTK to well designed and well operated Zigzag firing technology will reduce the SPM emissions by more than 80%.
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

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<thead>
<tr>
<th>Parameters</th>
<th>Technological solutions</th>
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<tbody>
<tr>
<td></td>
<td>Zigzag kiln, soild brick</td>
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<tr>
<td>Less Air Pollution</td>
<td>✓</td>
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<tr>
<td>Less Land Degradation</td>
<td>X</td>
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<tr>
<td>Less wastage of fuel</td>
<td>✓</td>
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<tr>
<td>Decent working conditions</td>
<td>X</td>
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<tr>
<td>Profitability</td>
<td>✓</td>
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<td>Lighter products</td>
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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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