Scaling up low carbon technology in construction & infrastructure Sector

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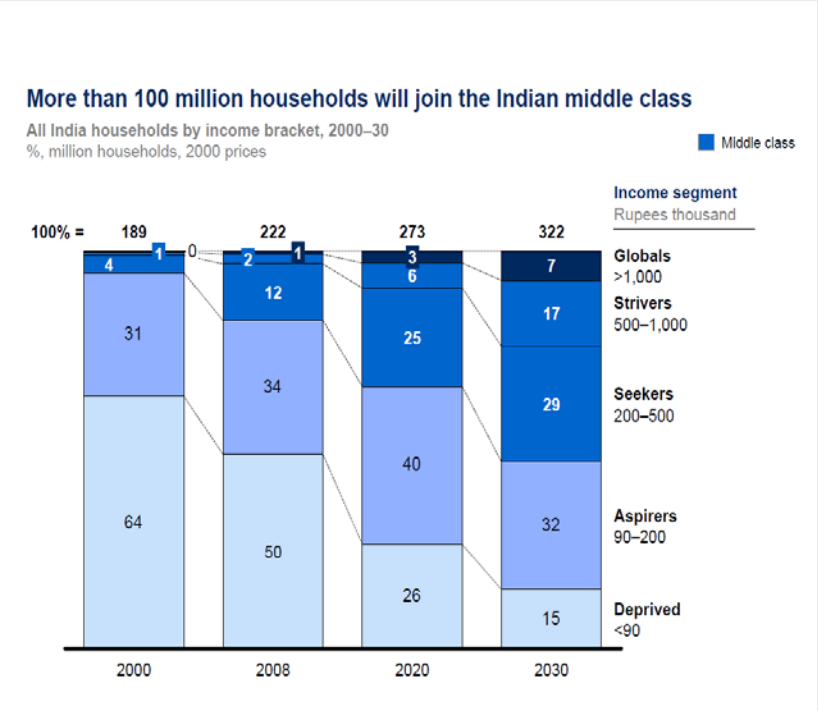
Climate Change Asia

Urbanisation in South Asia
growth and demands on built space

- In **India** the total urban housing shortage was estimated to be **18.78 million** (2012)
- In **Pakistan** housing shortage was estimated at **7.57 million** (2009)
- In **Nepal** an additional **1 million** urban houses will be required from 2011-21

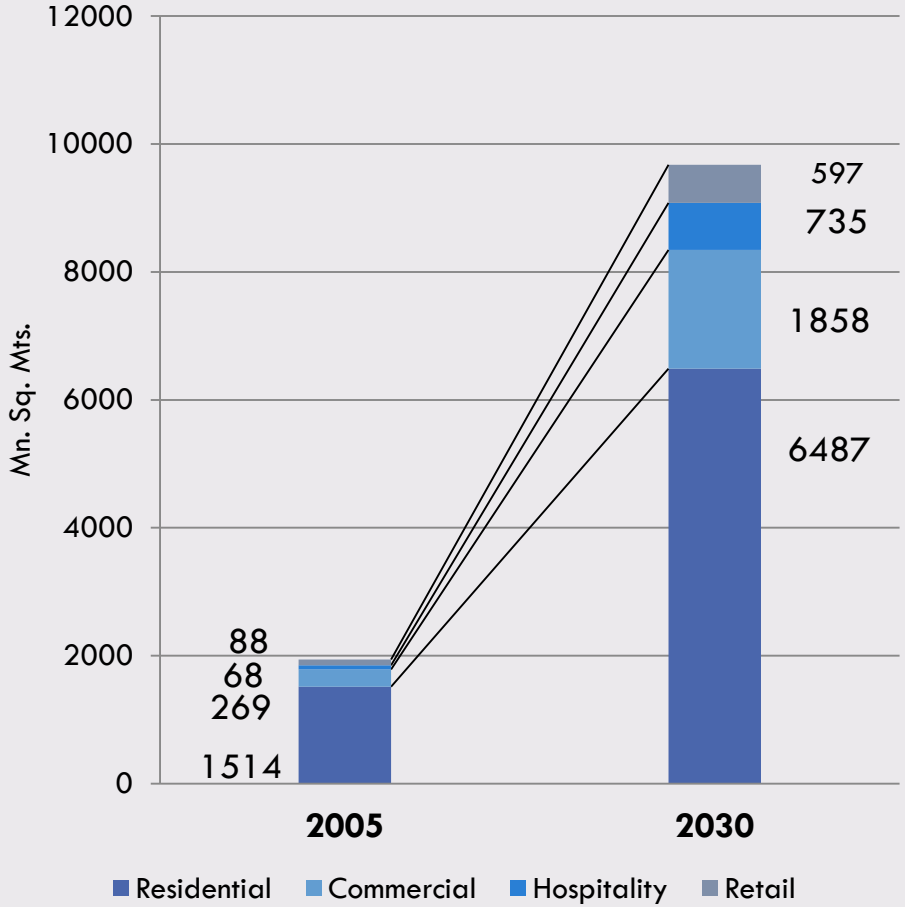


Predicted Growth in Indian Middle Class (Sankhe et al. 2010)

Development Alternatives

Urbanisation
pressure for more and new materials

- Worldwide buildings account for upto **30% raw materials use**
- In 2011, gross built up urban area grew by 10% (CII)
- A major share, almost **80% of the GHG burden** of the building sector, is borne by the building materials alone.
- Cement, steel, lime and bricks are the **largest bulk consumption items** in the Indian construction industry and also the most energy-guzzling.



Projected Growth in Building Sector of India (Parikh, 2011)

Development Alternatives

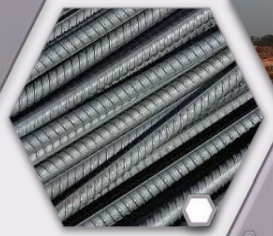
Construction Materials
growth trends in India









40-45% of India's Steel

Cement consumes 303 MT of limestone and 30 MT of coal

Cement production increased by 56% in the last decade

Annual material production growth rate of 9.8%

65-70% of Glass

85% of Paint Production

350 MT of top soil lost to brick making every year

2nd largest brick producer, 200 million bricks annually

Cost of construction materials - 40-60% of project cost

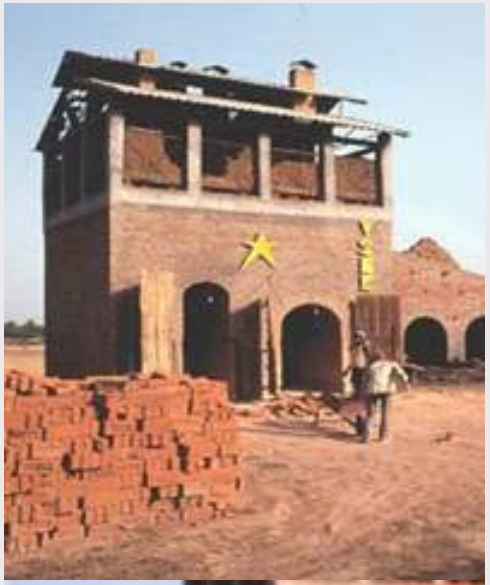
Construction sector accounts of 45% of total steel demand

300% increase in production in steel from 1994-95 to 2008-09.

Development Alternatives

What are Green Materials

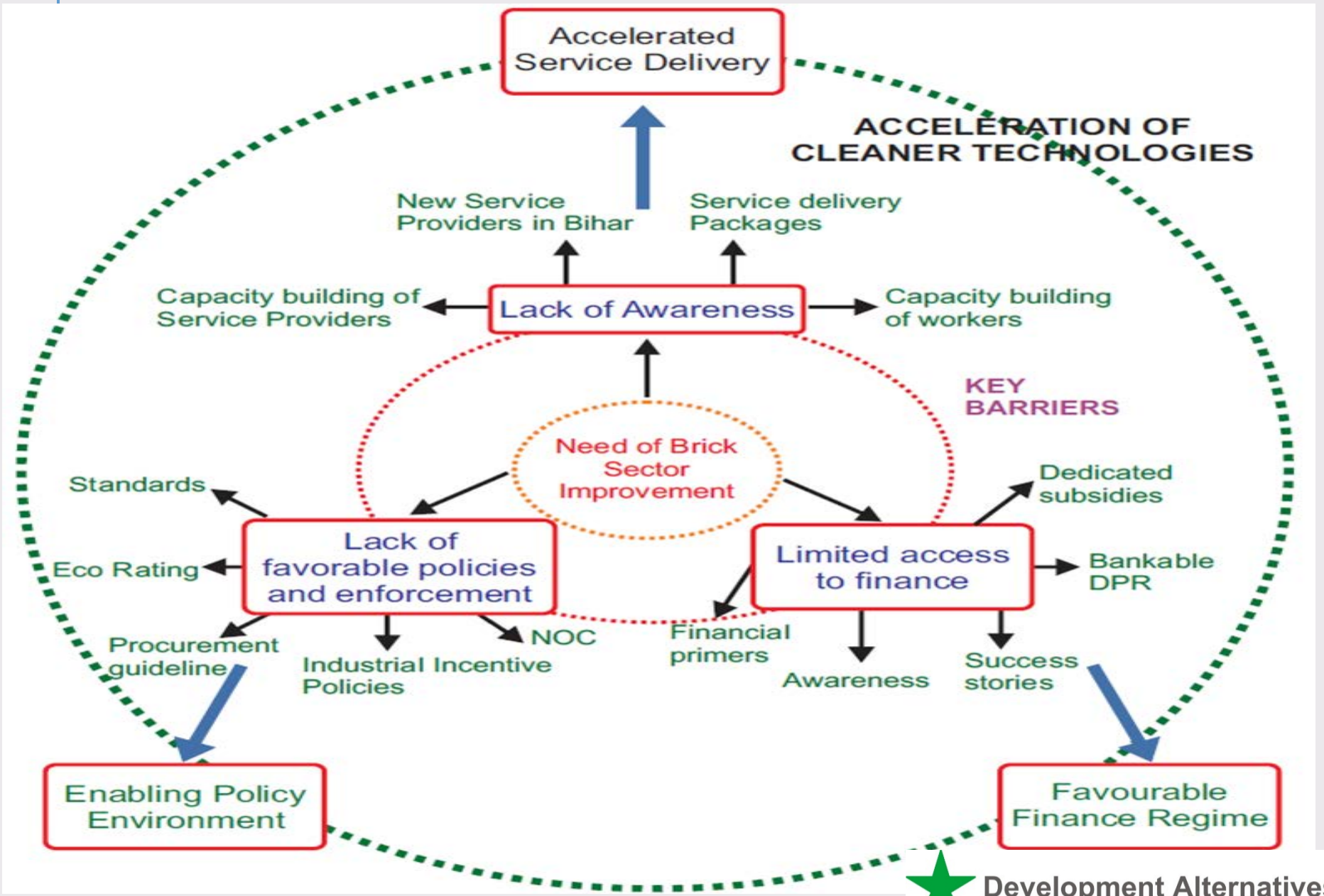
- Low in **embodied energy**
- Low in **resource footprints**
- **Cleaner production** processes
- Contribute to **thermal comfort**
- **Low or nil conflicts** with other uses of greater ecological and economic value
- **Recyclable/Reusable** – low life cycle costs



…low environmental impacts, small ecological footprints

Development Alternatives

Case example: Fly ash brick production in India



Development Alternatives

Case example: Vertical Shaft Brick Kiln in Pakistan

- **30% to 50%** lower CO2 emissions,
- **80%** reduction in suspended particulate matter
- **35-40% fuel reduction,** resulting in **30% increase in profit.**

- **Lessons learnt:**
  - Environmental hazards and threat to human health due to emissions by brick kilns have been given less consideration
  - Involvement and support from Pakistan Environment Protection Agency was critical
  - Cost effectiveness of the technology as well as collaborations with local investors (Small & Medium Enterprise Development Authority)
  - Greater public awareness among all stakeholders

Development Alternatives

Case example: Hollow Concrete Blocks, Nepal

- Precast concrete blocks produced from an appropriate mixture of **cement, sand and aggregates with manual or mechanical compressions** that have hollow cavities in between the cells.
- **Less embodied energy** that fire bricks
- HCB houses are **30-40% cheaper** compared to RCC buildings and more energy efficient

- Lessons learnt:
  - Low carbon construction materials are **not included in the Building Codes and Standards**, thus no compliance for use of sustainable building materials
  - **Lack of awareness** for use of alternative sustainable materials in the construction sector.
  - With **no existing norm and guidelines** for manufacturing these alternative materials, there is no assurance of strength and quality.
  - Lower cost of these materials is often thought of as being of lower quality by end-users. **(perception)**

Development Alternatives

Imperatives for upscaling low carbon technologies

Research	Capacity	Information
New Knowledge	Existing Knowledge	Consumer Engagement
Materials, Models	Curricular Revision, Vocational Skills	Public Disclosure, Decision Support

Development Alternatives

Imperatives for upscaling low carbon technologies

Technical Specifications	Regulatory Norms	Priority Finance
Standards & Codes	Behaviour Change	Performance Incentives
Certification & Labelling; Sustainable Procurement	Regulated Use / Bans; Incentives	Easy Credit & Grants; Tax Reform

Development Alternatives

Thank you

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