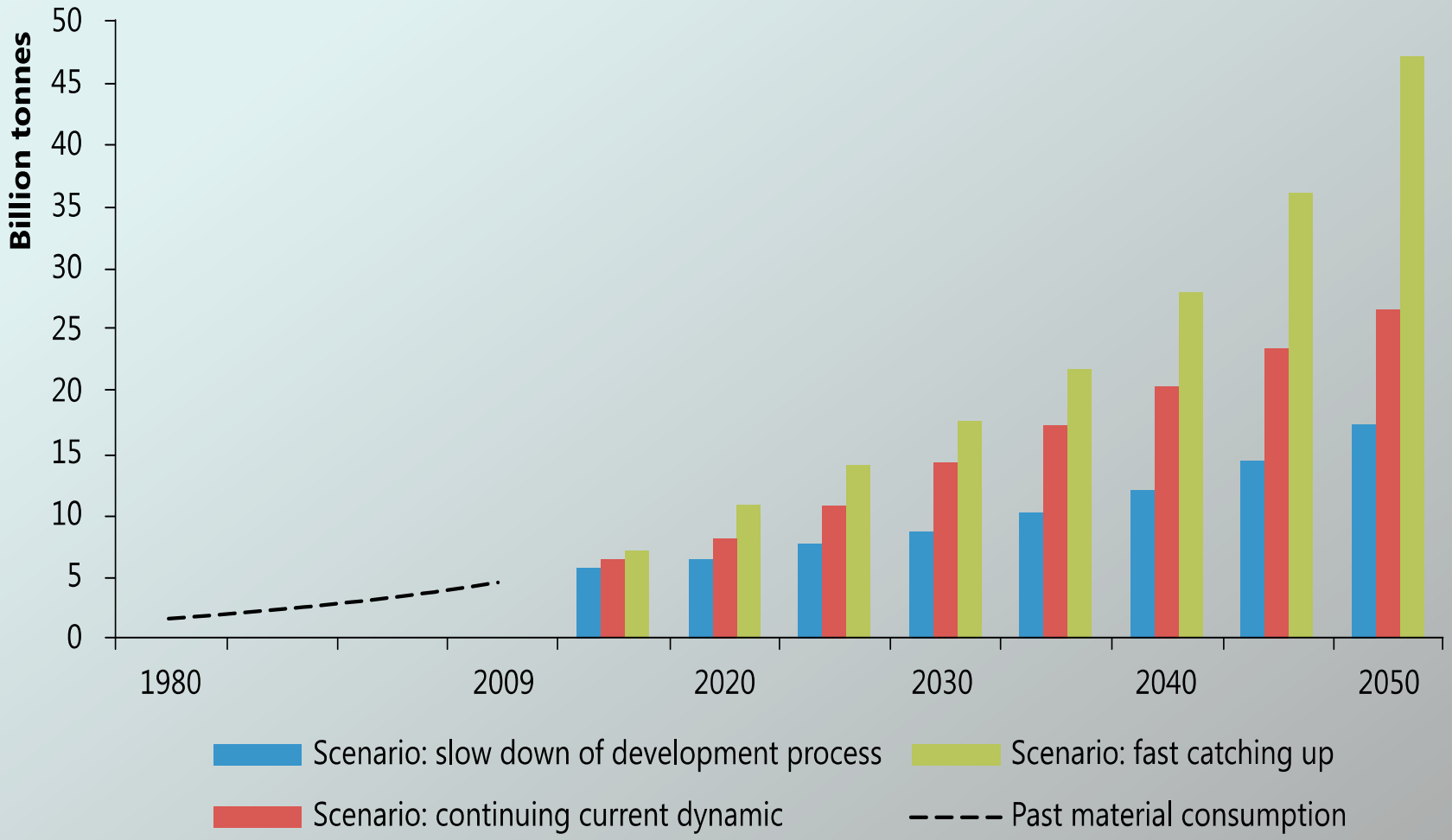
Resource Efficiency and Circular Economy
- The State of Play in India

European Resource Forum
Berlin, 3 November 2020

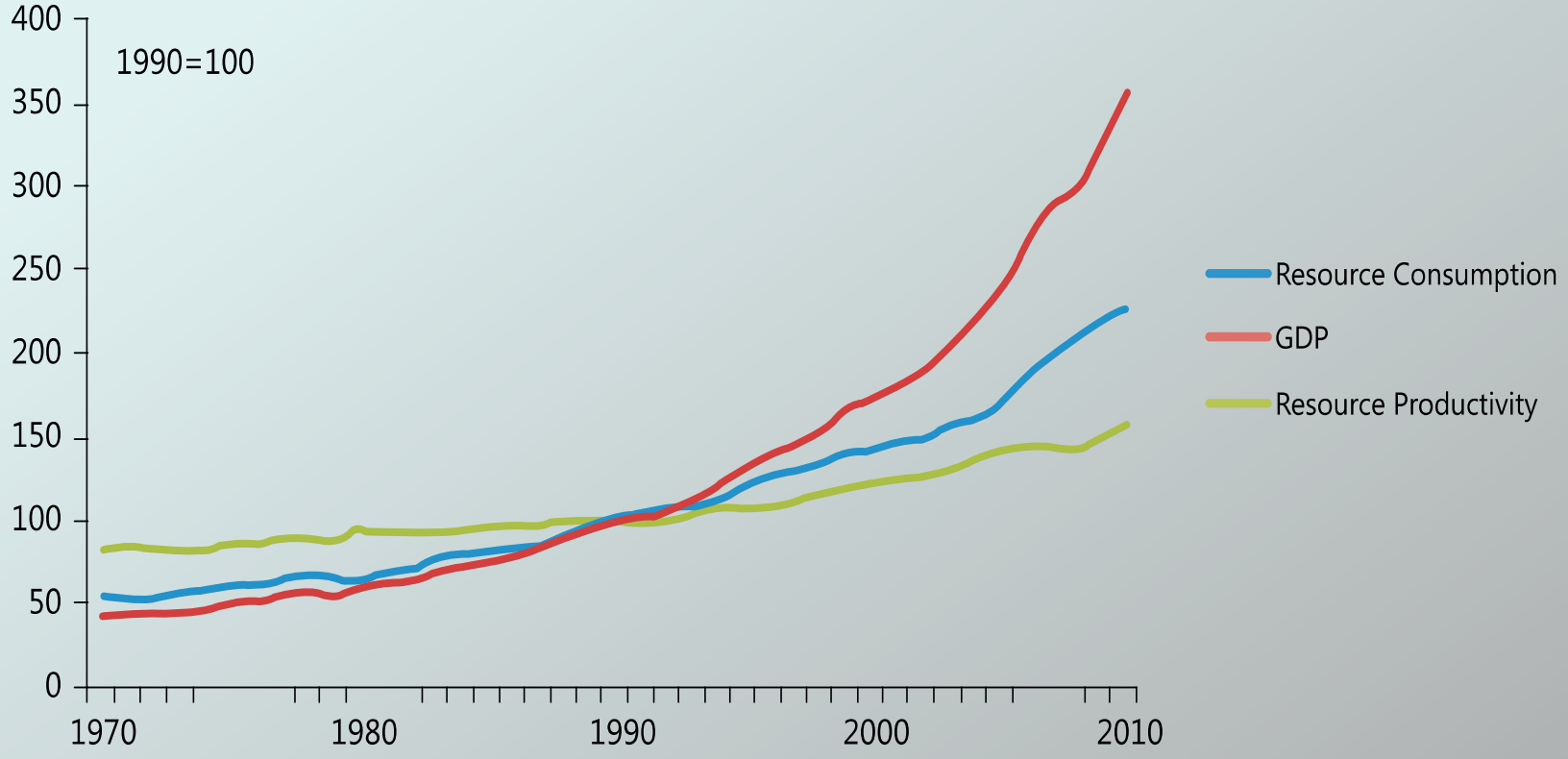
Ashok Khosla
Chairman, Development Alternatives,
Former Co-Chair, International Resource Panel

India's Material Demand to 2050



Ref: Govt of India

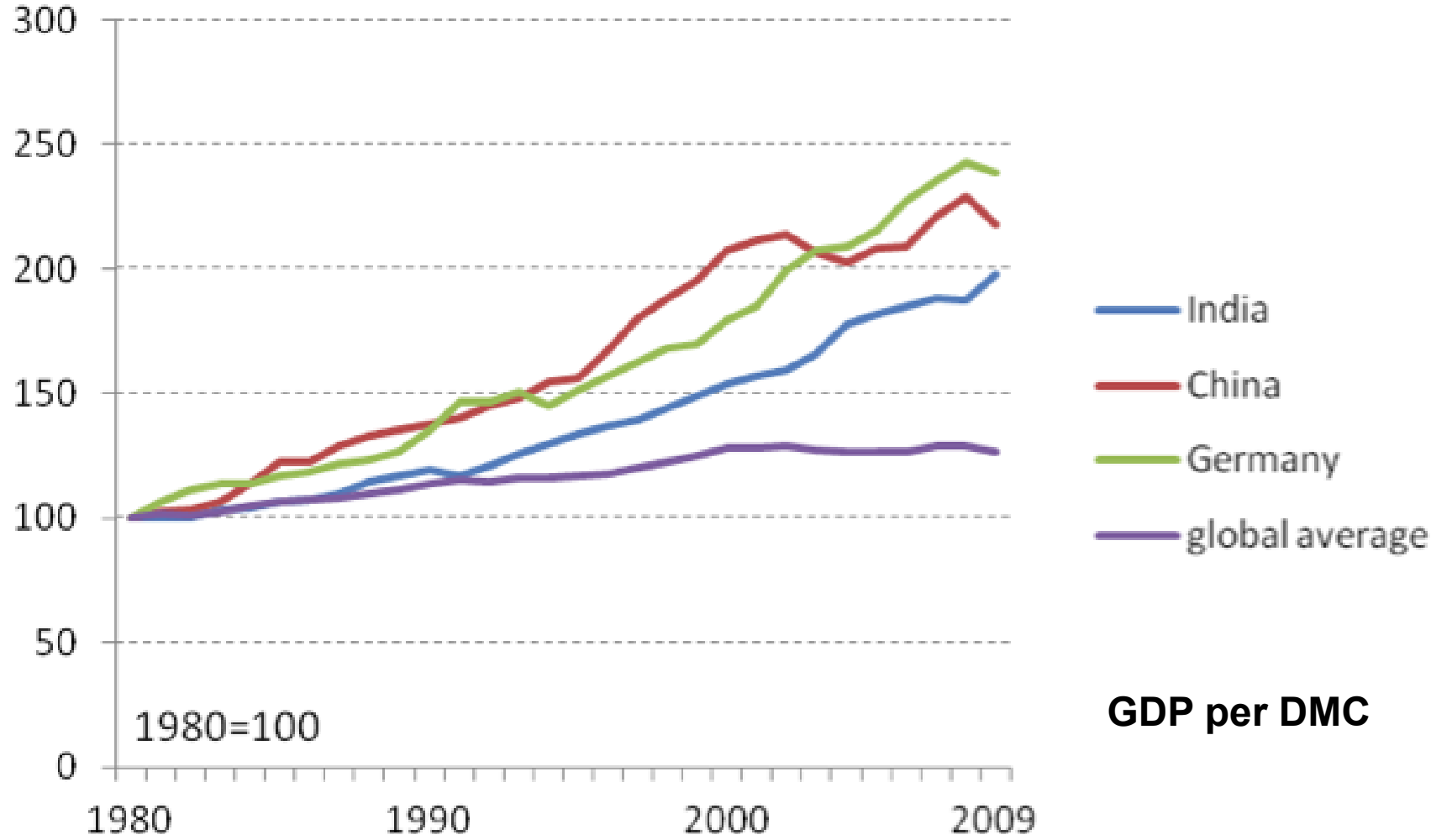
Growth of Resource Productivity in India, 1970 - 2010



Ref: UNEP, Govt of India

Growth of Resource Productivity

Germany, China and India vs The World Average



Source: Calculation based on Dittrich 2012, SERI 2011 and Worldbank 2011. Measured as GDP (ppp const. 2005) per DMC

India's Laws & Regul'ns for Resource Efficiency

Resources Addressed:

- Water
- Energy [by Sources]
- Land and Soils
- Construction Materials
- Biomass
- Wastes and E-Wastes

India's Laws & Rules for Resource Efficiency

Activities Addressed:

- Mining and Extraction
- Production and Manufacturing
- Consumption
- Transportation
- Design and Technology Dev't

Indian Institutions for Resource Efficiency

Chronologically:

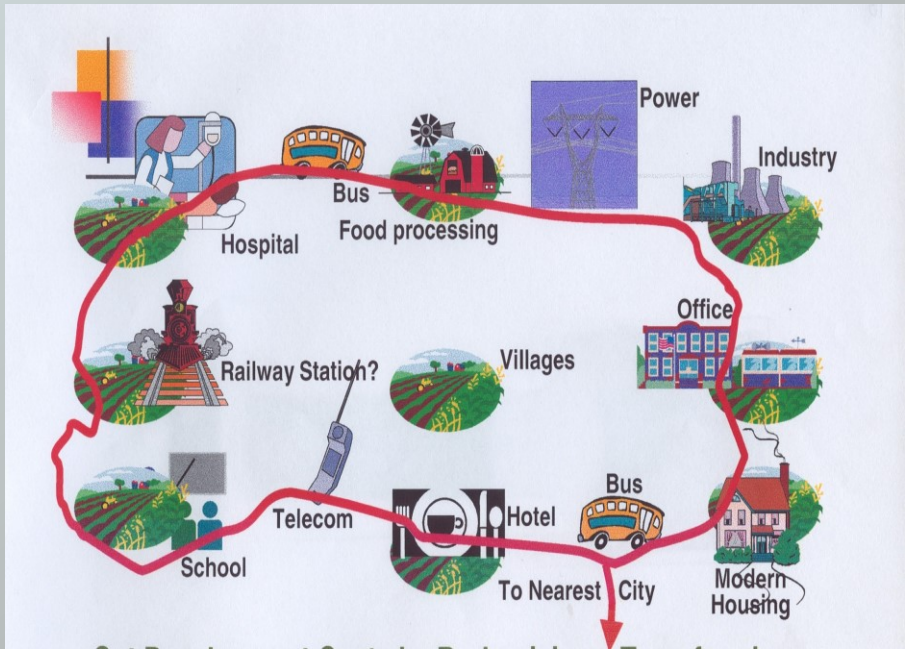
- **National Productivity Council (1958)**
- **Bureau of Energy Efficiency (2002)**
- **National Water Mission (2011)**
- **Smart Cities (2014)**
- **Bureau of Indian Standards (2016)**
- **National Resource Panel (2016)**
- ***Draft Policy for Resource Efficiency (2020)***

Energy Systems

- DSM, Efficiency
- Renewables
- Structural Change

Materials

Transforming Chaotic Growth of Urban Transport to Resource Conserving Urban Design



Other Initiatives in India on Resource Efficiency

Sectors:

- **Business (CII, FICCI, etc)**
- **Academic Research (IITs, Univ)**
- **Civil Society**
- **Media**

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Civil Society Initiatives on Resource Efficiency

Areas:

- Conceptual Frameworks
- Land & Water
- Construction Materials
- Energy
  - Cooking
  - Lighting
- Recycling

Development Alternatives Group: 1983

Handmade, Recycled Paper

300+ Units Set Up by Development Alternatives

Construction & Demolition Waste

- **Upgradation of existing products**
  - **10% cost reduction of M30 grade paver block**
  - **Improved mix design approved and adopted by major clients**

- **Development of new products**
  - **M50 grade paver blocks developed**
  - **Application of aggregates in concrete frames and windows**
  - **Application of clay and silt waste in manufacture of compressed earth blocks**




716 Million tonnes of C&D waste generated per Year in India

Waste Fly Ash from Thermal Power Stations for Making High Quality Unfired Bricks

180 Million tonnes of Fly Ash generated every year in India

Foundry Slag for Construction

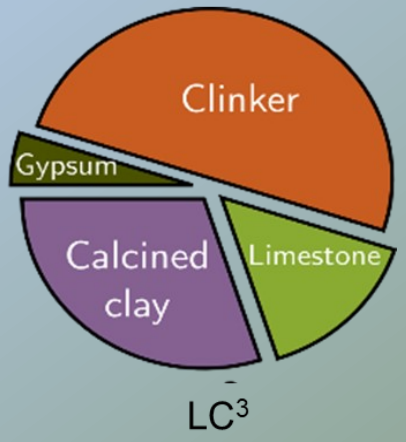
Application area:

- Rural roads
- Private housing
- Shopping mall
- Petrol pump
- Tourism park
- Footpaths
- Gardens

1 Million tonnes of foundry slag waste generated every year in India

LC3: The First New Cement in 200 years

by EPFL, DA, IIT & Others, Supported by SDC



2.6 GigaT of CO_2e Globally, every year

7-8% of man-made emissions of the world

LC^3 – A *Breakthrough* Cement:
Limestone Calcined Clay Cement

Demonstration Building in made of LC^3-Jhansi

Building made with LC^3 AAC blocks -Swiss Embassy, India

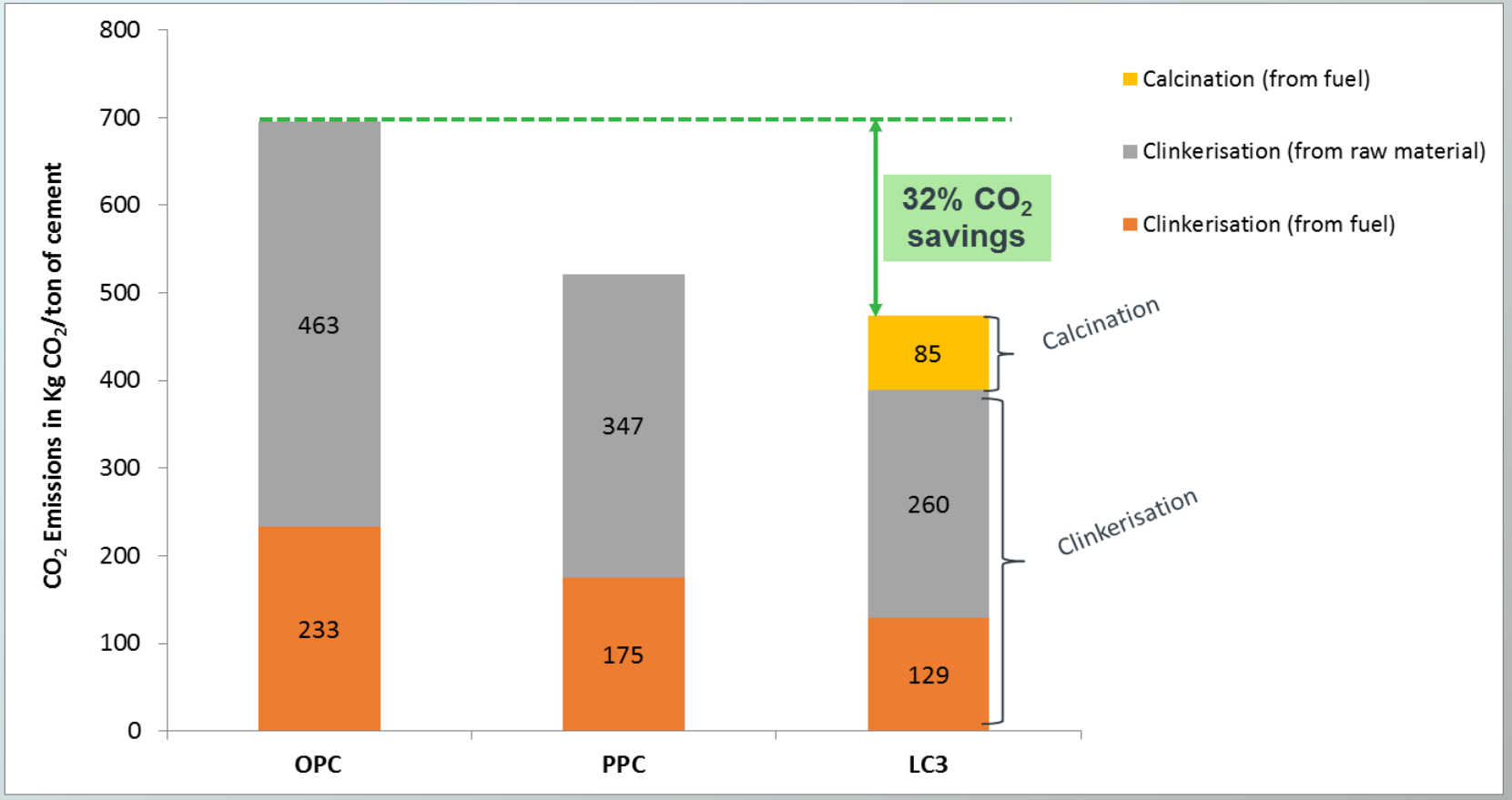
Road segments made with LC^3 in Chennai

Kerb Stones made with LC^3 in Jhansi

Concrete Road using LC^3 n Delhi

Blocks made with LC^3 in Ghaziabad

LC^3 - Low Carbon Cement CO_2 Savings



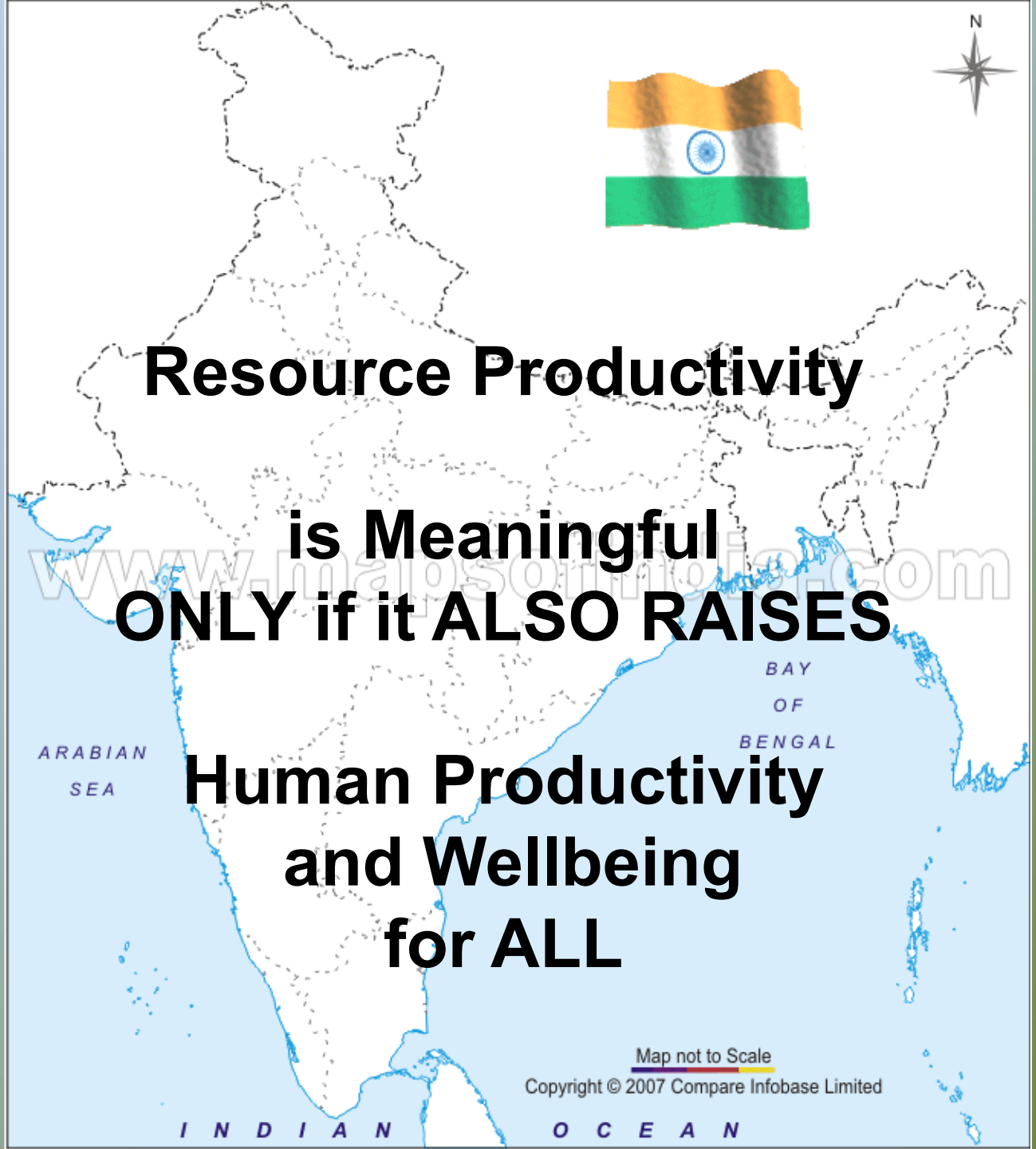
Calculations based on primary data collected from cement plants

Development Alternatives Group: 1983


30 to 50% Less
• Steel
• Cement
• Fired Bricks
• Wood


50% Lower Material Rucksack


N
Efficiency is Meaningful
ONLY if it is
Built on Sufficiency
BAY
OF
ARABIAN
SEA
Map not to Scale
Copyright © 2007 Compare Infobase Limited
INDIAN
OCEAN



Resource Productivity

is Meaningful
ONLY if it ALSO RAISES

Human Productivity
and Wellbeing
for ALL