Bureau of Energy Efficiency

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LC^3: A breakthrough technology to reduce CO_2 emissions from cementitious materials

Dr. Soumen Maity
TARA, New Delhi

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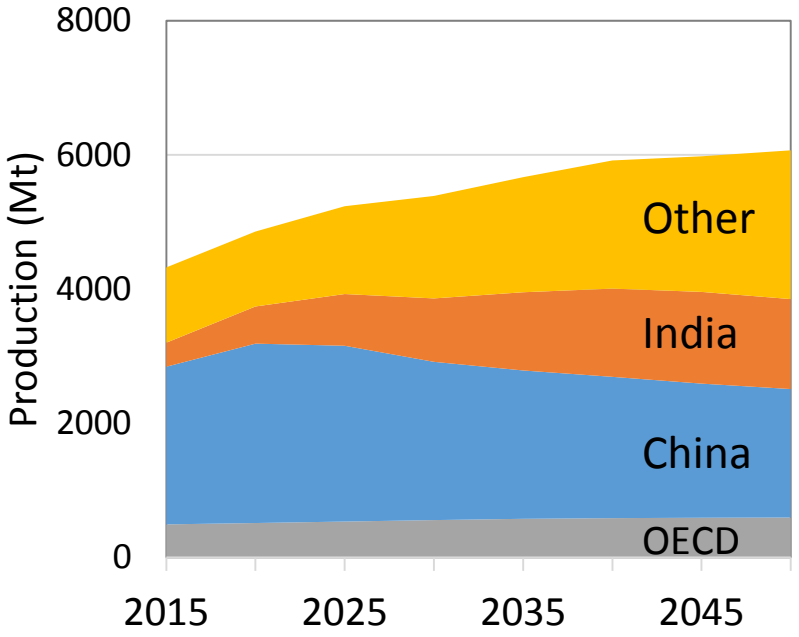
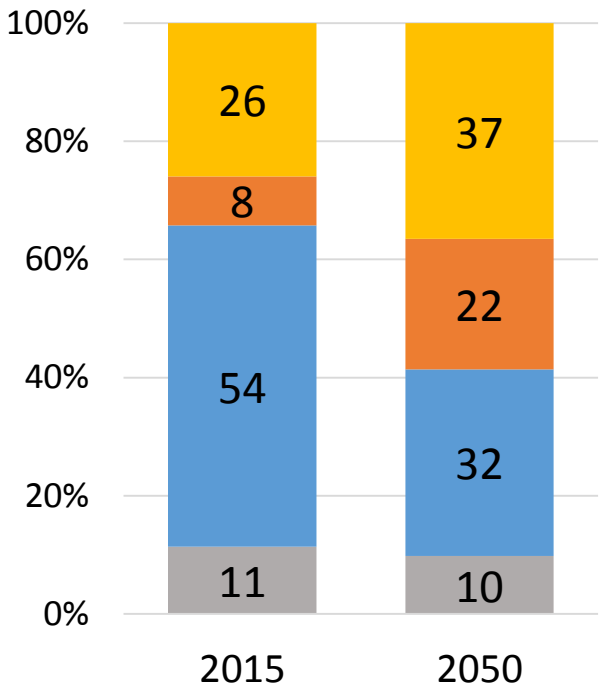
Growth forecast for the cement industry





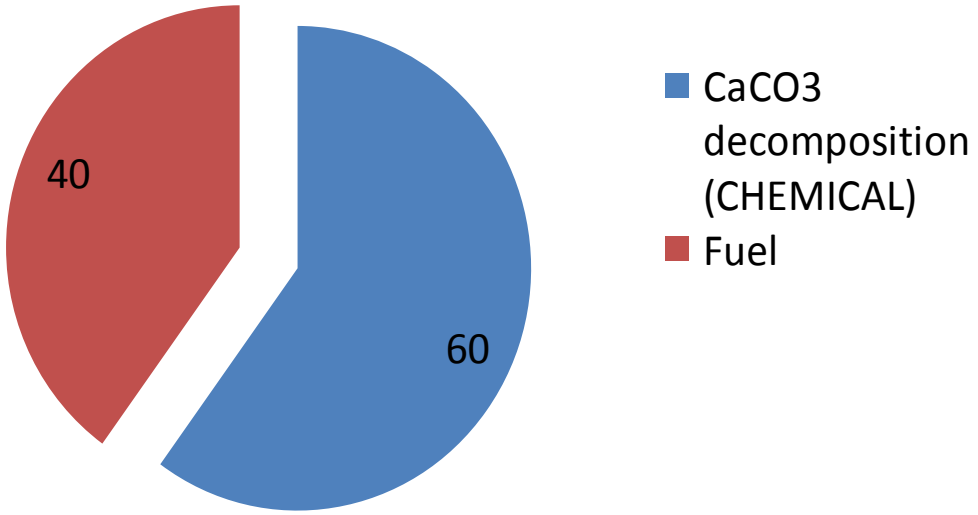
We need profitable solutions for developing countries

Origins of CO_2 production in the cement industry

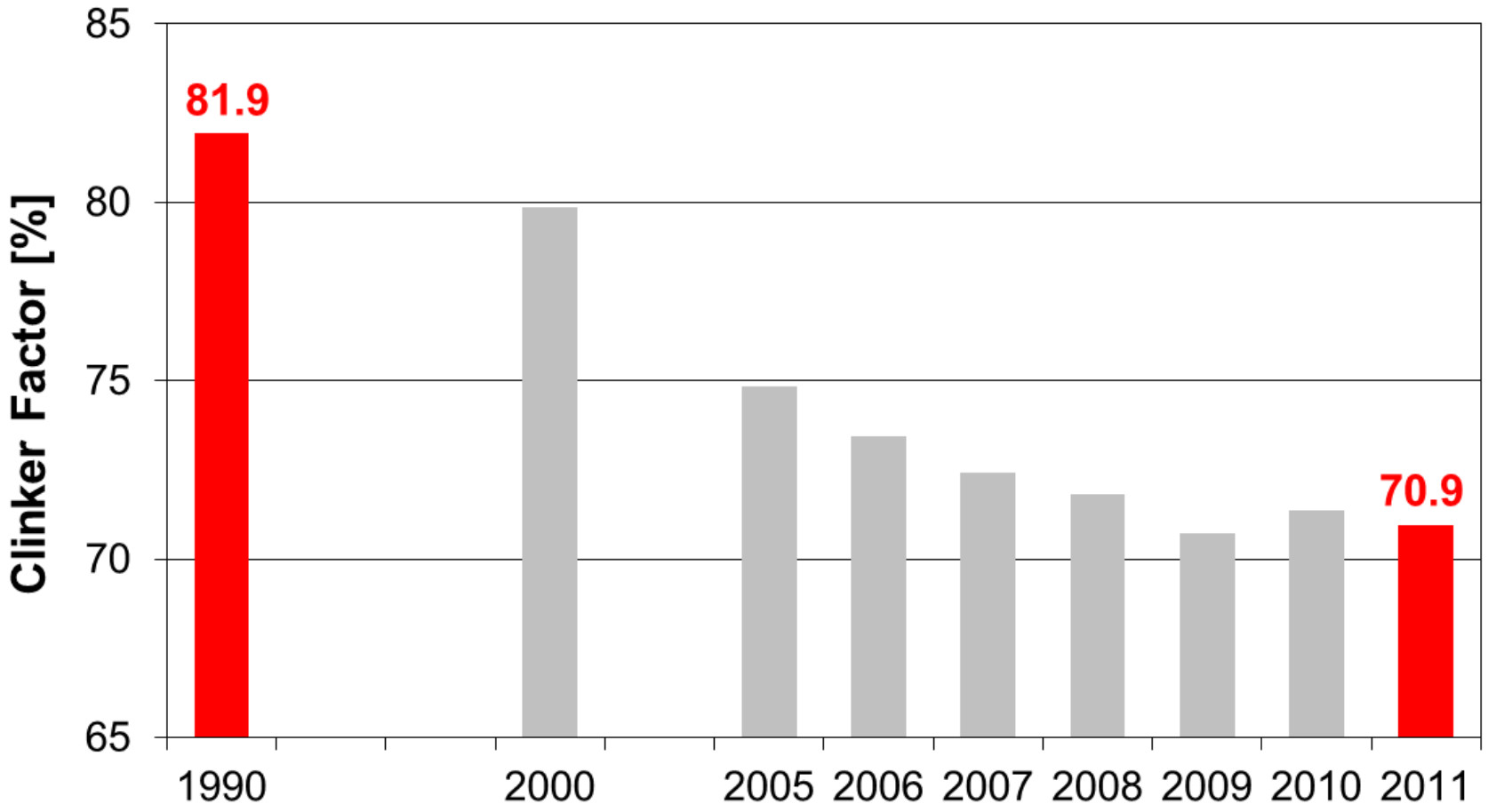
1 tonne of cement leads to the emission of 650 – 900 kg CO_2

The production process is highly optimised
Around 80% of thermodynamic limit.
it is estimated that **< 2%** further savings can be made here

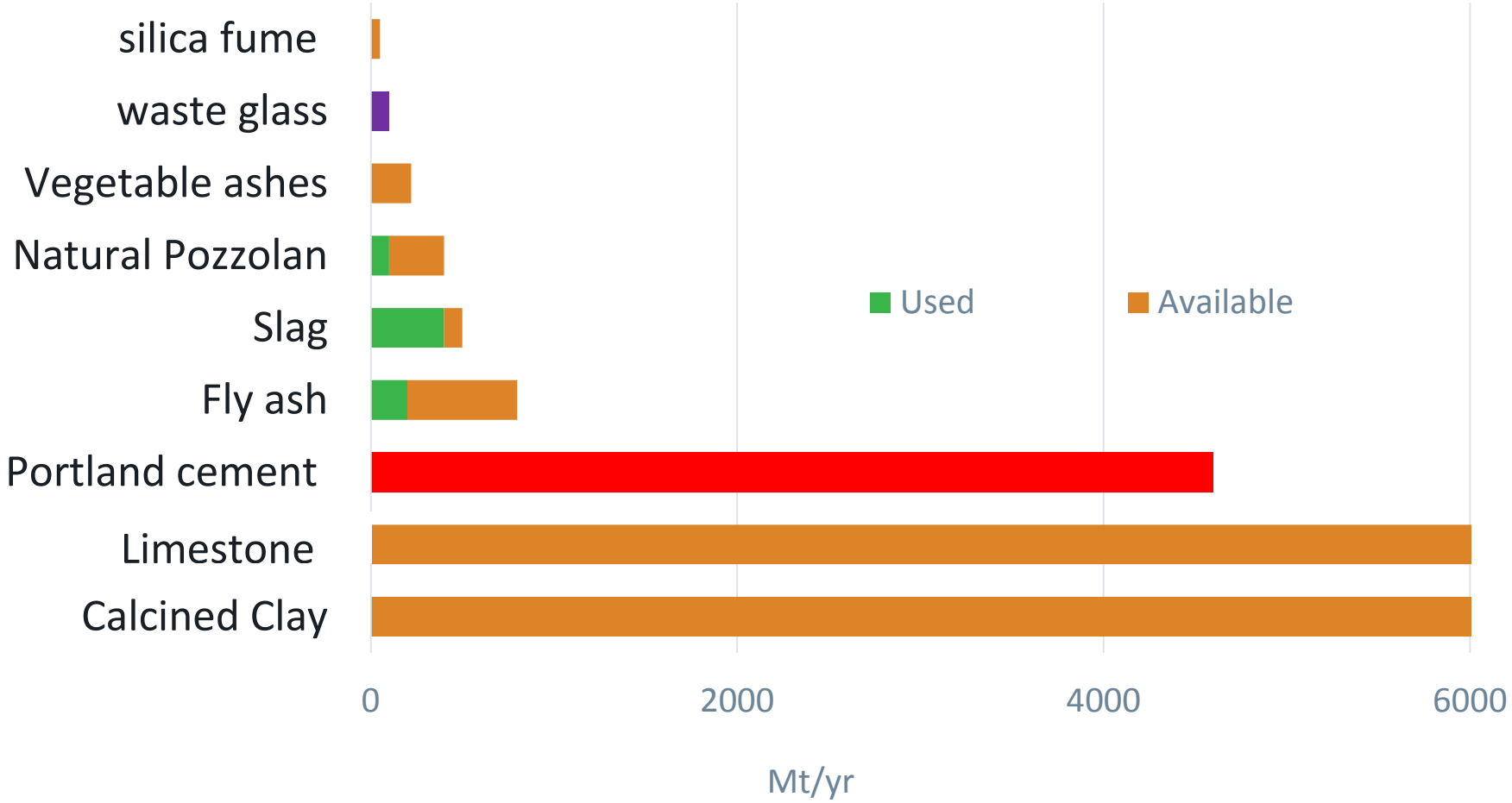
Use of waste fuels, which can be **> 80%** reduces the demand for fossil fuels



Evolution of clinker substitution

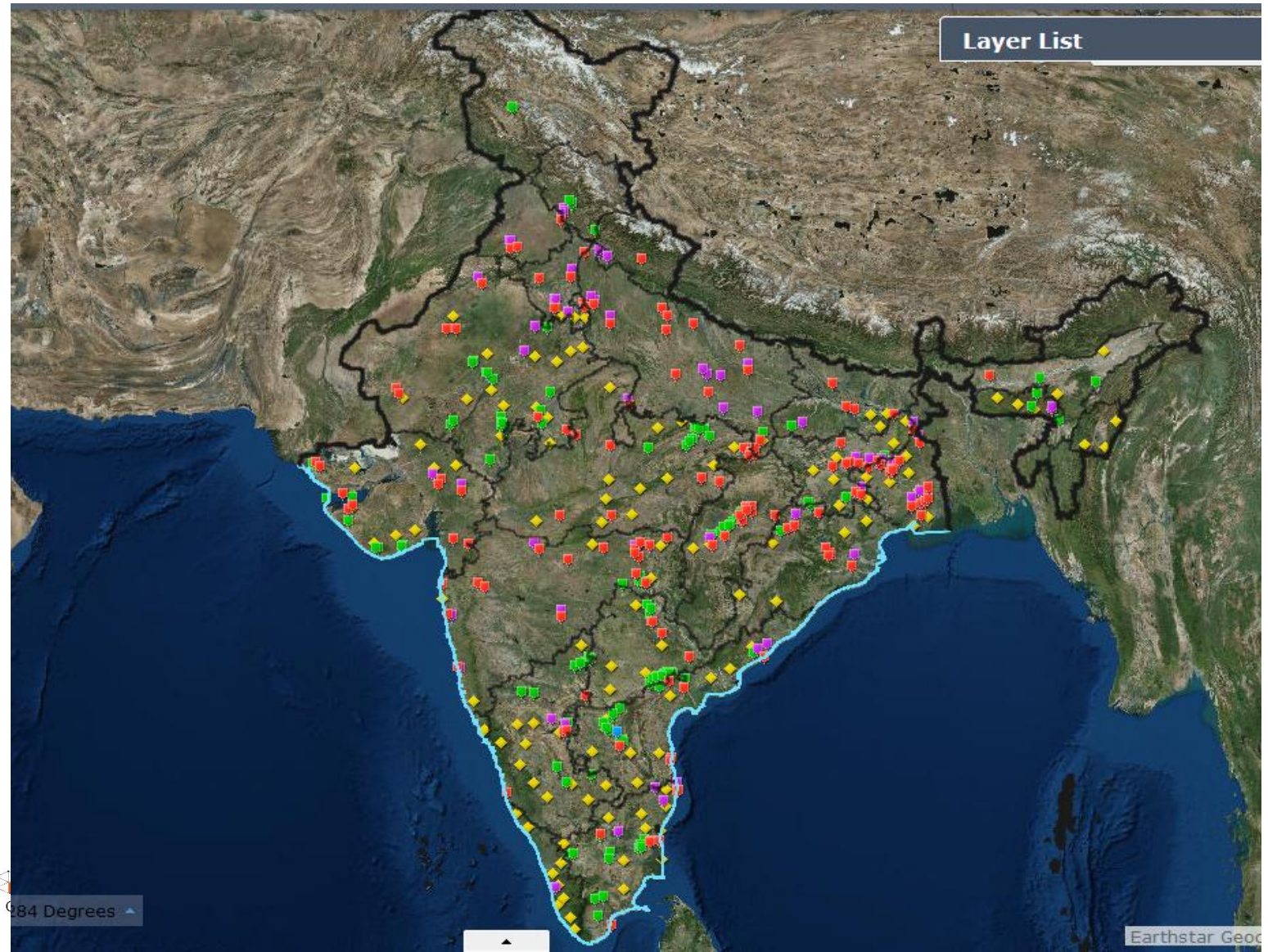


Alternate materials availability

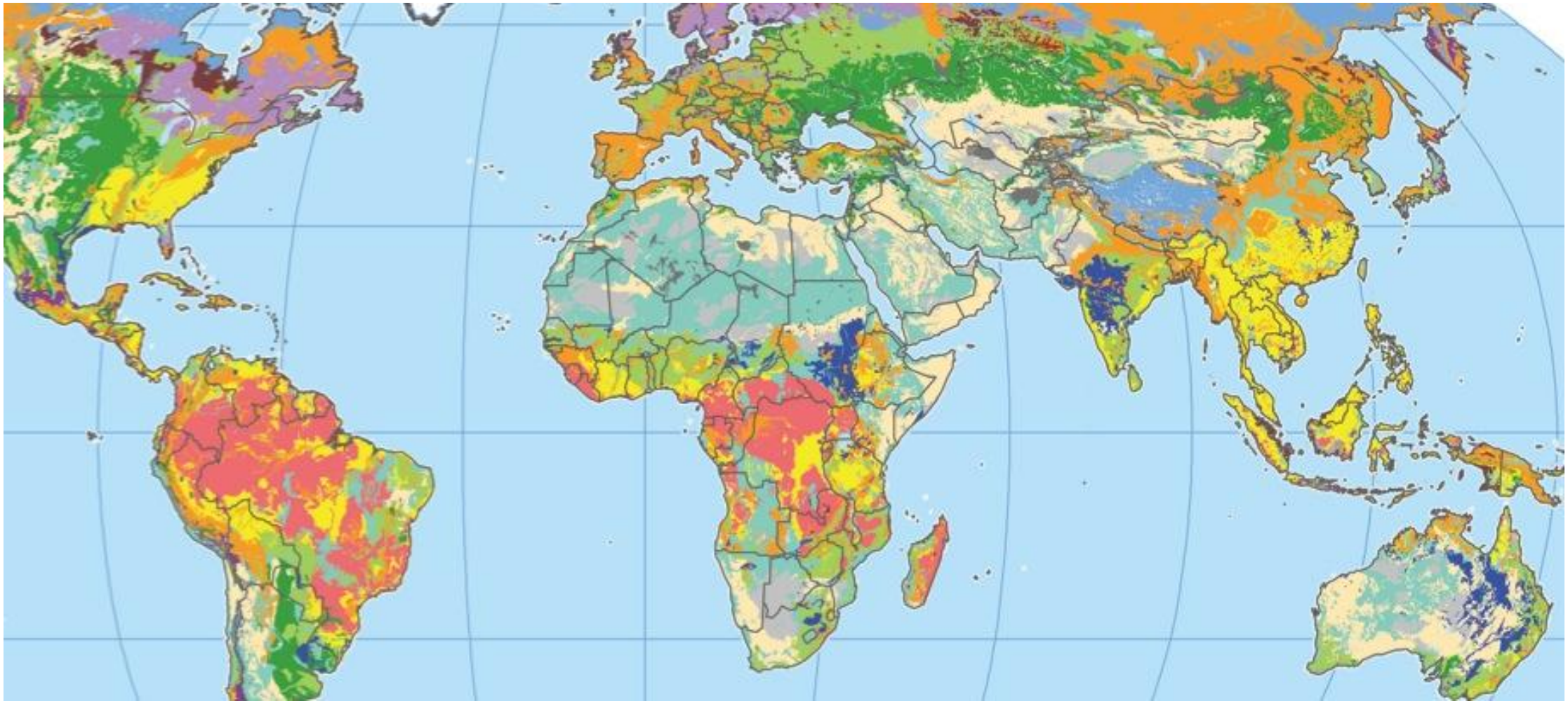


Resource availability for the Indian cement industry

- Grinding units
- Integrated cement plants
- Thermal power plants
- China clay mines

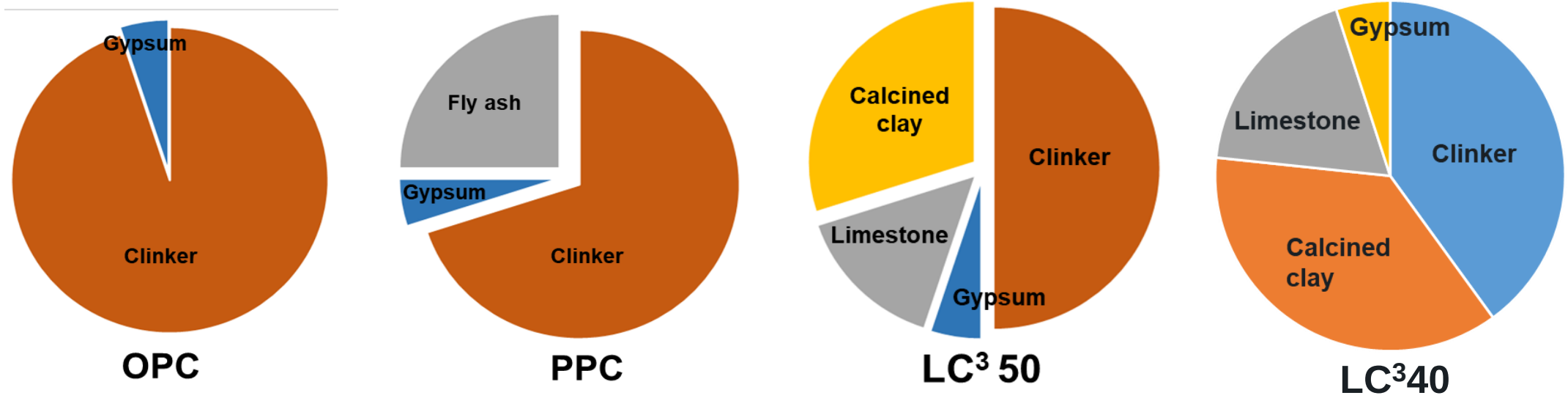


Worldwide availability of clay




Limestone
Calcined
Clay
Cement
LC3

The Limestone Calcined Clay Cement blend – LC^3



LC^3: Advantages

- Clinker factor reduced to 50%
- Use of moderate quality clays and low grade limestone resources
- Low temperature calcination of kaolinitic clays (800^0C)
- Saving of around 30% CO_2 emissions compared to Portland Cement

Raw materials used – china clay

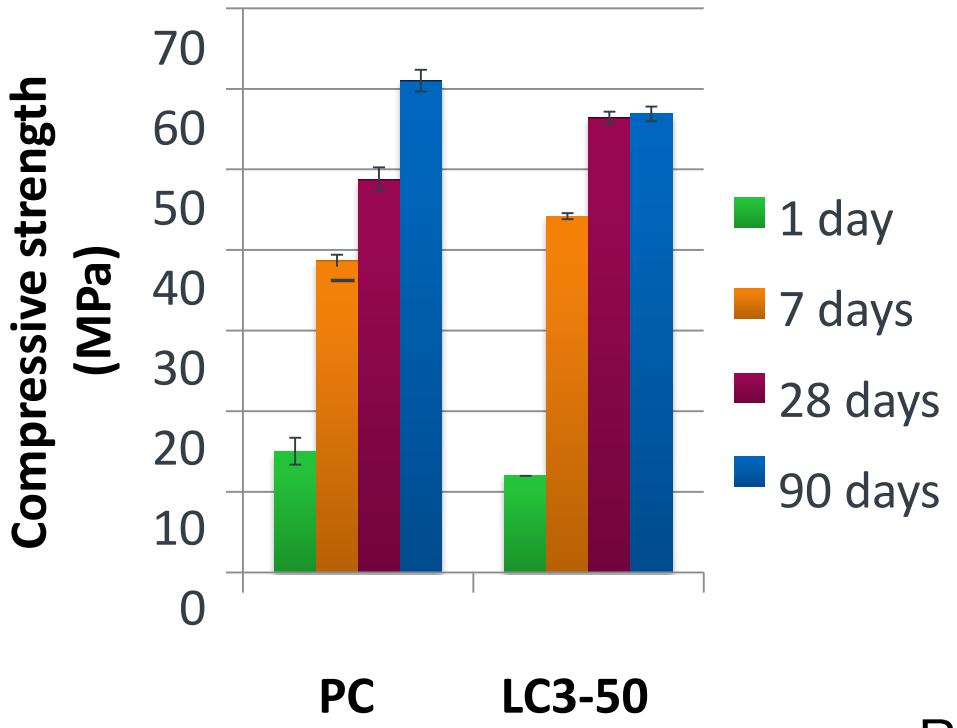
Raw materials used – Limestone

Production scale diversity

Robust system

- Similar quality at any scale of production
- Redundant rotary kilns can also be used

Quality and durability



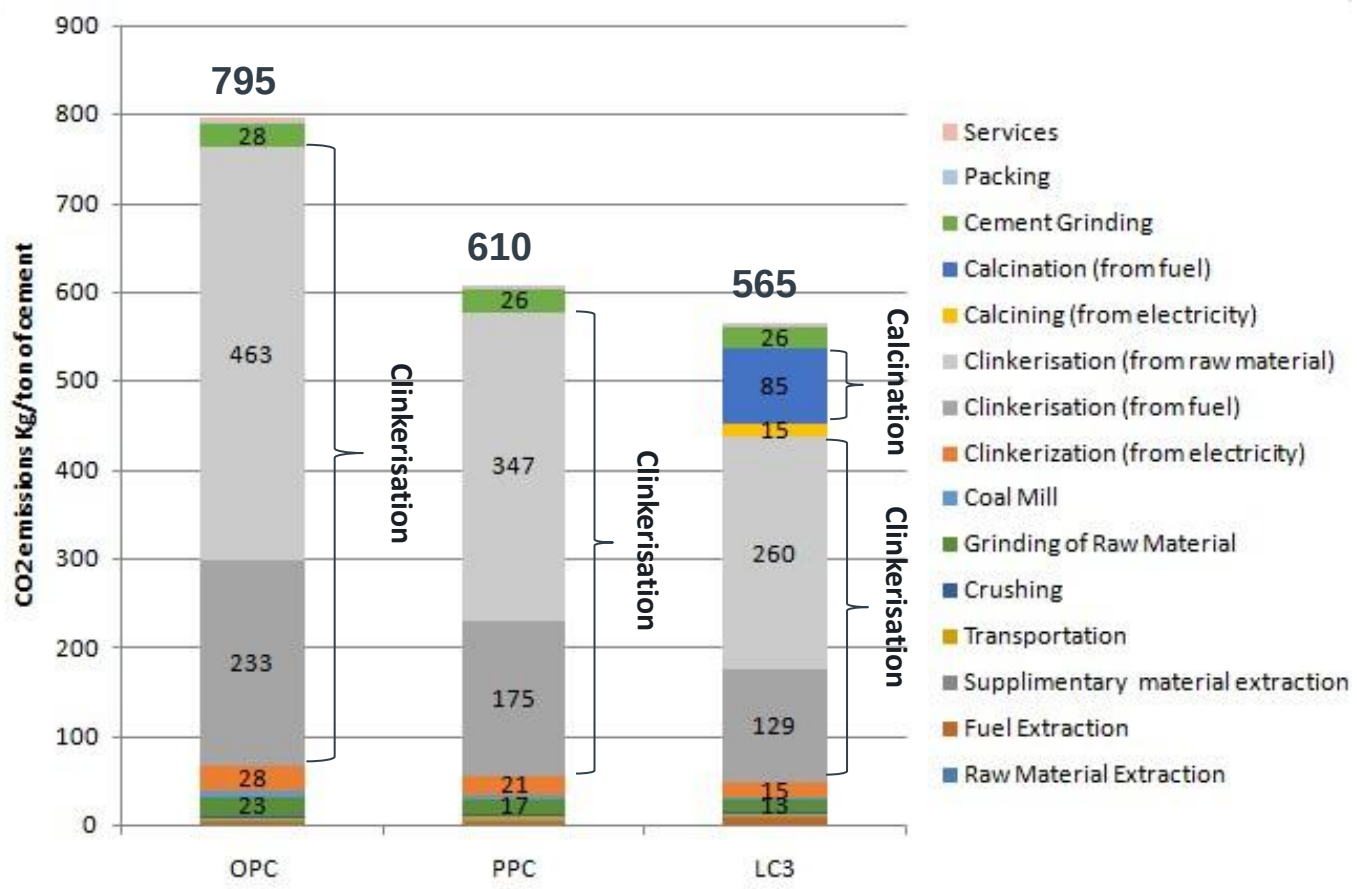
Results:

- Significant refinement of porosity even at 3 days
- Better chloride resistance
- ASR resistant
- Good flow ability with addition of superplasticizers

Product and production diversity

Application diversity

Process wise CO_2 savings – Ground to Gate

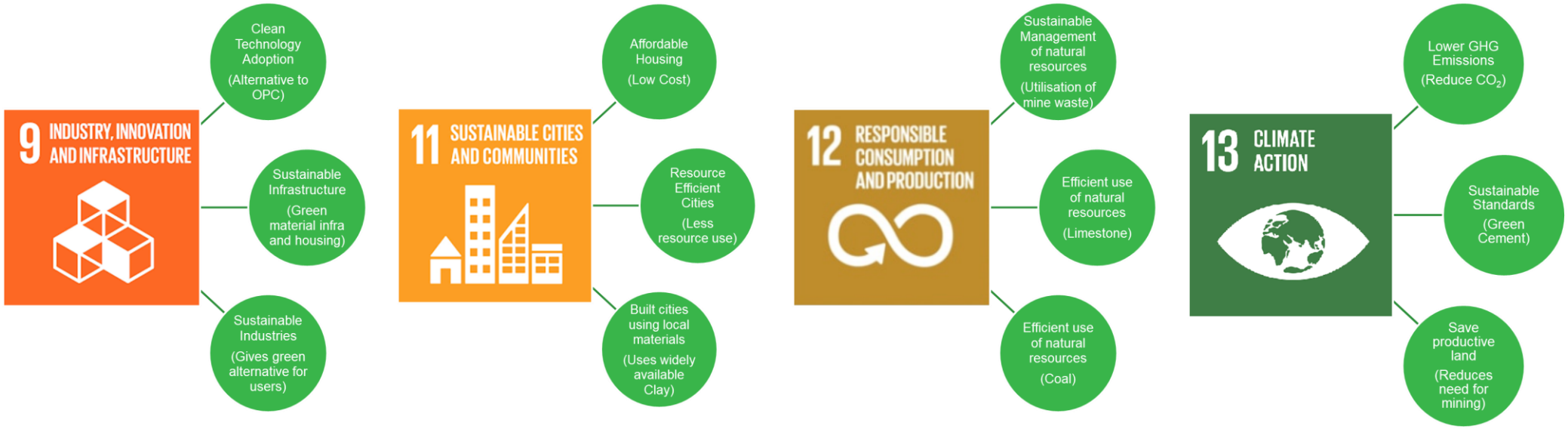


Demonstrated benefits

CO_2 savings - 48 kg/m^2

Resource savings - 164 kg/m^2

Sustainability indicators



Thank you

More information on: www.LC3.ch

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