Reducing the environmental footprint of building materials by enabling the circular economy

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Concrete is needed to develop new and smart cities as well as to respond to a growing middle class and population growth at large.

Growth in cement use over last 70 years

Source: UNEP Report (2016) "Eco-efficient cements"
HeidelbergCement has committed to doing more with less

SUSTAINABILITY COMMITMENTS 2030

DRIVING ECONOMIC STRENGTH AND INNOVATION

ACHIEVING EXCELLENCE IN OCCUPATIONAL HEALTH AND SAFETY

REDUCING OUR ENVIRONMENTAL FOOTPRINT

ENABLING THE CIRCULAR ECONOMY

BEING A GOOD NEIGHbour

ENSURING COMPLIANCE AND CREATING TRANSPARENCY
Cement production is at the heart of industrial ecology

HeidelbergCement recovers finite resources to minimise primary energy consumption
Various levers in HeidelbergCement’s strategy help lower the CO₂ footprint of its products by means of circular solutions

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<th>Alternative raw materials</th>
<th>Alternative Fuels</th>
<th>Carbon Capture</th>
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| • Reduction of clinker content in cement and concrete | **Biomass** (zero emissions)  
  • sewage sludge  
  • Wood, paper, carton  
  • animal meal, animal fat  
  • animal bone meal | • Pilots on capture technologies in Norway, Belgium, Italy |
| • Alternative cementitious systems | **Other fuels**  
  • waste oil, tyres  
  • RDF | • Commercial use of CO₂ to generate biomass (fish meal) in Morocco on non-arable land |
| • Examples:  
  [Image: Fly-ashes cement used for a dam in Morocco]  
  [Image: Use of slag cement for basements and massive construction parts for a power plant in Poland] | | • Recarbonation of concrete: over its lifecycle, concrete structures naturally take up 10-25% of CO₂ emitted during calcination process  
  → **Life-cycle thinking is key!** |

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Circular Economy Stakeholder Dialogue
Further innovation includes a circular carbon solution for producing aggregates and building materials with aesthetic value

**Light-weight aggregates from CO₂**

**CARBON8 project in Estonia**

- **Carbonating CaO-rich ashes** with CO₂ produces light-weight aggregates
- 70k tonnes of aggregates **part of HC-Estonia sales**
- **EUR 3m investment** by HeidelbergCement
- Construction and permitting planned for 2018

**Aesthetic material reducing air pollution**

**i.active BIODYNAMIC cement**

- High performance, highly flowable cement mortar for non-structural architectural precast elements
- 80% recycled aggregate
- **Fully recyclable** after use as an inert material
- Use of **photocatalytic additives** (TX-Active) for reduction of air pollution.
- 80% White Carrara marble (scrap) + White cement (<20%) + Additives

Milan EXPO 2015: palazzo ITALIA
Reducing the environmental footprint in building materials by enabling the circular economy

Thank you for your attention.

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