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The European Cement Association

THE CEMENT & CONCRETE INDUSTRY: READY FOR FUTURE CHALLENGES !!!

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Finnish Concrete Industry Association

Koen Coppenholle, Chief Executive CEMBUREAU

WHAT WILL THE FUTURE LOOK LIKE ?

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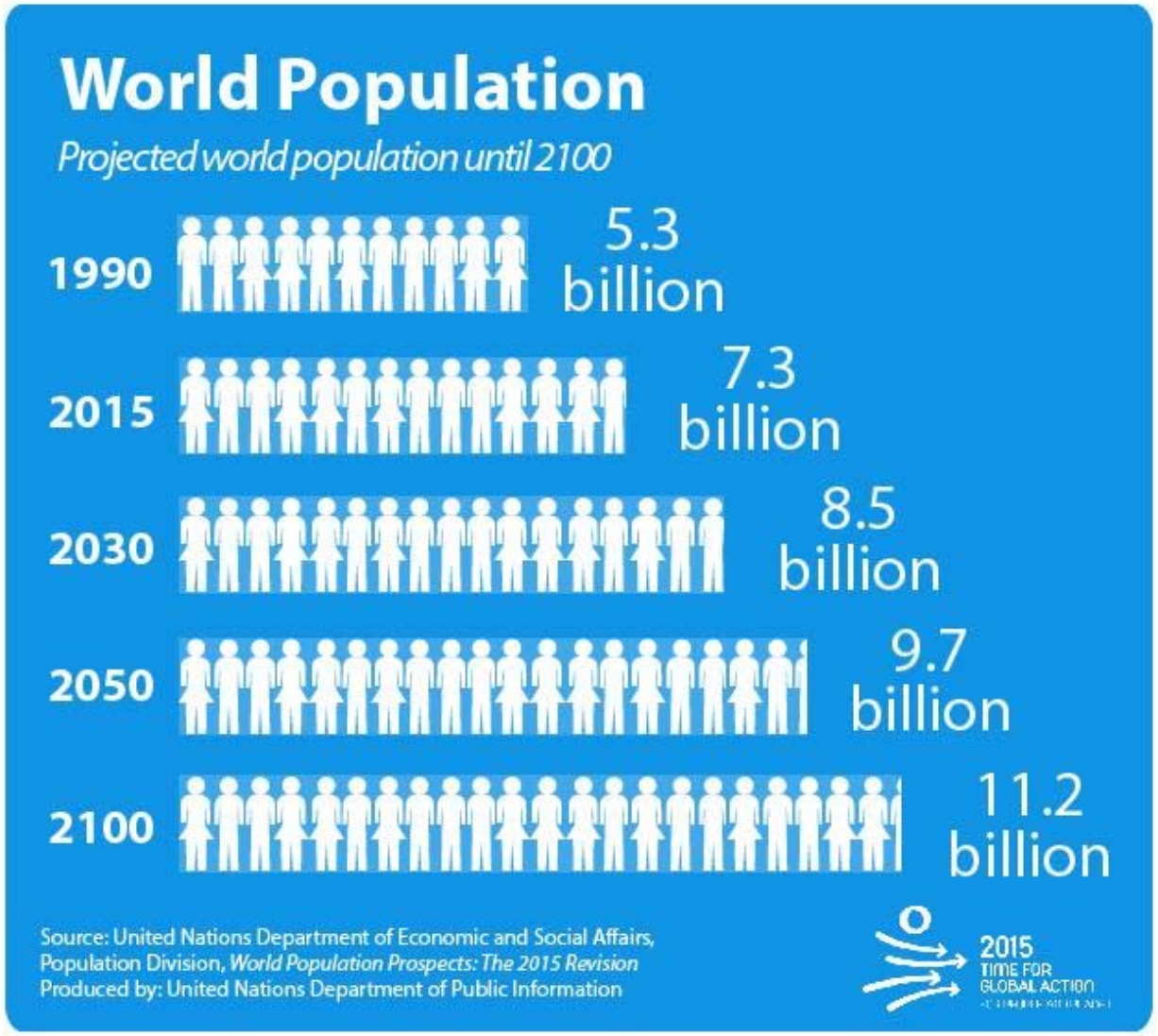
POPULATION GROWTH



- **2 out of 3 people will live in cities**
- **Growth will concentrate in Africa & Asia / decrease in Russia, Japan, Europe**
- **Need for housing and infrastructure**

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WHAT PEOPLE WANT

SMART CITIES

DURABILITY

RESILIENCE

ENERGY EFFICIENT BUILDINGS

AFFORDABILITY

ELECTRICAL CARS

LESS CO_2

DIGITAL HIGHWAYS …

ARE CEMENT & CONCRETE PART OF IT ?

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WE CAN OFFER SOLUTIONS

SUSTAINABLE CITIES

INFRASTRUCTURE

ENERGY

SAFE DRINKING WATER

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CONCRETE AS ENABLER FOR THE LOW CARBON ECONOMY

SUSTAINABLE TRANSPORT

RENEWABLE ENERGY

THERMAL MASS

HOW WILL WE TACKLE IT?

SOME BACKGROUND: CEMENT PRODUCTION 2016

EVOLUTION SINCE 2001

169 million tonnes

225 million tonnes

4.1 bn tonnes

2.4 bn tonnes

661 million tonnes

75.4 million tonnes

30 million tonnes

85.9 million tonnes

88 million tonnes

290 million tonnes

102 million tonnes

CEMENT CONSUMPTION PER CAPITA: WORLD OVERVIEW

- World (cement consumption kg/inhab.)

1913	1953	1993	2013	2014	2015	2016
25	68	232	557	553	574	565

- Some consumers categorized by size (cement consumption kg/inhab.)

Large		Medium		Small	
Qatar	2950	Russia	436	Burundi	19
Saudi Arabia	1922	EU28	307	Rwanda	45
China	1705 (300 in 1993, 6 in 1953)	USA	287	Chad	57
		India	208 (65 in 1993, 10 in 1953)		

Source: ICR, Global Cement Report, 12th Edition, June 2017 & CEMBUREAU, World Cement Market in Figures, 1913-1995

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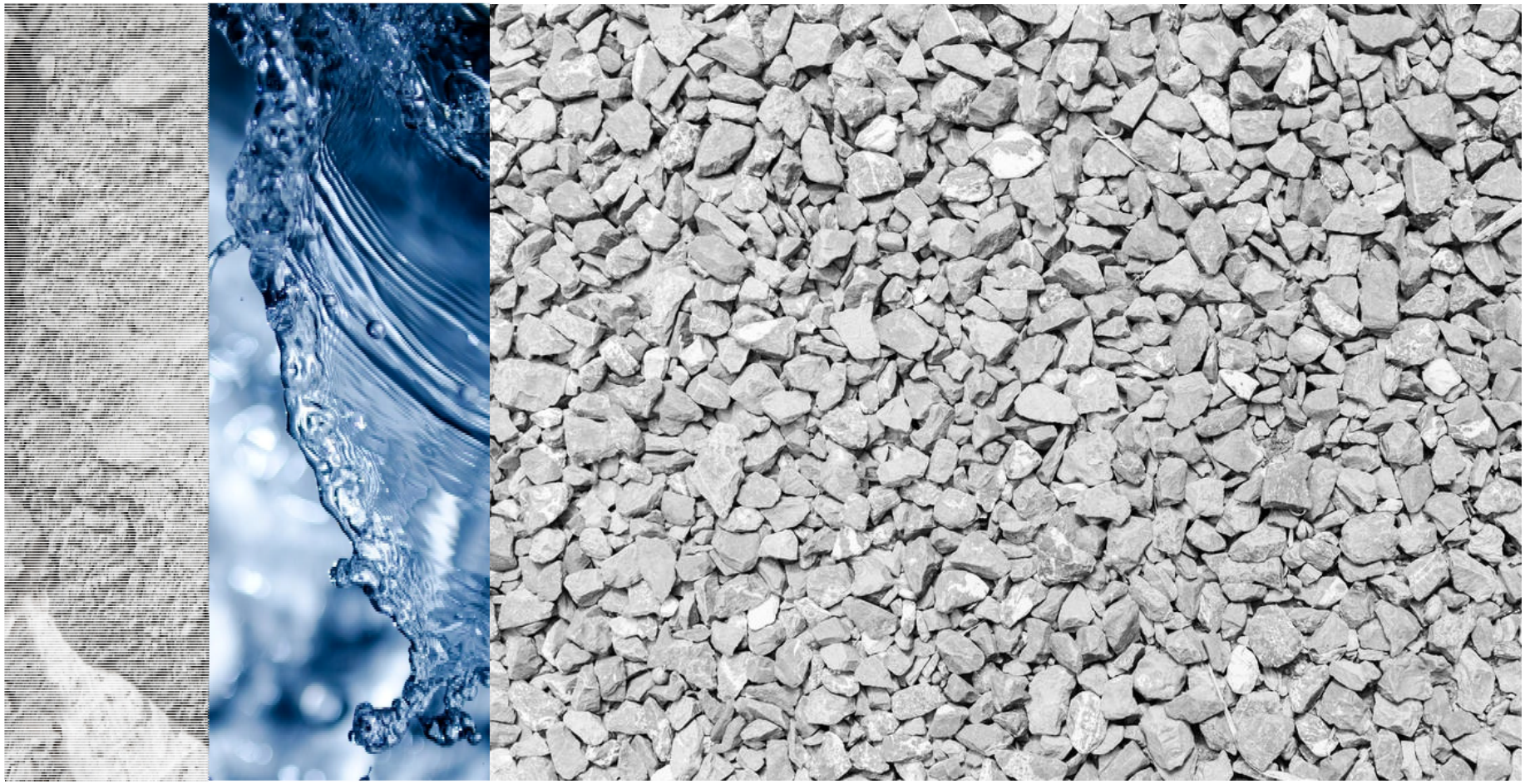
SMALL REMINDER …

Concrete =



Cement (10%-15%)

Water (15%-20%)

Aggregates (65%-75%)

TAKING RESPONSIBILITY ALONG THE SUPPLY CHAIN

quarries → raw materials → fuels → clinker & cement production

CO_2 and ENERGY INTENSIVE

→ concrete in the built environment →

recycling end-of-life

LOW CARBON PRODUCT THAT CONTRIBUTES TO CARBON NEUTRALITY ALONG THE VALUE CHAIN

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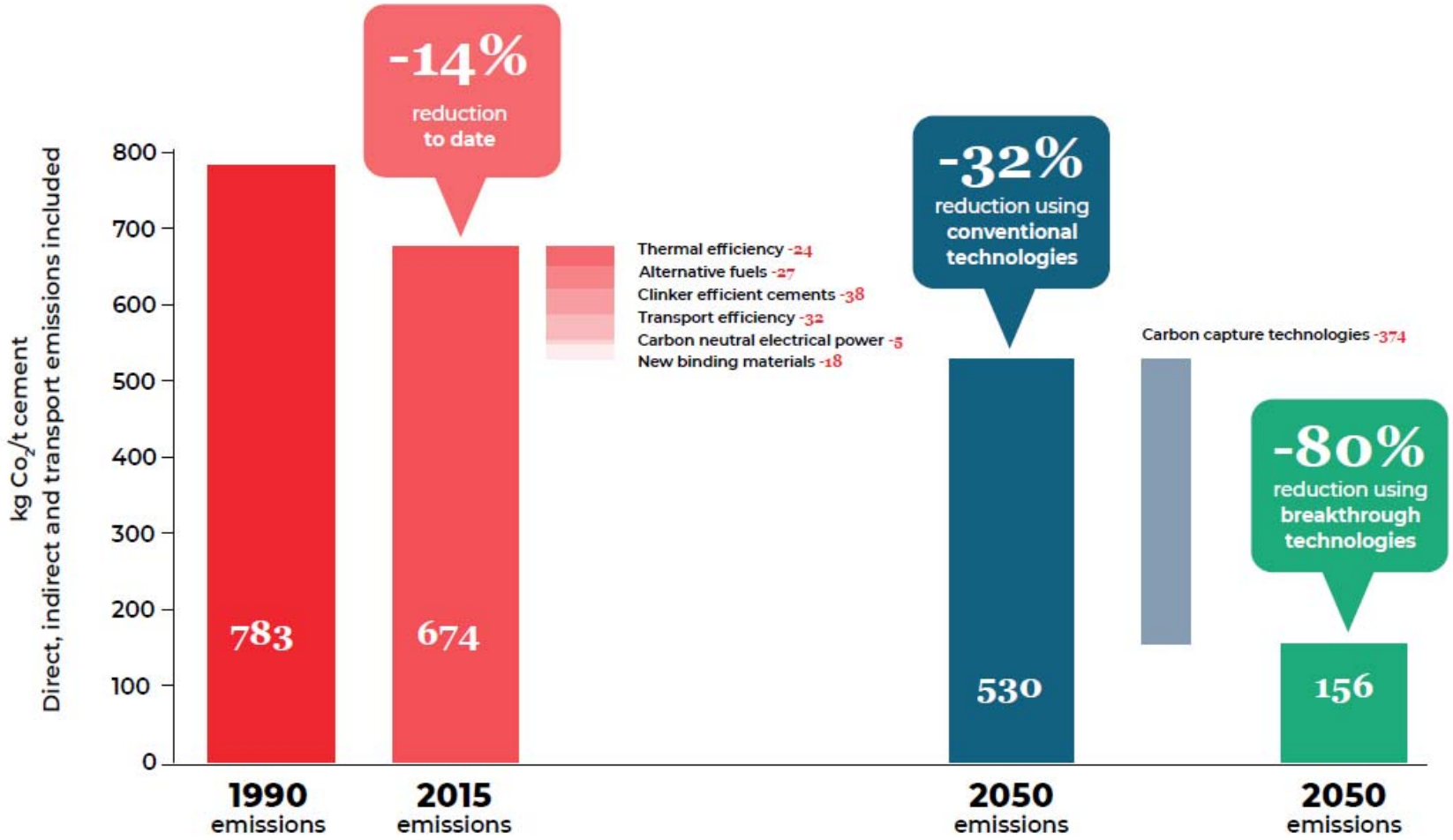
CO_2 REDUCTION MEASURES: 2050 PERSPECTIVE



Source: ECRA and CEMBUREAU own calculations

Note: Other technologies (e.g. electrical efficiency, alternative raw materials) not displayed as long term reduction potentials are severely limited

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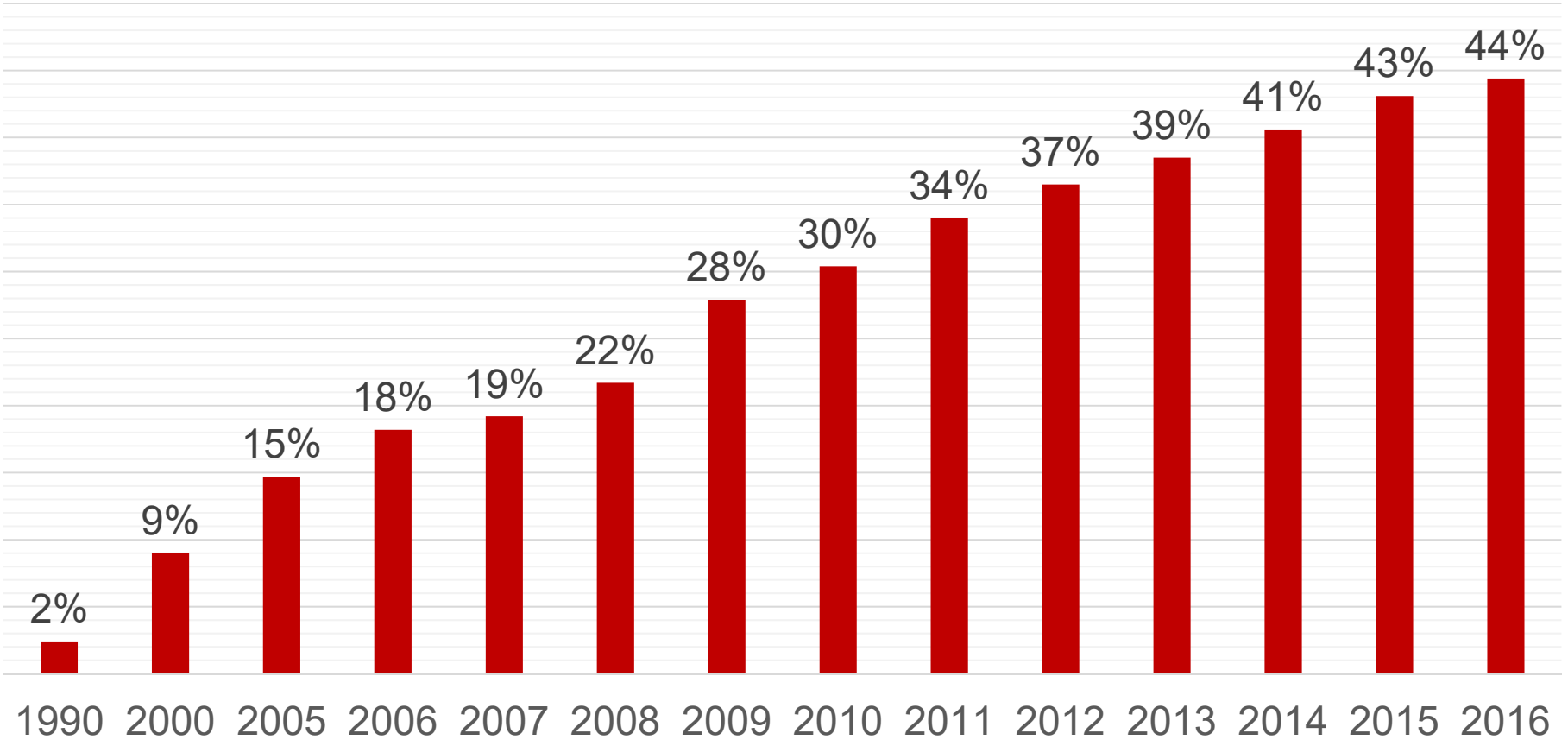
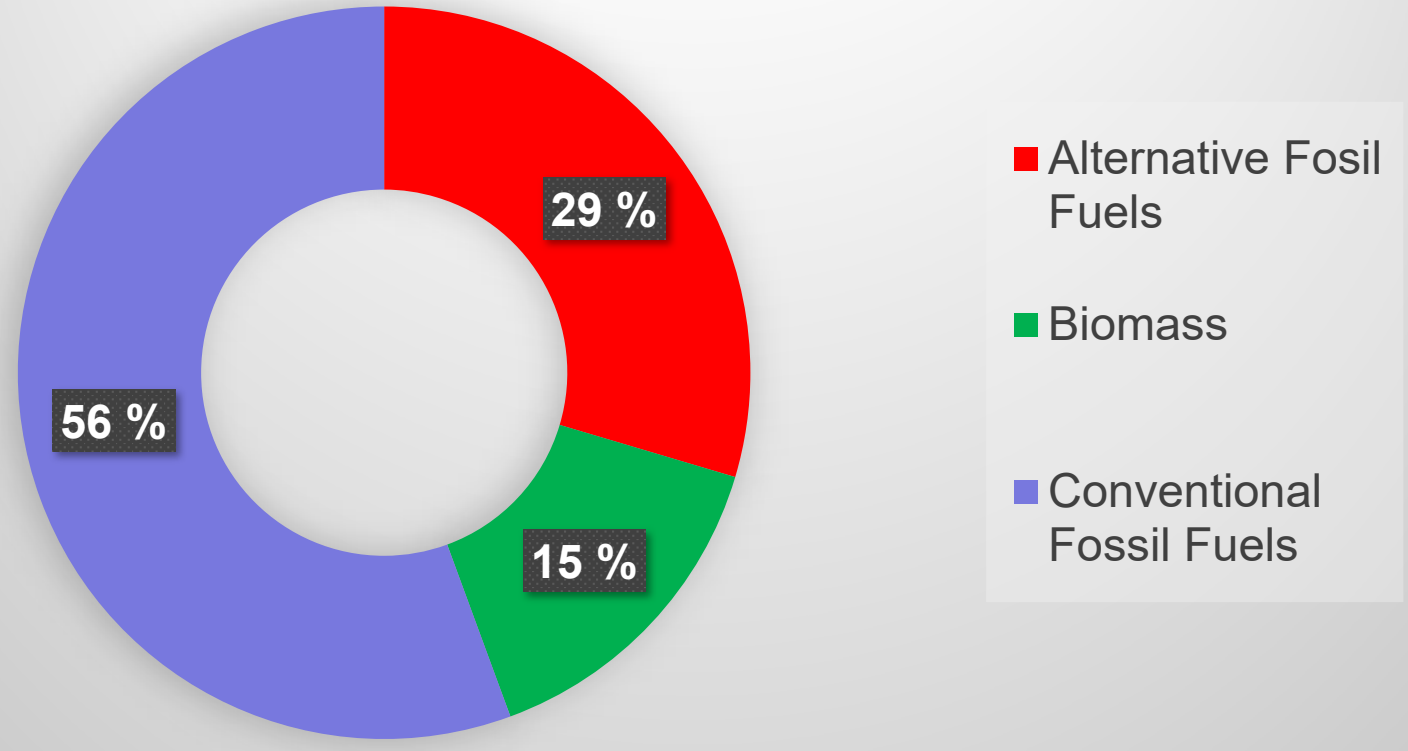
REPLACING FOSSIL FUELS …

% of Thermal energy from Alternative Fuels in the Cement sector in the EU-28



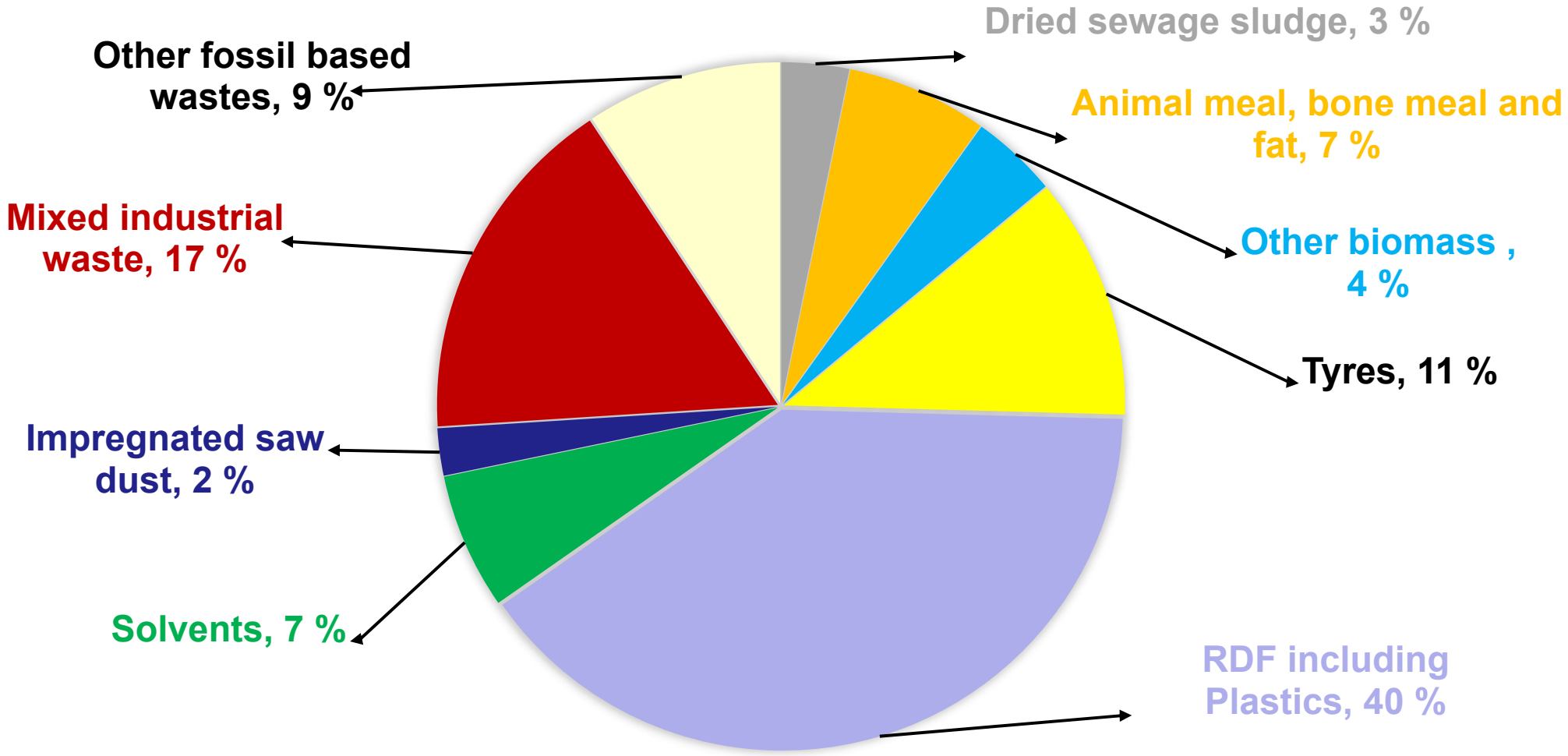
ALTERNATIVE FUELS STATISTICS

THERMAL ENERGY CONSUMPTION BY FUEL TYPE for the year 2016



INDUSTRIAL SYMBIOSIS CHAMPIONS

BREAKDOWN OF ALTERNATIVE FUELS 2016



INVESTING IN BREAKTHROUGH TECHNOLOGIES TO REDUCE PROCESS CO_2 EMISSIONS

- Carbon capture

  Post-combustion: Norcem Brevik project (pilot testing); CEMCAP prototype

  Oxyfuel: ECRA, LafargeHolcim / Air Liquide / FLSmidth, CEMCAP

  Move to industrial scale oxyfuel / EUR 90 MM funding required

- Carbon re-use

HEIDELBERGCEMENT → **algae cultivation; methane, CO_2 carbonation**

LafargeHolcim Solidia Technologies

- **develop non-hydraulic binder to produce cement (less limestone / lower kiln temperatures) / 30% less CO_2**
- **concrete production through mineral carbonation of non-hydraulic binder, capturing 300 kg CO_2/t cement**

R&D with support of EU funding

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INNOVATION

➢ Clinker substitution / Lower Carbon Cements

- Continued reduction efforts but constraints (availability of raw materials; product quality,…)

ECO BINDER

➢ New binders / Novel cements

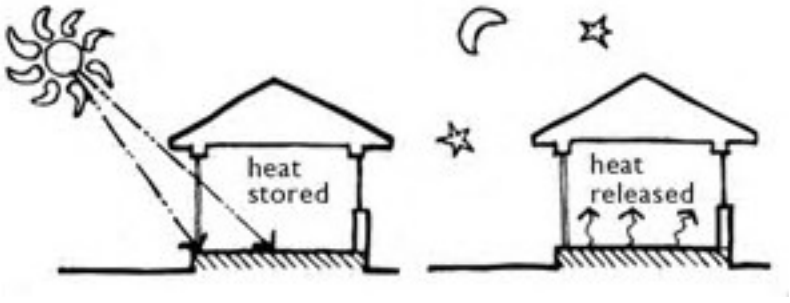
- Low energy demand / CO_2 reduction (around 50%)
- Niche applications / early development
  - **CSA cements, Celitement, Carbonation hardening cement, Magnesium based cements,...**

➢ Product durability remains key (www.nanocem.org)

- Research on impact of different cement types or materials in concrete mix on product quality

GOING DOWN THE VALUE CHAIN

- **Thermal mass** of concrete
- **Energy storage** capacity of concrete
- 25% **CO_2 reduction** per dwelling / 50% **reduction in the need for peak electricity supply capacity** / **savings** up to EUR 300 per household per year



- **Durable**: life cycle between 50-100 years
- **Resilient**: fire-safe; withstands extreme weather conditions

THERMAL MASS ACTIVATION

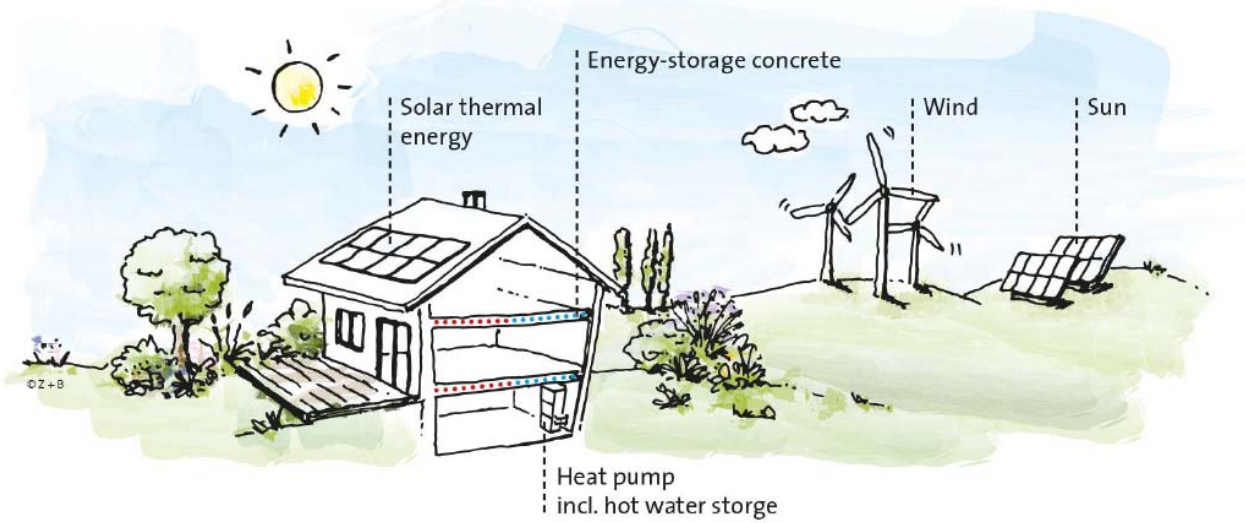
VÖZ
VEREINIGUNG DER ÖSTERREICHISCHEN ZEMENTINDUSTRIE

One sustainable solution!

www.zement.at

Thermal storage of peak loads within the building structure by

- activation of massive building parts in
- nearly zero energy buildings with energy supply
- via heat pump linked to the grid



END OF LIFE / RECARBONATION & RECYCLING

- **Concrete recycling**: crushed concrete can be used as an aggregate in concrete or as a foundation or backfilling for many applications

- **Recarbonation**: exposure of crushed concrete at end of life increases CO_2 uptake through contact of concrete with air / proper recycling allows 25% of originally emitted CO_2 to be recycled / further research ongoing

CONCRETE RECYCLING: NATIONAL ACTION REQUIRED

- C&DW = 25%-30% of all waste generated in the EU
- In a lifetime, an average EU citizen generates 160 tons of C&DW
- WFD sets a 70% C&DW recycling target by 2020
- Protocol focuses on
  - improved waste identification, source separation and collection
  - improved waste logistics
  - improved waste processing

A FACILITATING REGULATORY FRAMEWORK

OVERALL NEED FOR
- **Level playing field**
- **Material neutrality**

For recovery of energy and recycling of materials from waste, we need
- **Landfill ban**
- **National barriers to be addressed**
- **Material recycling counting towards national recycling targets**

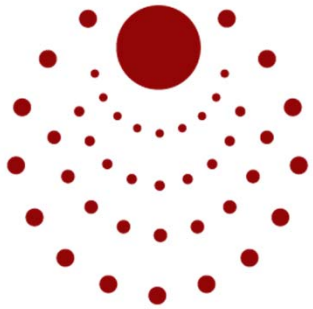
For breakthrough technologies:
- **Consistent and accessible public financing / risk financing**

At the demolition phase
- **Join up with the building sector to increase recyclability of concrete at the end of life**

For cement and concrete in the built environment
- **Standards and building codes that combine environmental, reliability and durability criteria**
- **A building life cycle approach**
- **Recognition of thermal mass and thermal energy storage in energy efficiency and grid discussions**

WE NEED THE FULL VALUE CHAIN TO ENGAGE

That is why we developed the 5C approach …



CLINKER
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CONSTRUCTION
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https://lowcarboneconomy.cembureau.eu/


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