

*Langstone Consulting*

Sustainable | Construction | Strategies | Delivered

**European Minerals Forum**  
**Meeting the Energy Efficiency**  
**Challenge**

**Wed 25 November 2009**

**Mike Gilbert**

# Meeting The Energy Efficiency Challenge

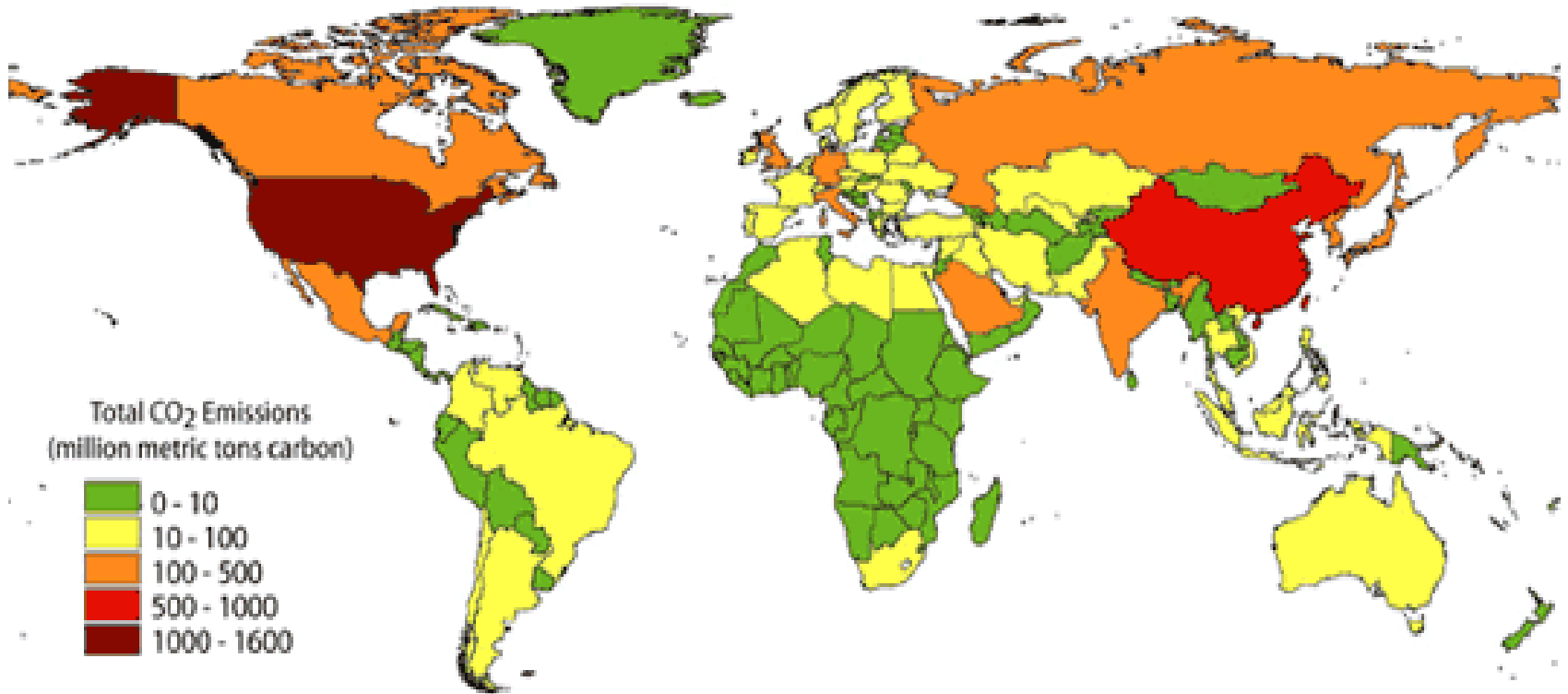
## The Challenge



**Energy – and the Carbon dioxide emission related  
Resources – reducing, recycling and reusing  
Waste – making less of it**

# Meeting The Energy Efficiency Challenge

## The challenge



## CO<sub>2</sub> Emissions by Country

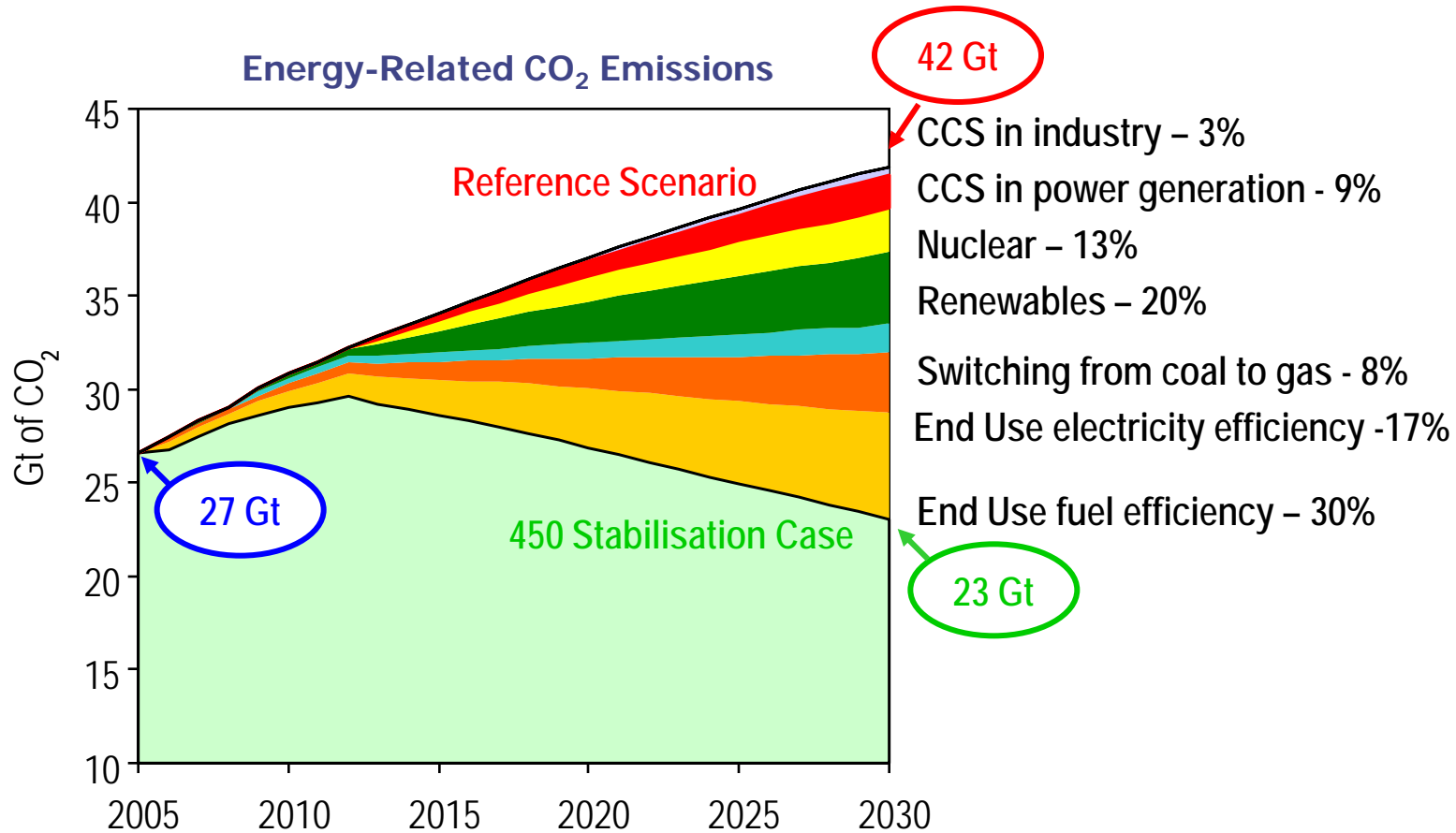
# Meeting The Energy Efficiency Challenge

The challenge

## Strategies for Change

- **Global**
- Regional
- National
- Industry
- Sector
- People

# CO<sub>2</sub> Emissions - 450 Stabilization Case *Achievable or Science Fiction?*

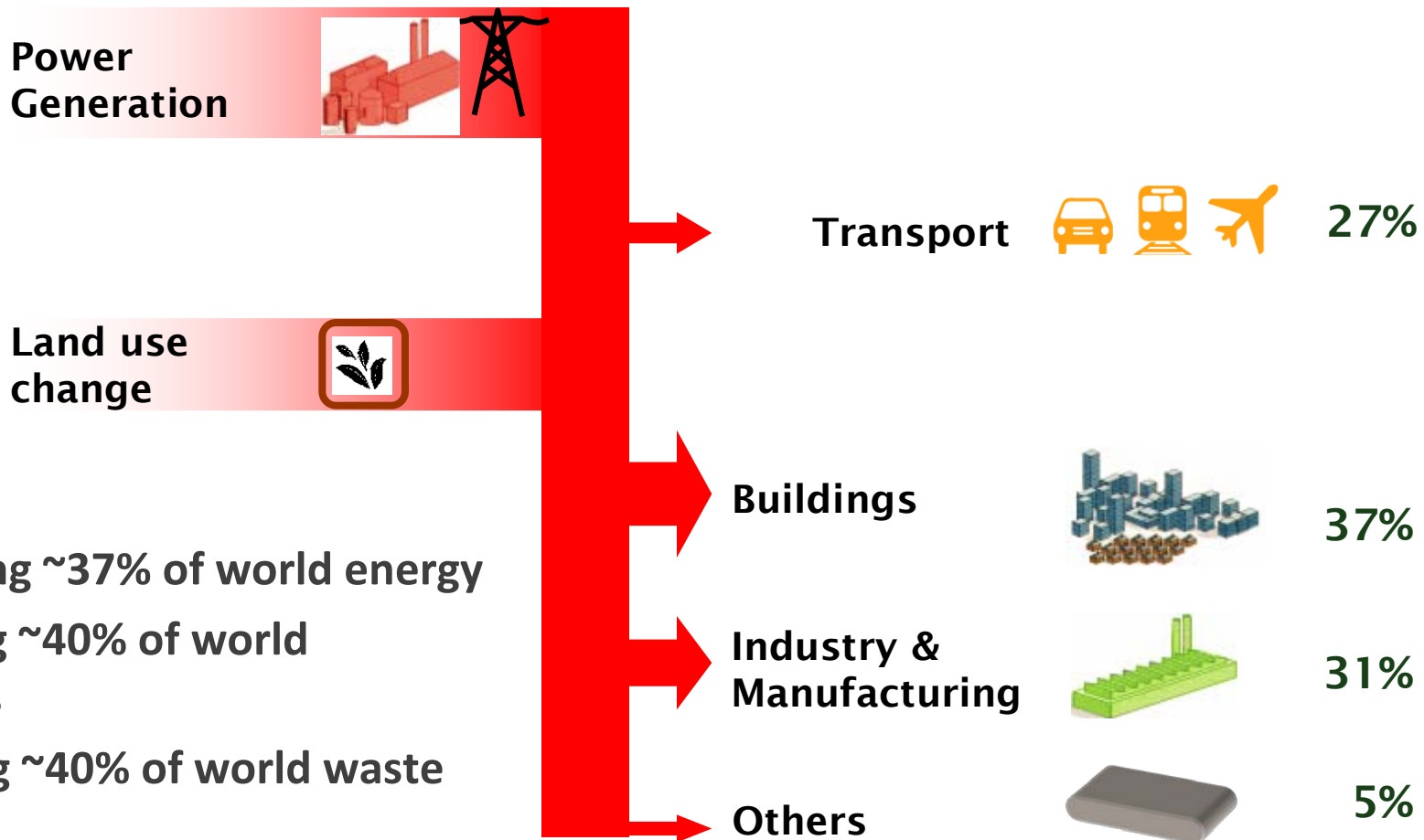


**By 2030, emissions are reduced to some 23 Gt,  
a reduction of 19 Gt compared with the Reference Scenario**

(N. Tanaka, IEA)



# Final Energy Consumption



## Buildings

- Consuming ~37% of world energy
- Exploiting ~40% of world resources
- Producing ~40% of world waste

# Meeting The Energy Efficiency Challenge

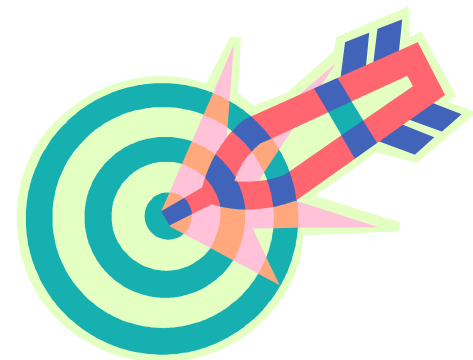
## Buildings; the energy balance

Energy balance in a building's life cycle



1% Demolition  
3% Maintenance

83% Usage



1% Construction  
12% Materials

# Meeting The Energy Efficiency Challenge

The challenge

## Strategies for Change

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# Meeting The Energy Efficiency Challenge

The challenge: CO<sub>2</sub> reduction

## EU commitment to achieve 20% reduction by 2020

- **Sustainable Production and Sustainable Consumption**
- **Energy Efficiency Action Plan**
- **Energy Efficiency in Buildings Directive**
- **Sustainable Construction: Lead Market Initiative**
- **Carbon Capture and Storage : Deployment of CCS in power generation - and industry.**
- **EU ETS with Auctioning for CO<sub>2</sub>**

# Meeting The Energy Efficiency Challenge

EU Action: LMI Sustainable Construction

## Lead Market Initiative: Sustainable Construction - A 'dynamic' for developing new solutions

- **Action 1: Screening Building Regulations**
- **Action 2: Recasting EPBD/'Strategies for Sustainable Construction'**
- Action 4: Award in Public Procurement of Life Cycle Costing
- Action 5: Public Authority Network on Procuring SC
- **Action 6: A European Label for Sustainable Buildings**
- **Action 7: Widening Euro-codes**
- **Action 8: Aligning Construction Product Regulations**
- Action 9: SME's
- Action 10: Insurances/Warranties
- **Action 11: Skills and Competencies**
-

# Meeting The Energy Efficiency Challenge

The challenge

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# Meeting The Energy Efficiency Challenge

## Steps towards Very Low Energy Buildings

### Energy Performance of Building Directive (EPC) (at least)

- Member States to ensure that by **Dec 2020** all new buildings are **Very Low Energy** buildings and that the cost benefit analysis over the life cycle is positive
- New public buildings to be **NZEB** by **Dec 2018**
- **Very Low Energy Building** means a building that has a very high energy performance. The zero or low amount of energy required should as far as possible be covered by energy from renewable sources including renewable energy produced on-site or nearby.

Latest draft: 'Nearly Zero Energy Buildings'

# Meeting The Energy Efficiency Challenge

## The change: Steps towards Very Low Energy Buildings

	2009	2010	2012	2013	2015	2016	2020
Denmark		-25%			- 50%		-75%
Finland		-30-40%					
France			LEB				E+
Germany	-30%		-30%				NFFB
Ireland		-60%		NZEB			
Netherlands		-25%			-50%		ENB
Norway	-25%						LEB
UK		-25%		-44%		NZEB	

LEB = Low Energy Building; ENB = Energy Neutral;  
 NZEB = Near Zero Energy; NFFB = Non-Fossil Fuel Building

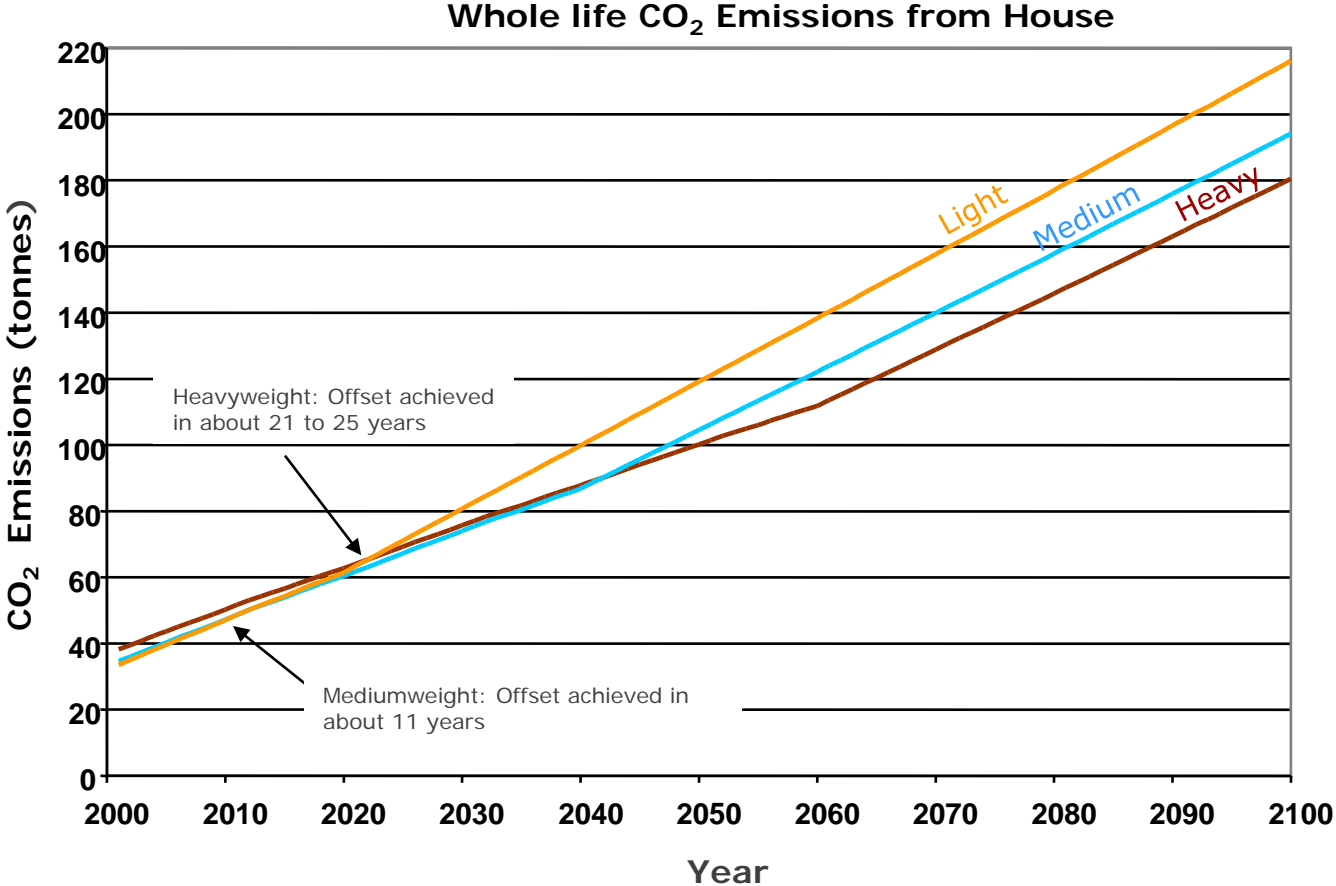
# Meeting The Energy Efficiency Challenge

## Whole life considerations: Thermal Mass

Adaptation/Mitigation  
of Climate Change  
The Case for  
Thermal Mass



(source TCC)



# Meeting The Energy Efficiency Challenge

## Refurbishment to Passive House Standards



## Thermal Imagery in Frankfurt

# Meeting The Energy Efficiency Challenge

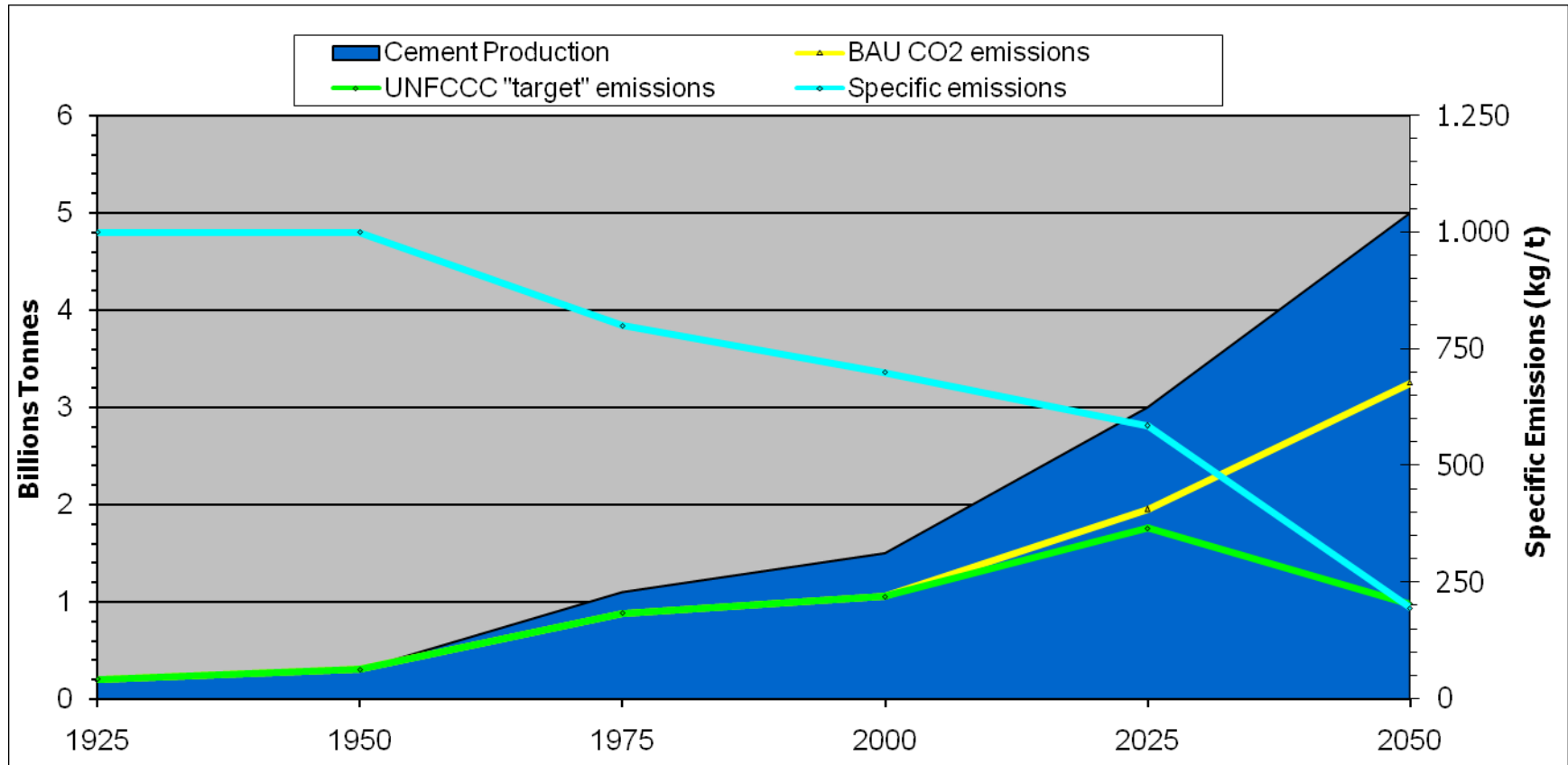
The challenge

## Strategies for Change

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# Meeting The Energy Efficiency Challenge

## The challenge: Cement production

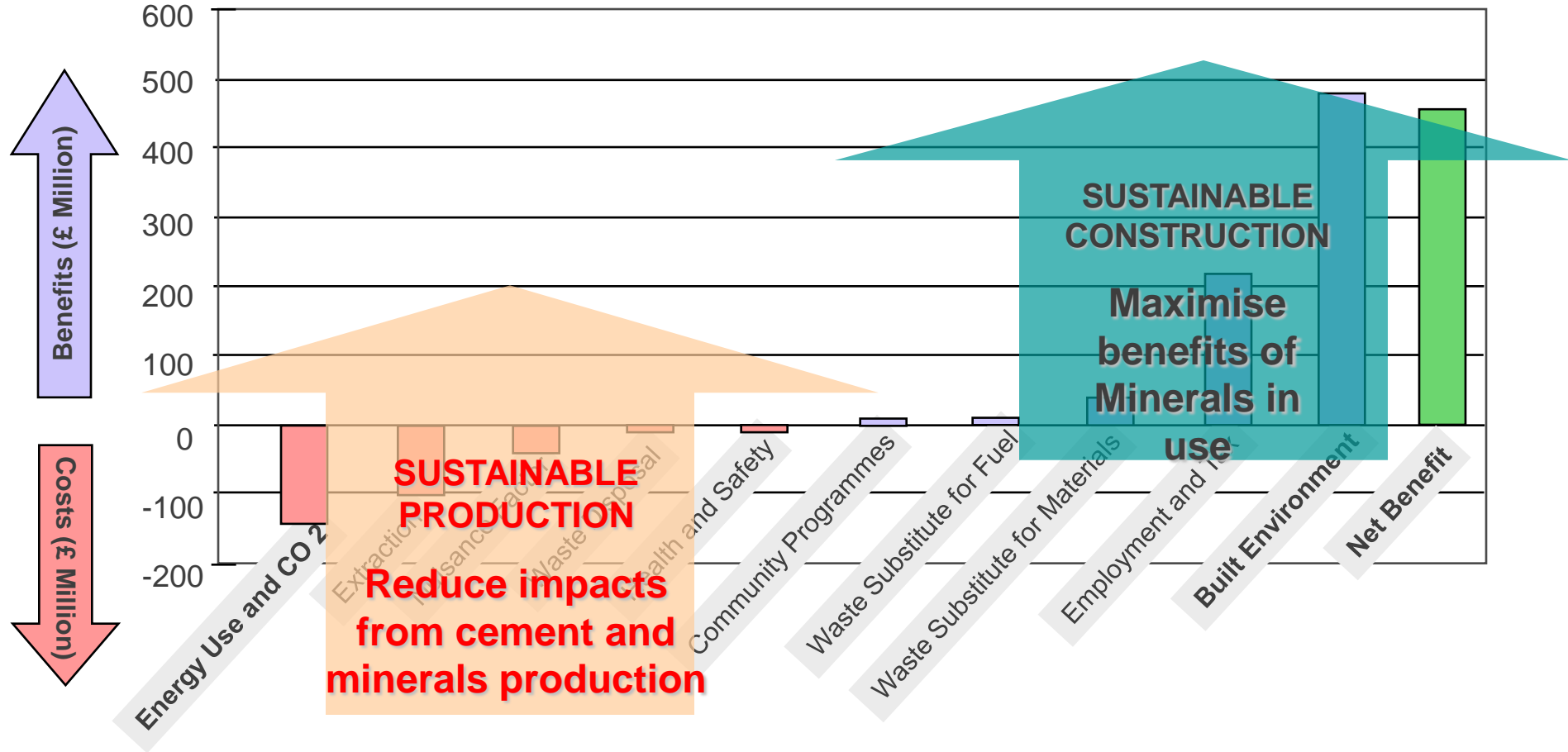


- Cement production doubles in next 40 years. (IEA forecast)
- Society "requires" global emissions to half by 2050. (Stern, IPCC)
- Equates to a specific emissions decrease of approximately 70%.

Source: WBCSD

# Meeting The Energy Efficiency Challenge

The challenge: cement and concrete business case



# Meeting The Energy Efficiency Challenge

A Global Sector response

## World Business Council for Sustainable Development: Cement Sector Initiative

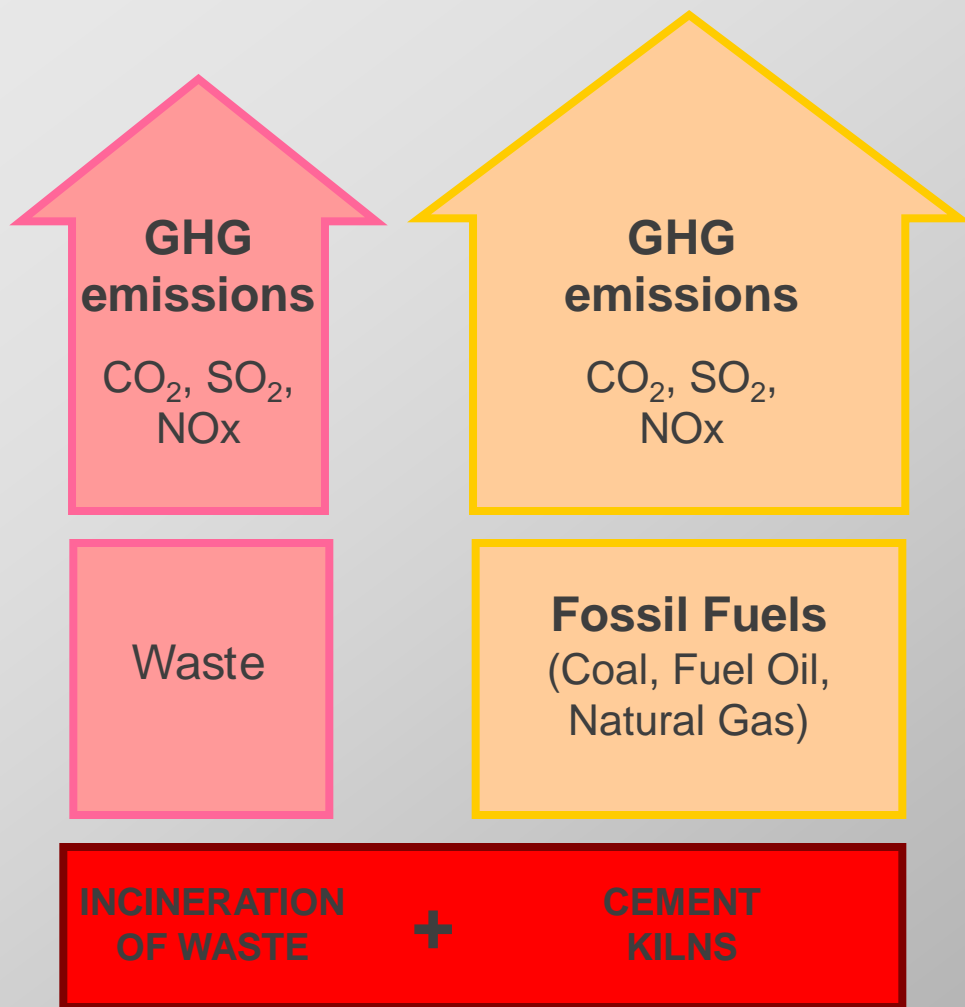
Agenda for Action on:

- Climate Protection
- Fuels and raw materials use
- Employee health and safety
- Emissions reduction
- Internal business processes

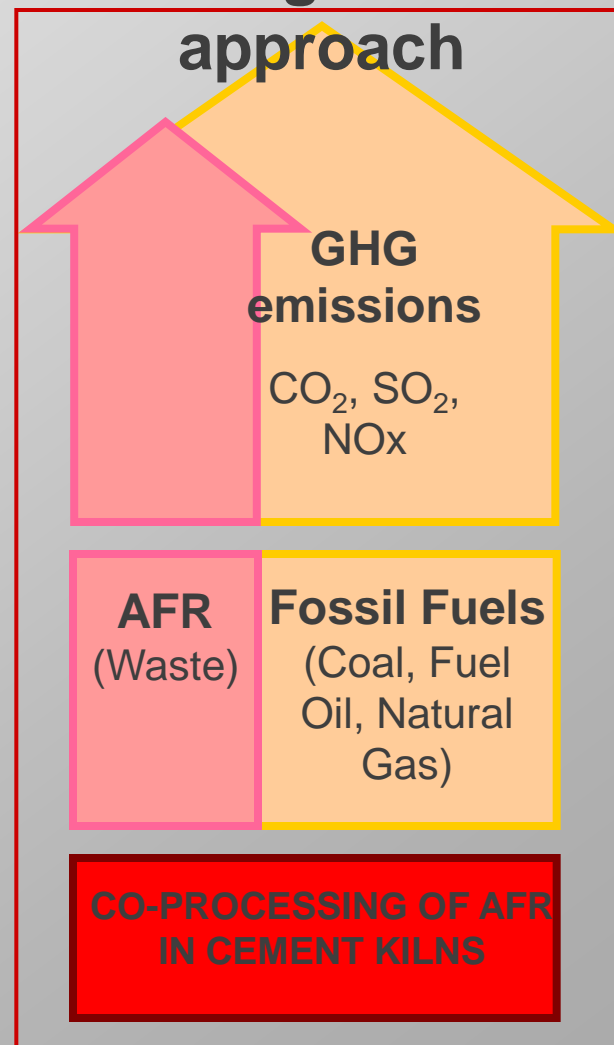


# CO-PROCESSING AND REDUCTION OF GHG EMISSIONS

## Conventional approach



## Integrated approach



# Meeting The Energy Efficiency Challenge

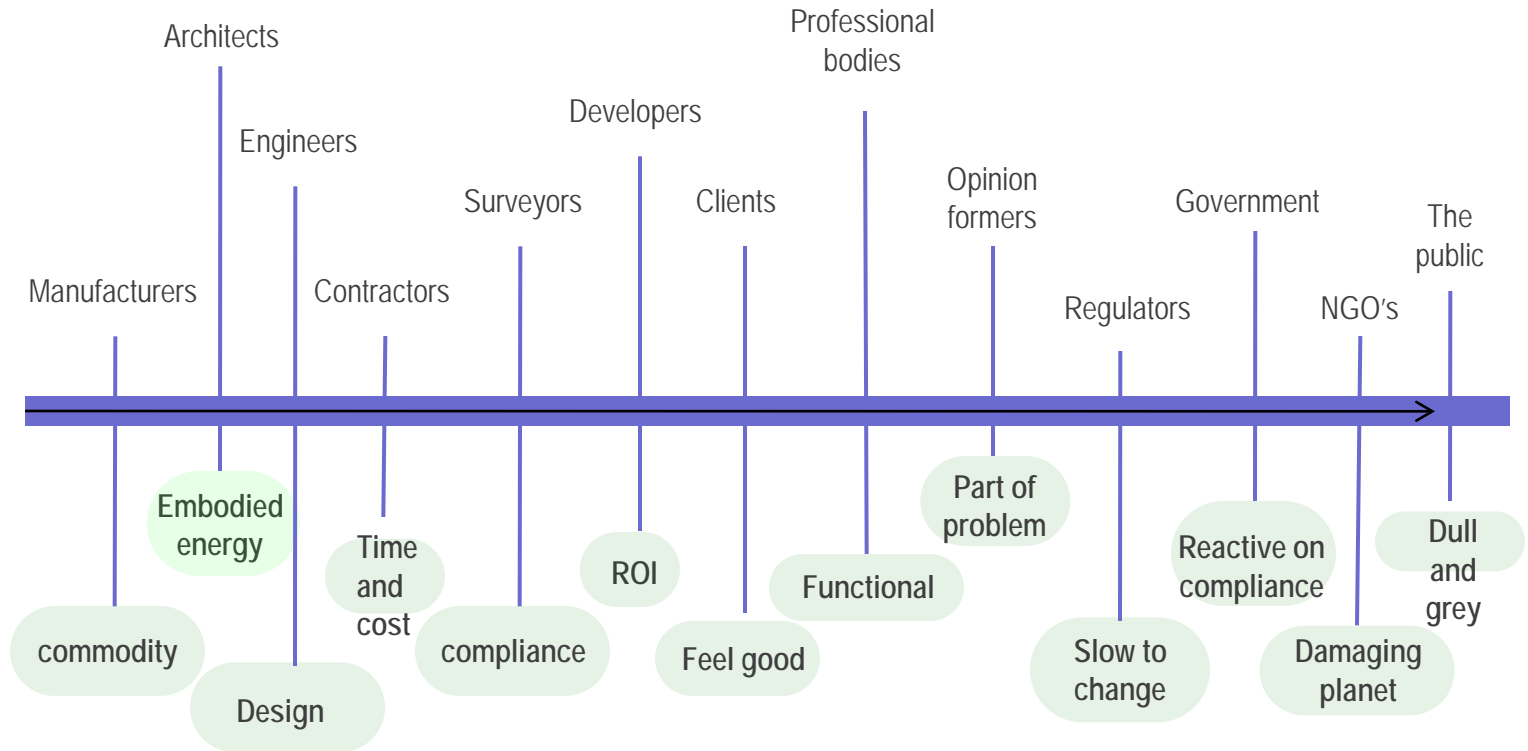
The challenge

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# Meeting The Energy Efficiency Challenge

## The change: Steps towards understanding our audience



These are the perceptions of our target audiences

(source TCC)

# Meeting The Energy Efficiency Challenge

## Sector responses

SUSTAINABLE CONCRETE

Home
News & Events
Case Studies
Publications
FAQs
Contact Us

- What is Sustainability?
- Measuring Sustainability
- Concrete
- Sustainable Concrete
- Sustainable Design and Construction

Go

Welcome to Sustainable Concrete

This website has been designed by the UK Concrete Platform Sustainable Construction Task Group (UKCP SCTG) - the member logos, which link to the various websites, are to the right.


The website is designed to inform and assist those interested in knowing more about concrete, its sustainability and how it can be used in sustainable design and construction. The site has been launched to coincide with the publication of *Sustainable Concrete* (click to download from The Concrete Centre website).

**MYTH BUSTER - True or False?**

A tonne of concrete produces a tonne of carbon dioxide.


**FALSE!**


The embodied carbon dioxide (ECO<sub>2</sub>) of a tonne of concrete varies with mix design and is in the range of:  
75-176kg CO<sub>2</sub>/tonne  
0.075 - 0.176tonne CO<sub>2</sub>/tonne




### Concrete for energy-efficient buildings

The benefits of thermal mass







## PLANT OPEN WEEK

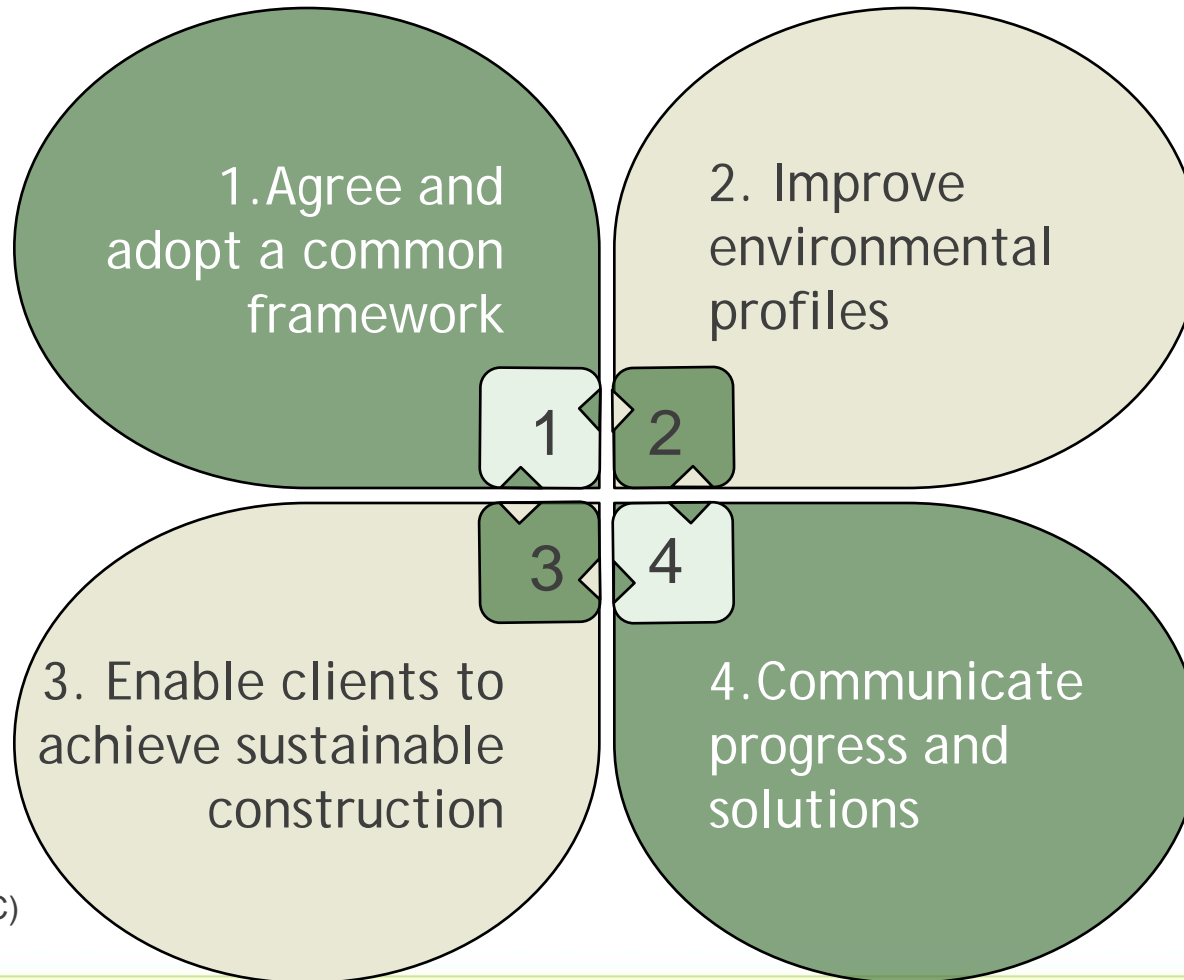
The European cement industry opens its doors

**10 to 18 May 2008**

# Meeting The Energy Efficiency Challenge

Aligning Industries in a common response

## A National Concrete Sector Initiative UK



(source TCC)

# Meeting The Energy Efficiency Challenge

## Responsible Sourcing Schemes



### Concrete Industry Guidance Document

to support

**breglobal**

**BES 6001**

Framework Standard for the  
Responsible Sourcing of  
Construction Products

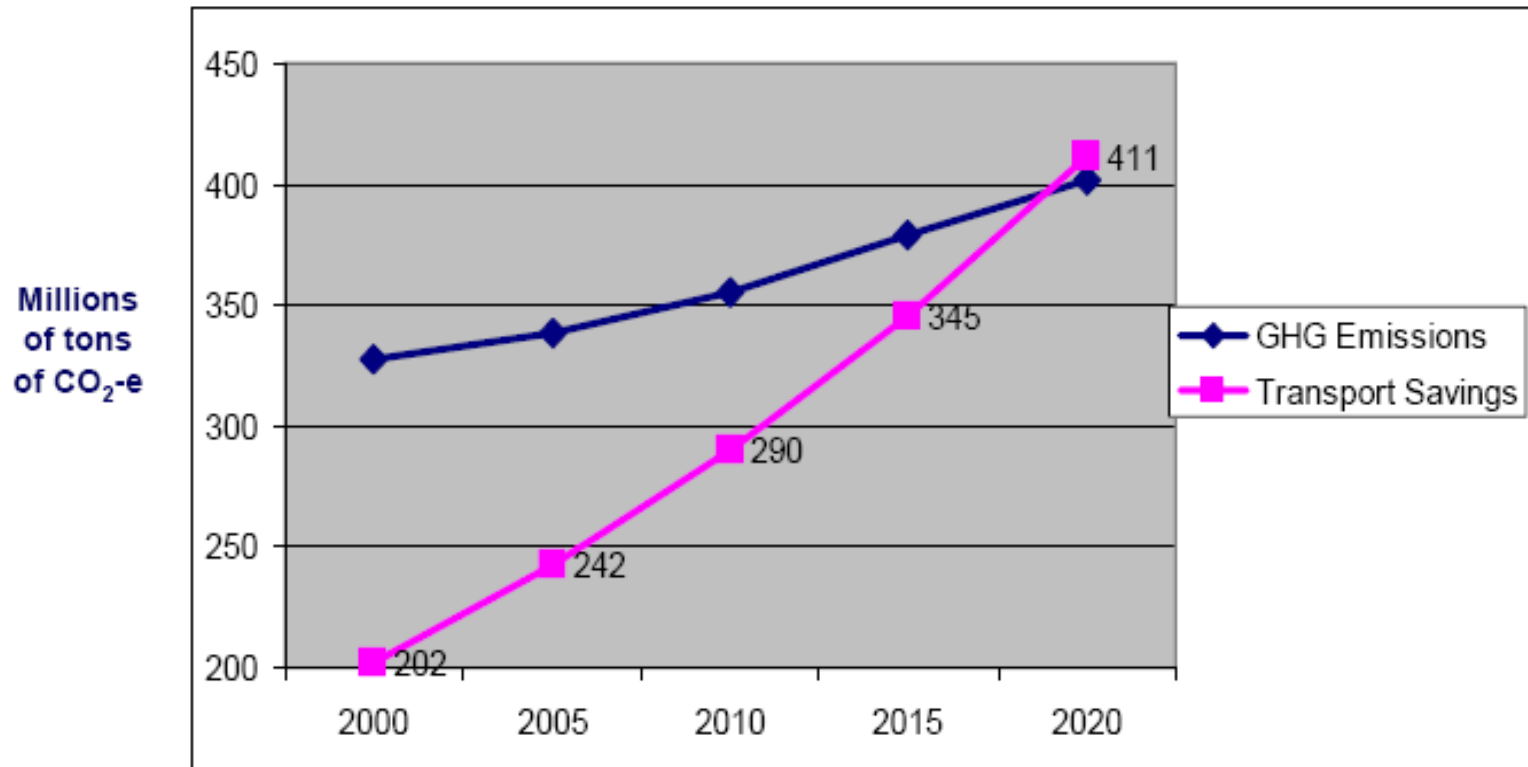


The Concrete Centre

Issue 1: December 2008

# The Aluminium Example

## Aluminum Can Be GHG Neutral by 2020

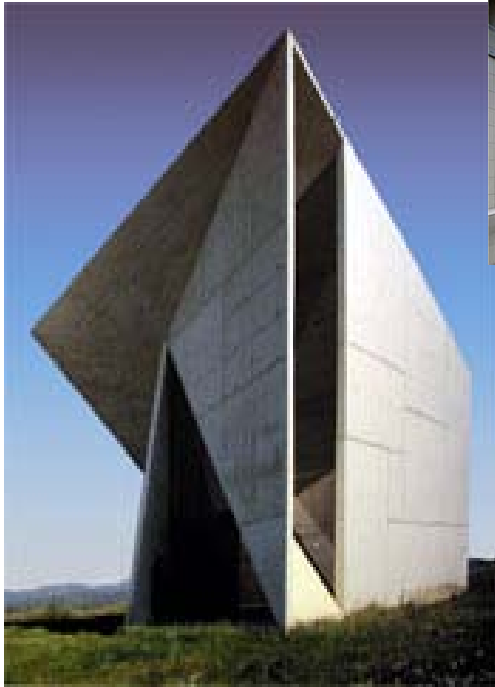


**Potential Emissions Savings From Transport Growing Faster Than Aluminum Production Emissions**

# Meeting The Energy Efficiency Challenge

Minerals climate credentials: concrete benefits....

## *ECO BUILDINGS*



## *BRIDGES TUNNELS*



Wastes as Fuels

Wastes as raw materials

Recarbonation and  
sequestration

## *ROADS*



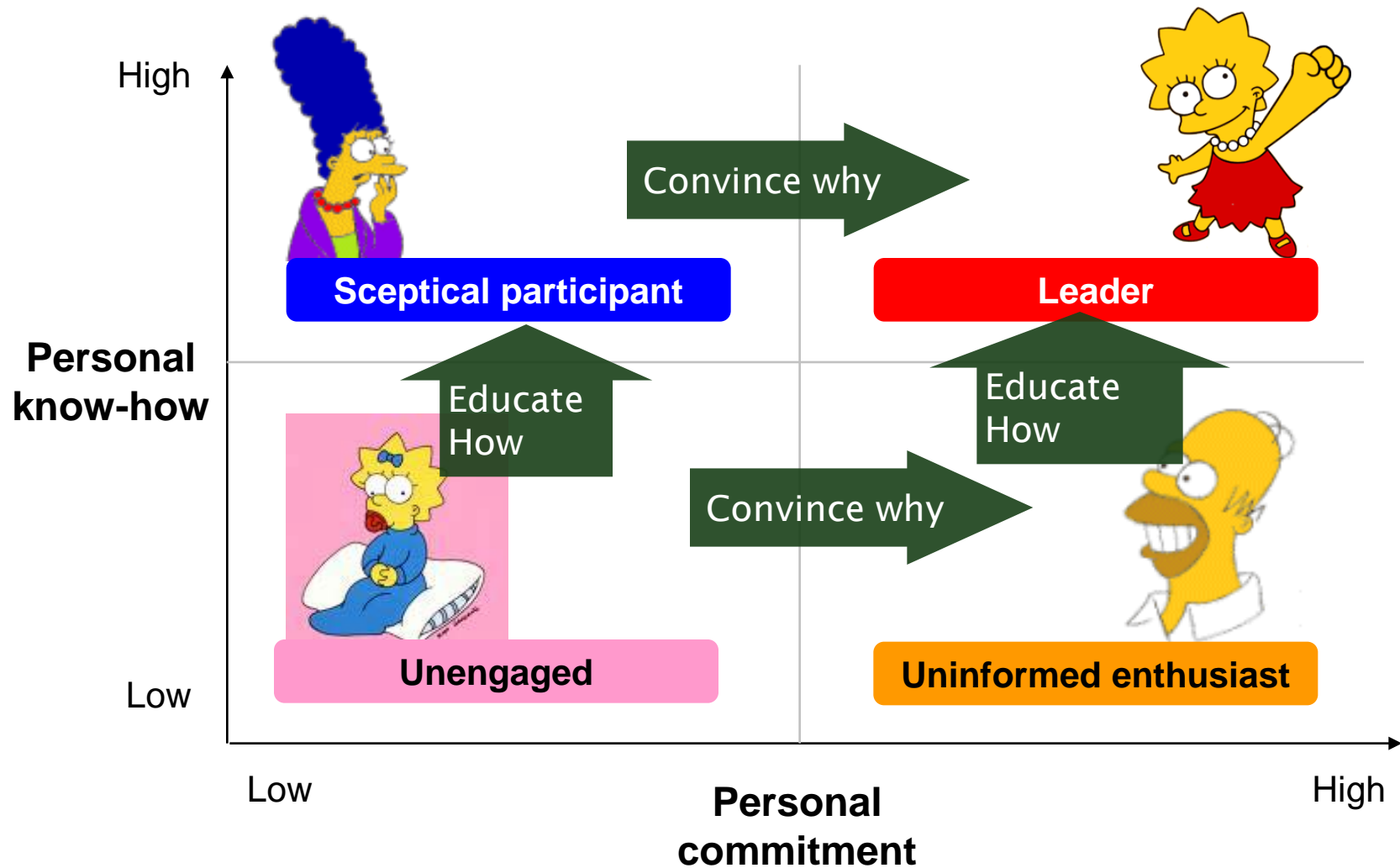
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# Behaviors of building professionals





ARCHITECTS' COUNCIL OF EUROPE  
CONSEIL DES ARCHITECTES D'EUROPE



# Do you speak sustainable construction?

## A common language for Europe

A joint project of  
the Architects' Council of Europe  
&  
the European Concrete Platform



ARCHITECTS' COUNCIL OF EUROPE  
CONSEIL DES ARCHITECTES D'EUROPE



## The Glossary of terms - 2

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Term	Definition	Relevance to sustainable construction	Examples	References
Concepts <b>'Passivhaus' Standard (or Technology)</b>	A Standard that...	Reduces the energy demand and...	See examples at...	<a href="#">www.links</a> to further sources
Finance <b>Whole Life Cycle Costing</b>	A calculation that..	Provides for long life, low energy, loose fit	See XYZ	<a href="#">www.links</a> to further sources
Materials <b>Thermal Mass Materials</b>	Materials that provide Thermal Mass in construction...	Allows for diurnal heat exchange saving energy through...	See buildings in..	<a href="#">www.links</a> to ECP and other sources
Energy <b>Net Zero Energy Buildings</b>	Buildings that....	This makes a difference because...	See Building A, B,C...	<a href="#">www.links</a> to further sources



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## A Common Language for Sustainable Construction

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### **Coherence - Cooperation - Understanding**

A joint project of the Architects' Council of Europe  
and the  
European Concrete Platform

**Be sure to register and take part in  
the Wiki consultation:**

**[www.sccommonlanguage.eu](http://www.sccommonlanguage.eu)**

# Meeting The Energy Efficiency Challenge

The challenge

## Strategies for Change

## European Minerals...??

# Meeting The Energy Efficiency Challenge

## A Minerals SWOT?

### Strengths:

Plentiful  
Accessible  
Local  
Carbon ne

### Opportunities:

Lead Market  
Durability  
Thermal Mass  
Recycling

### Weaknesses

Non-renewable  
Cement energy/Co2  
Planning constraints  
Change

### Threats

Alternative Solutions  
Alignment  
Competition  
TMR

**ACTIONS:**  
**Research**  
**Communicate**  
**Educate**  
**Convince**

# Meeting The Energy Efficiency Challenge

## A Strategy

# European Minerals

## What would be in your Strategy for Change?

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**“Thank you for listening”**