

# An International Perspective on Sustainability of the Cement Industry

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Chief Executive

British Cement Association 8<sup>th</sup> October 2008

What is the big, big picture? What is the global political and economic background to all this?

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**Global:** Kyoto:

**Europe:** CAFÉ; REACH; CR6; Lisbon; IPPC; TC 350

**UK:** Kyoto: 12.5% (Gov. Target 20%)

Post Kyoto 60% by 2050

Codes; Regulations; Climate Change Bill

# The Earth at Night

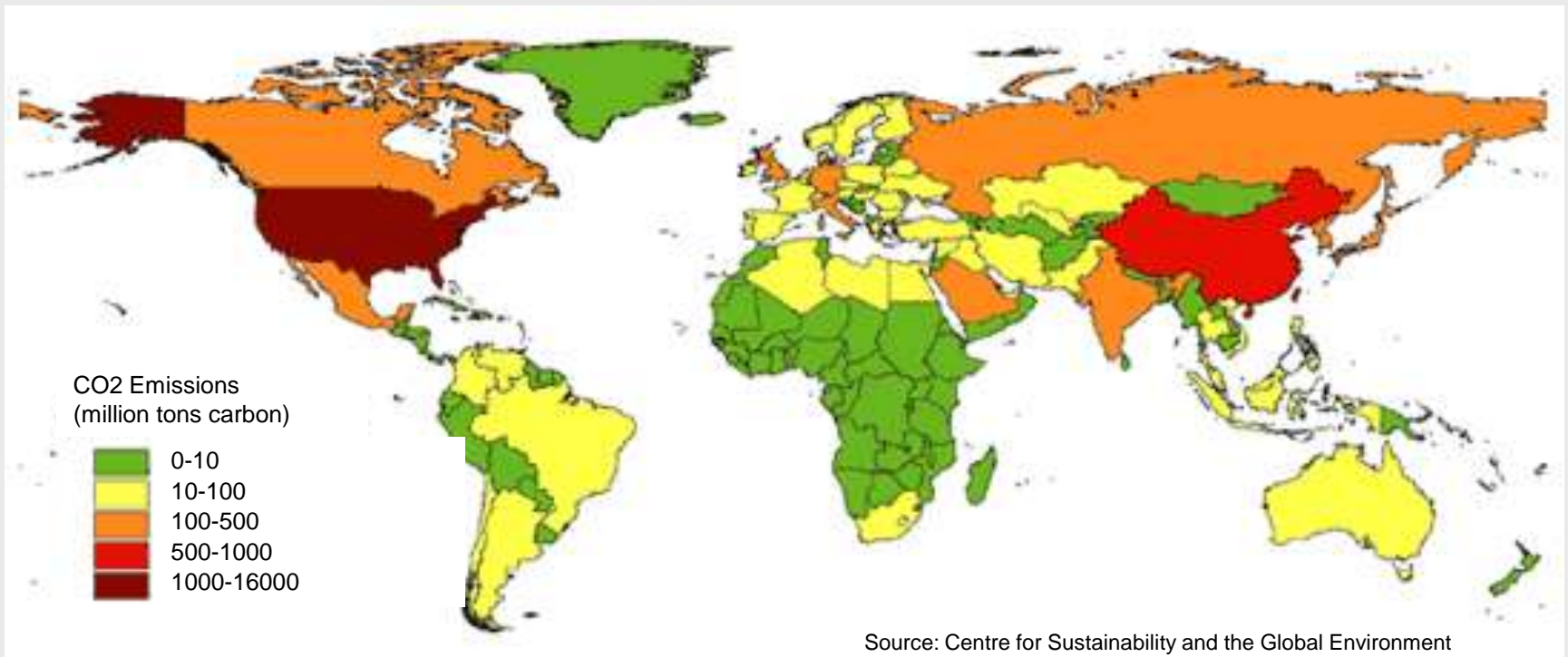


Its About:

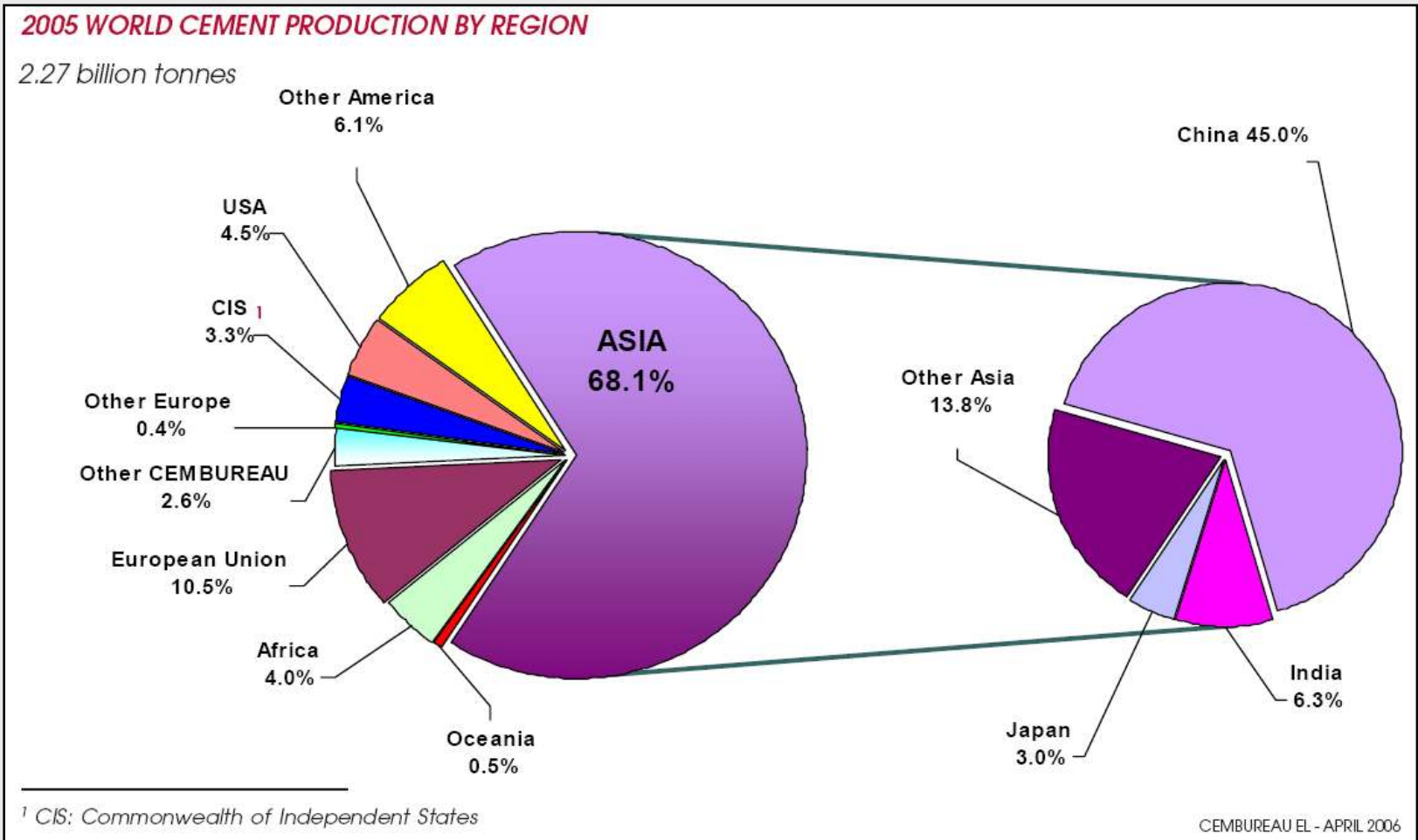
Energy – and the Carbon dioxide emission related  
Resources – reducing, recycling and reusing  
Waste – making less of it – efficiency.

Source: NASA

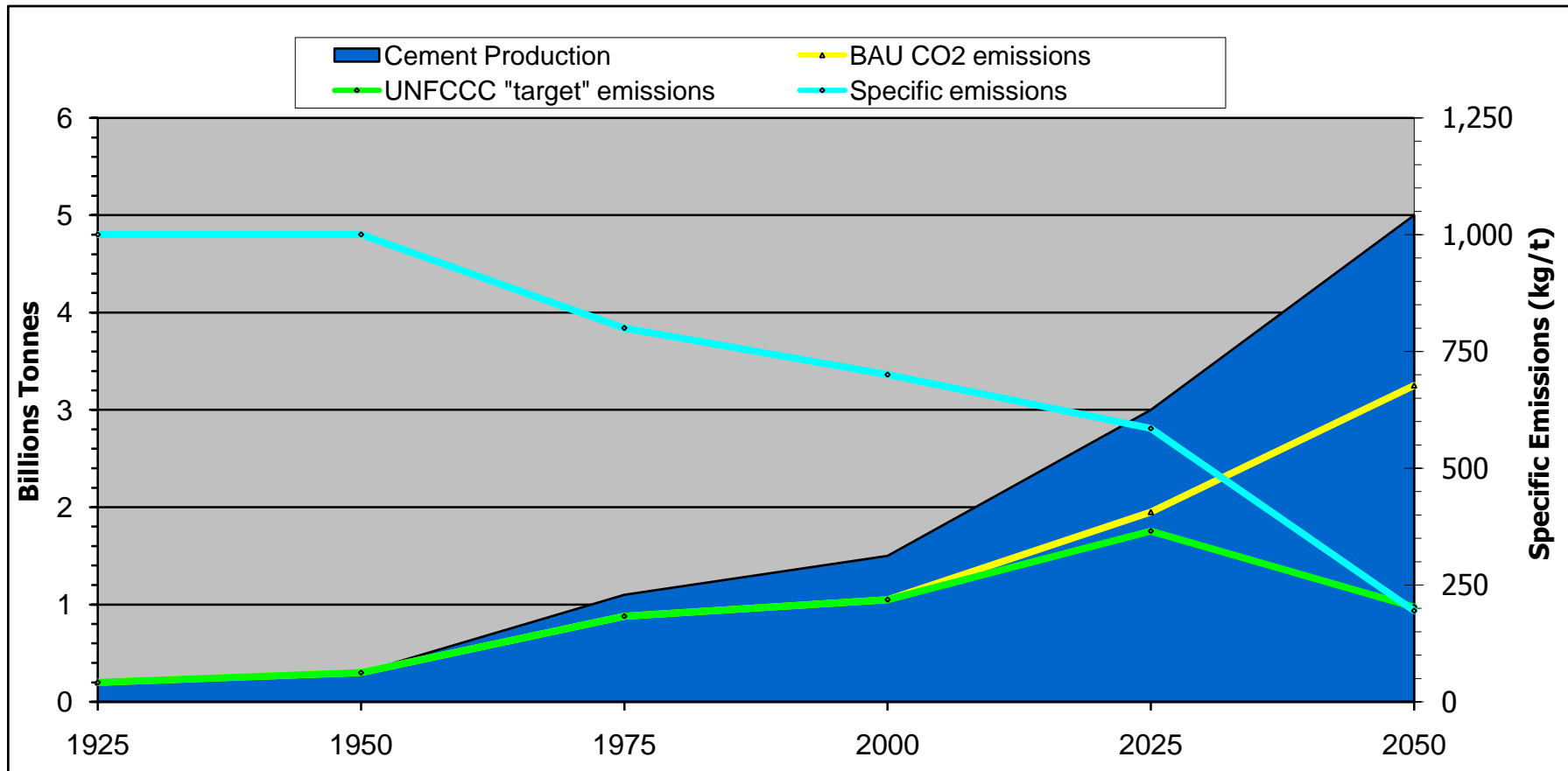
# CO<sub>2</sub> Emissions by Country



# World Cement Production



# The Great Challenge: Growth in Cement Demand



- 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%.
- Huge challenge for our industry:
  - NO SOLUTION IDENTIFIED YET

# World Cement Sustainability Initiative

World Business Council for Sustainable Development:

Cement Sector Initiative

Agenda for Action on:

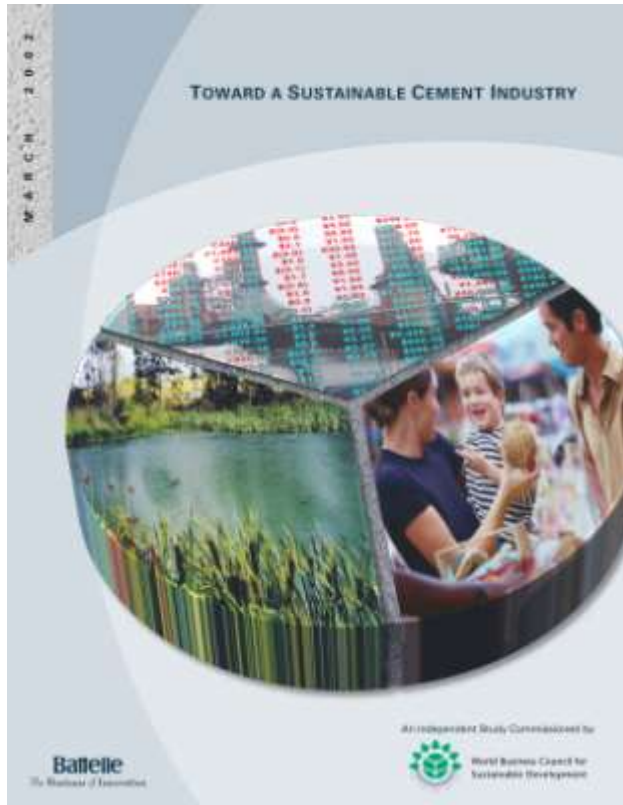
- Climate Protection
- Fuels and raw materials use
- Employee health and safety
- Emissions reduction
- Internal business processes



# Cement Sustainability Initiative - 3 phases\_

*Independent Study*

2000 - 2002



*Planning*

2002



*Action*

2002 - 2020

Individual implementation



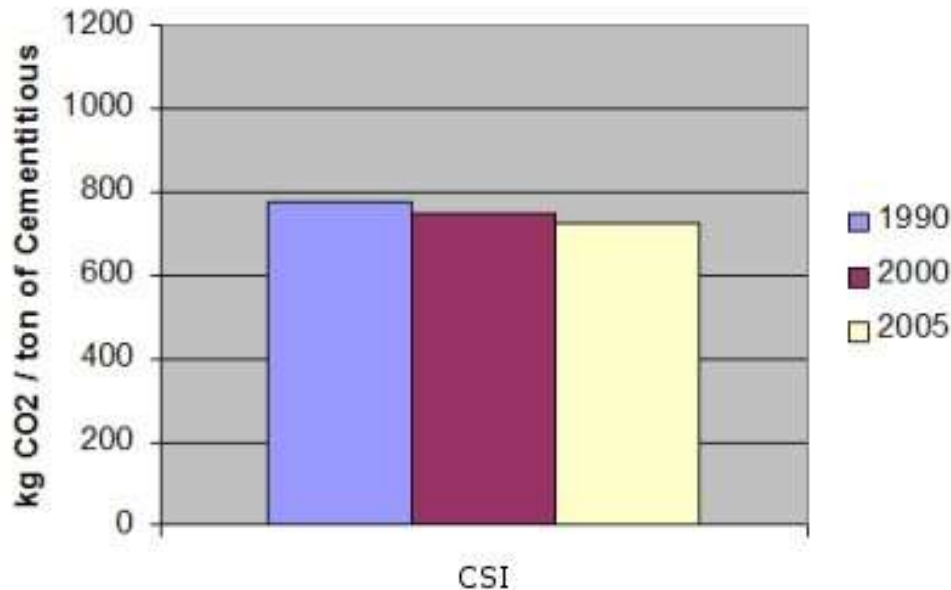
Joint projects

+

Communication and outreach

# World Business Council for Sustainable Development Cement Sustainability Initiative

**Average gross CO2 emissions  
(Cementitious)**



CSI has made progress:

- Consistent improvements in energy efficiency
- Using alternative fuels as a partial substitute
- Improving Health & Safety records
- Global database 'Getting the Numbers Right'
- Sectoral Approach modelling.
- CDM benchmarking
- Concrete Strategy
- Recycled Aggregates Report





[www.cembureau.eu](http://www.cembureau.eu)

- Limiting Global Climate Change to 2 degrees Celsius: 30% reduction by developed countries by 2020
- Firm independent commitment to achieve 20% reduction by 2020
- Sustainable Production and Sustainable Consumption Action Plan: Energy Efficiency in Buildings Directive
- Carbon capture and geological storage : Deployment of CCS in power generation
- EU ETS with Auctioning for CO<sub>2</sub>; Link EU ETS with other “comparable domestic trading schemes”

# GLOBAL EFFICIENCY OF EU-COMMITMENTS

- **8% EU-Reduction** corresponds to about **1%** global reduction
  - **US and in particular developing countries** are in the process of substantially increasing their emissions
  - **The EU-contribution** to global emissions will further decrease (14% in 2000)
- 
- **The UNFCCC objective** would require a *global* emission reduction by 15-20% below 1990 emissions by 2050, equivalent to 50-60% below BAU!

# EU ETS – CEMBUREAU'S POSITION

- **Need for a global system!** Based on a sectoral (cement) approach
- **No auctioning!** Free of charge allowances based on Benchmarking Clinker Production
- Early actions and production rationalization to be rewarded
- Use of AFR to be rewarded
- Process emission specificities - **BREF**
- **“Carbon Leakage”** issue - Use Of Boston Consulting



## WG 1 Climate Change and CO<sub>2</sub> Reduction

### TASK FORCES

- CO<sub>2</sub> Monitoring, Reporting & Inventory
- ETS Review & Post-Kyoto\*
- Accounting Treatment of CO<sub>2</sub> Emission Rights

## WG 2 Energy and Materials Resources

### TASK FORCES

- Use of Waste
- Electricity
- Solid Fuels

## WG 3 State of the Art in Cement Manufacturing *(Including environmental performance)*

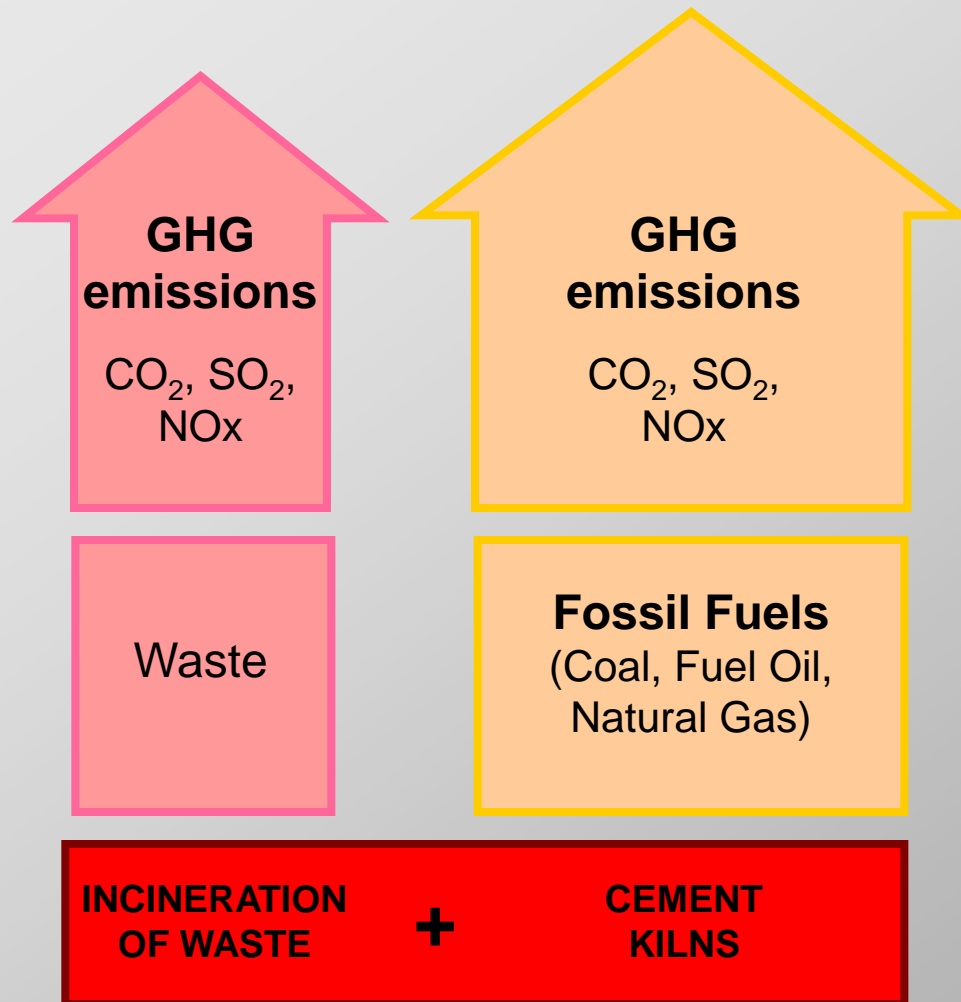
### TASK FORCES

- Revision of the BREF\*

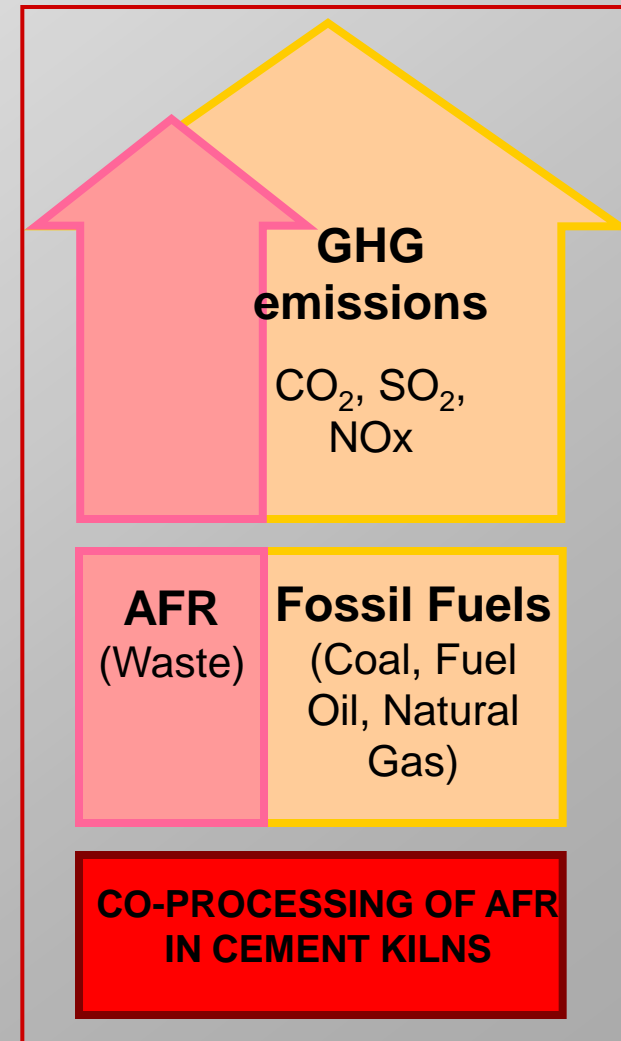
\* *Advocacy at EU level via the SAG*

# CO-PROCESSING AND REDUCTION OF GHG EMISSIONS

## Conventional approach



## Integrated approach



# SOLUTION: ALTERNATIVE RAW MATERIALS

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## IN CLINKER PRODUCTION

- **Substitution of natural raw materials by alternative ones** (slag, fly ashes and the non-combustible part of all waste fuels)  
**Direct saving of almost 14 million tonnes of limestone = 6.5%** of the natural raw materials needs

## IN CEMENT PRODUCTION

- **Substitution of clinker by mineral components** (blast furnace slag, fly ash)  
EU average clinker to cement ratio is 0.8

## WG 4 Health and Safety

### TASK FORCES

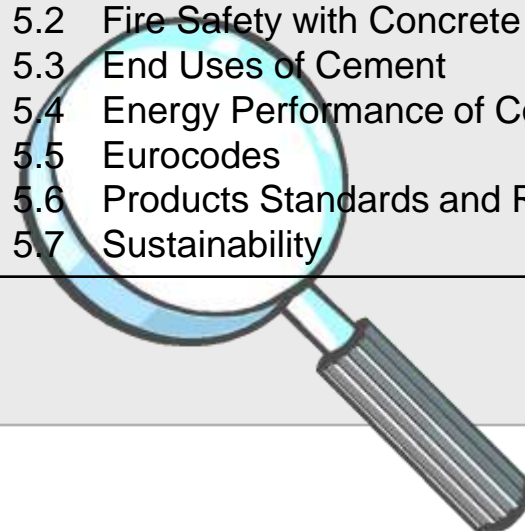
- REACH\*
- Comprehensive Health Risk Study
- Crystalline Silica
- SDS Harmonisation

\* *Advocacy at EU level via the SAG*

## WG 5 Markets and Products

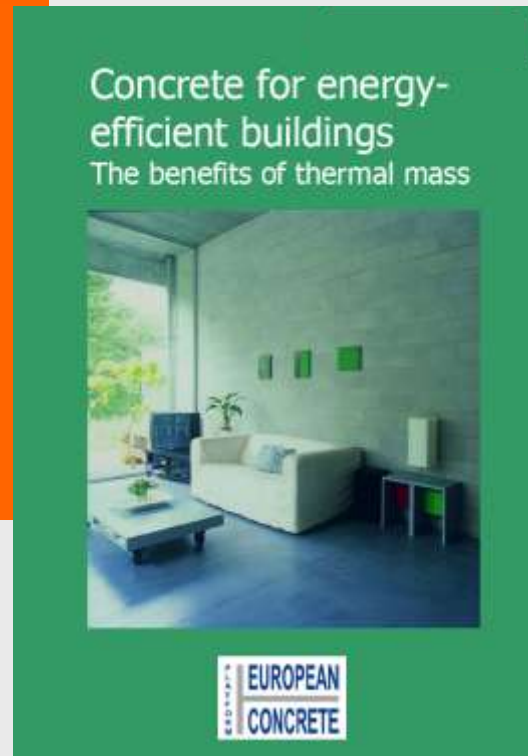
### TASK FORCES

- 5.1 Environmental Product Declarations (EPDs) for Cements
- 5.2 Fire Safety with Concrete
- 5.3 End Uses of Cement
- 5.4 Energy Performance of Concrete Buildings
- 5.5 Eurocodes
- 5.6 Products Standards and Regulations
- 5.7 Sustainability



- **Provides a focus** for sustainability and sustainable construction initiatives within CEMBUREAU, its members (national Associations), companies and partners.
- **Developed a CEMBUREAU strategy in 2007**
- **Activity plans for 2008/9 and 2010**
- **Working with Concrete industry partners**
- **Working with European Architects**

# European Cement Industry working with European Concrete Platform



- **Joint Projects**
- **Speaking**
- **Publications**
- **Events**
- **Plant open days**
- **Website information**
- **Communications Strategy**
- **EU Parliament sponsored events**

# REVISED SHORT-TERM ACTION PLAN 2009

## SUSTAINABLE CONSTRUCTION - SHORT TERM ACTION PLAN 2009

Revised 18 June 2008


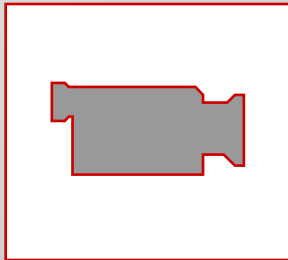
What? ACTIVITY	Who? OWNER	How much? RESOURCES									How shall we measure success ?		
			2009 (€ 150K)				2010						
Joint Action with ECP			1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q			
7 <sup>th</sup> Conference of Cement & Concrete Marketeers and Promotion Officers	ECP		→ 18 March 2009										
Pro's & Con's on blended cements or cement within concrete products	TF 5.7 AHG incl. All WGs with SC mandate	€ 25K + WG3? consultant?	Input	→			1 <sup>st</sup> draft	2 <sup>nd</sup> draft	Final				
Examples of Whole Life Cycle of concrete buildings & structures	TF 5.4 with new Mandate from WG5?	€ 30K	→										
Toolbox "A common language" for Sustainable Construction	TF 5.7 ECP ACE	€ 30K	Input	→			1 <sup>st</sup> draft	2 <sup>nd</sup> draft	Final				
Communication/Promotion Actions	TF 5.7 Secretariat	€ 30K											
Brochure on recycling of concrete and use of concrete as waste aggregates Postponed from 2008	ECP UEPG	(€ 15K) from Budget 2008	→										
Workshop - Making the link between sustainable construction and the European Cement Industry	TF 5.7	€ 15K					→						
Budget allocation for 2009	<b>Total</b>	<b>€ 130K</b>											
Provision for budget overrun		€ 20K											
<b>Budget 2009</b>	<b>TOTAL</b>	<b>€ 150K</b>											



# PLANT OPEN WEEK



CEMENT PLANT OPEN WEEK



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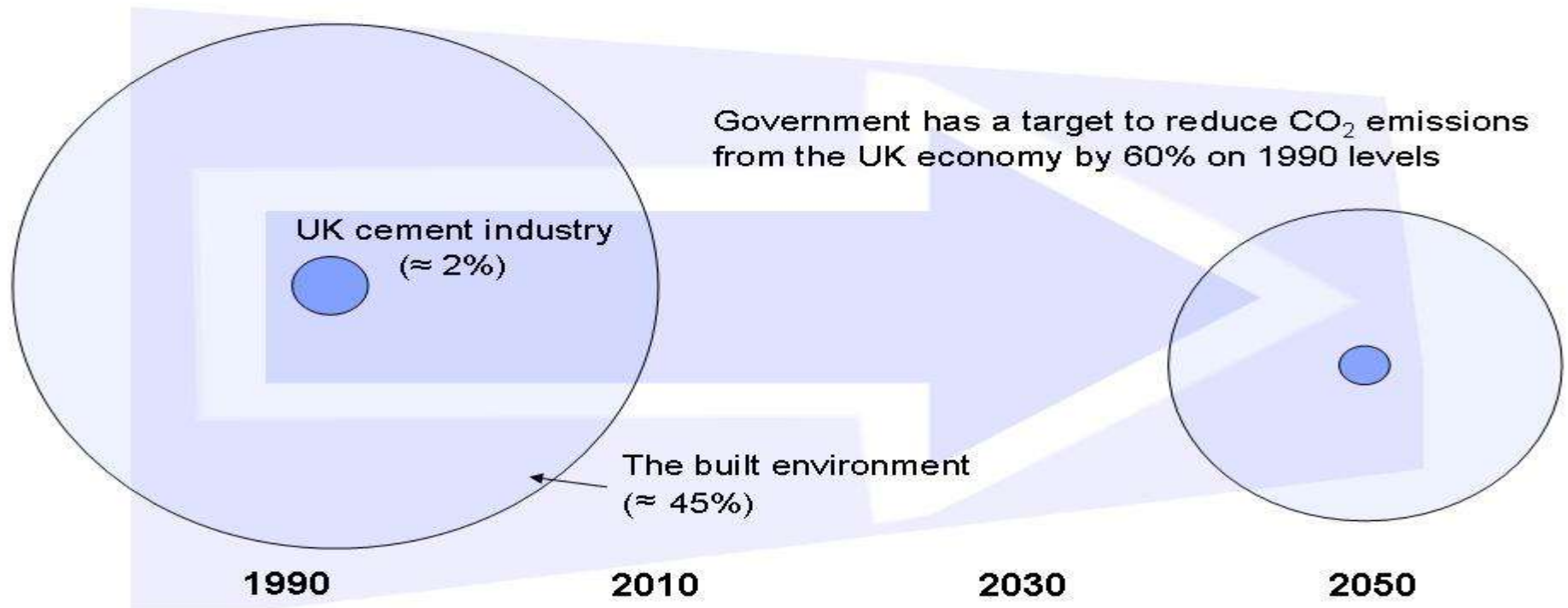
**PLANT OPEN WEEK**

*The European cement industry opens its doors*

**10 to 18 May 2008**

- EU Emissions Trading; UK Climate Change Levy; UK Aggregates Tax
- EU Thermal Performance of Buildings Directive
- UK Sector Strategies; Modern Methods of Construction
- UK Better Buildings Summit: Sustainable Buildings Task Group
  - Code of Sustainable Homes published 2007
  - Link to Green Guide – Specifiers guidance for materials; Eco-Homes –BREEAM;
  - Sustainable Procurement Task Force
  - Zero Carbon Homes target – 2016
  - Sustainable and Secure Buildings Bill
  - Sustainable Construction Strategy
  - Responsibly Sourced Materials Credit
- Climate Change Bill – 60% CO2 reduction by 2050

## Greenhouse Gas Reductions (GHG) in the UK (1990 – 2050)



### UK cement industry: strategic direction

- Optimisation of cement manufacture (new fuels, processes, materials & products; R&D; investment)
- Influencing the construction industry to use cement and concrete in more GHG efficient and long-life applications

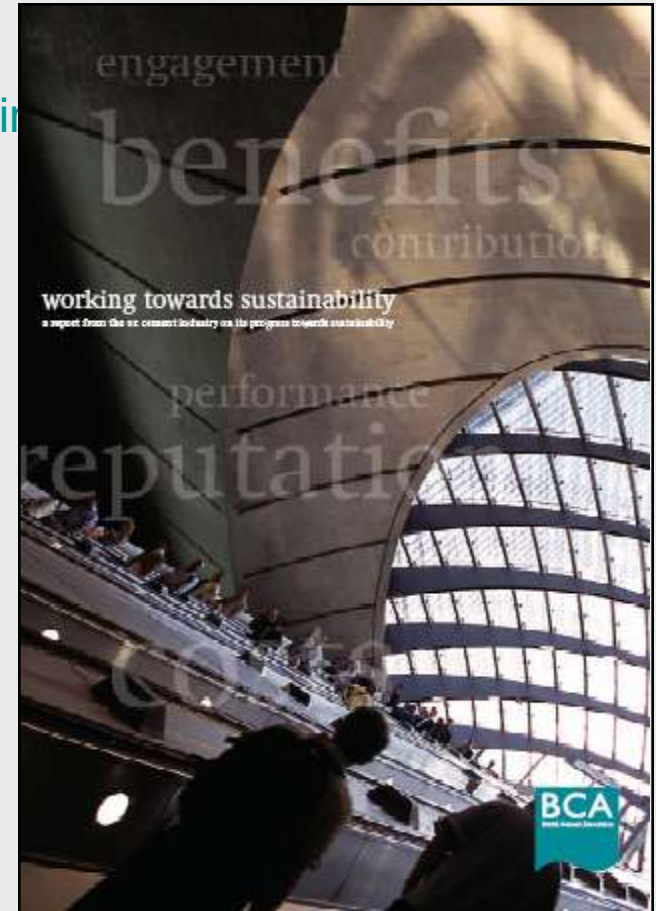
# Sustainable Development

## SD Task Force major activities

The SD Task Force was established to integrate sustainable development into industry's activities within one year.

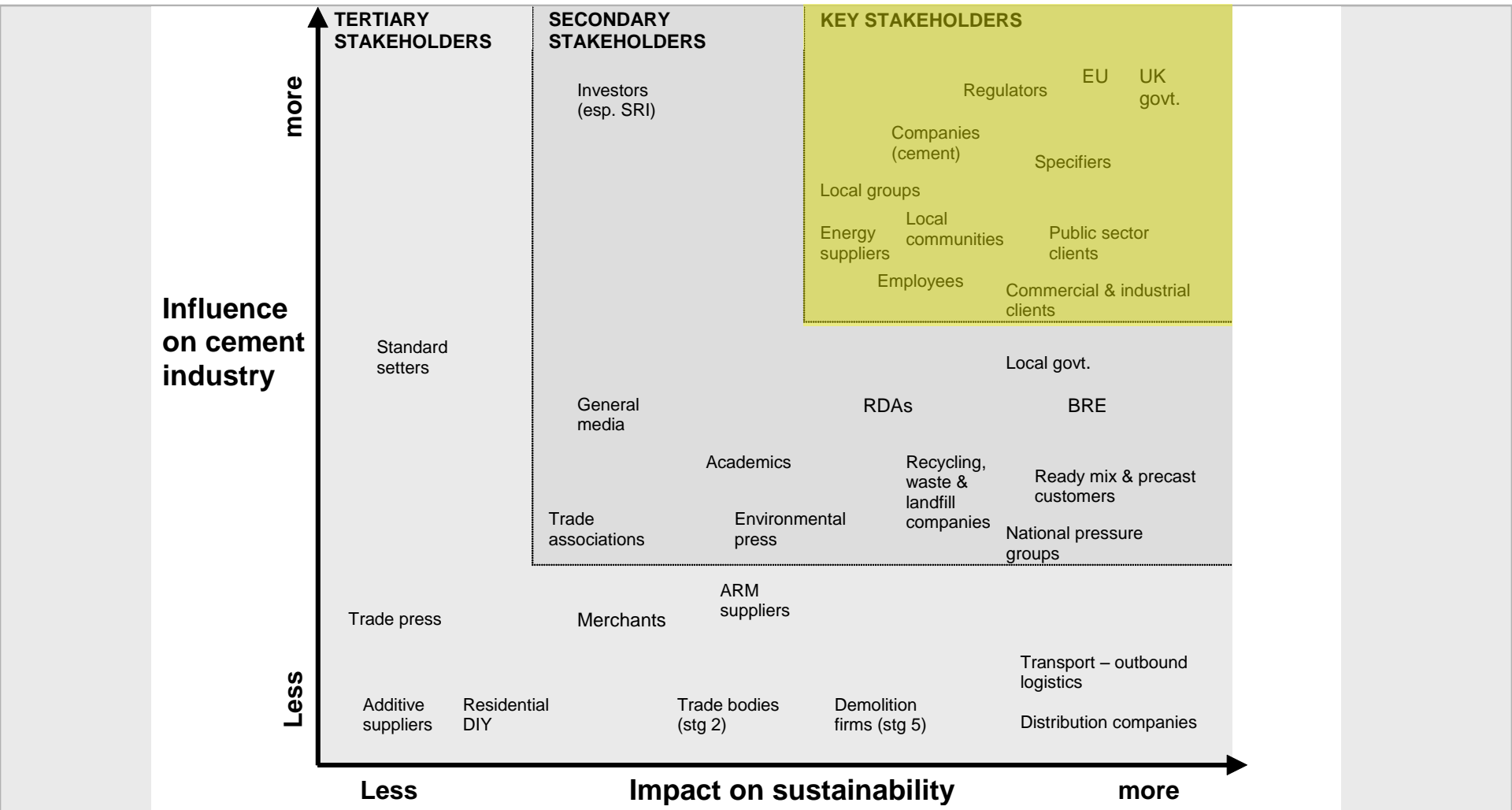
MASTERCLASS Process: Completed in November 2005, major outputs are:

- Stakeholder engagement
- Carbon Strategy
- Business Case
- EA Sector Plan
- H&S Strategy
- Cement Makers' Code
- *Working toward sustainability 2005* report



# Stakeholder Engagement:

## Key targets of sustainability dialogue



# The Business Case

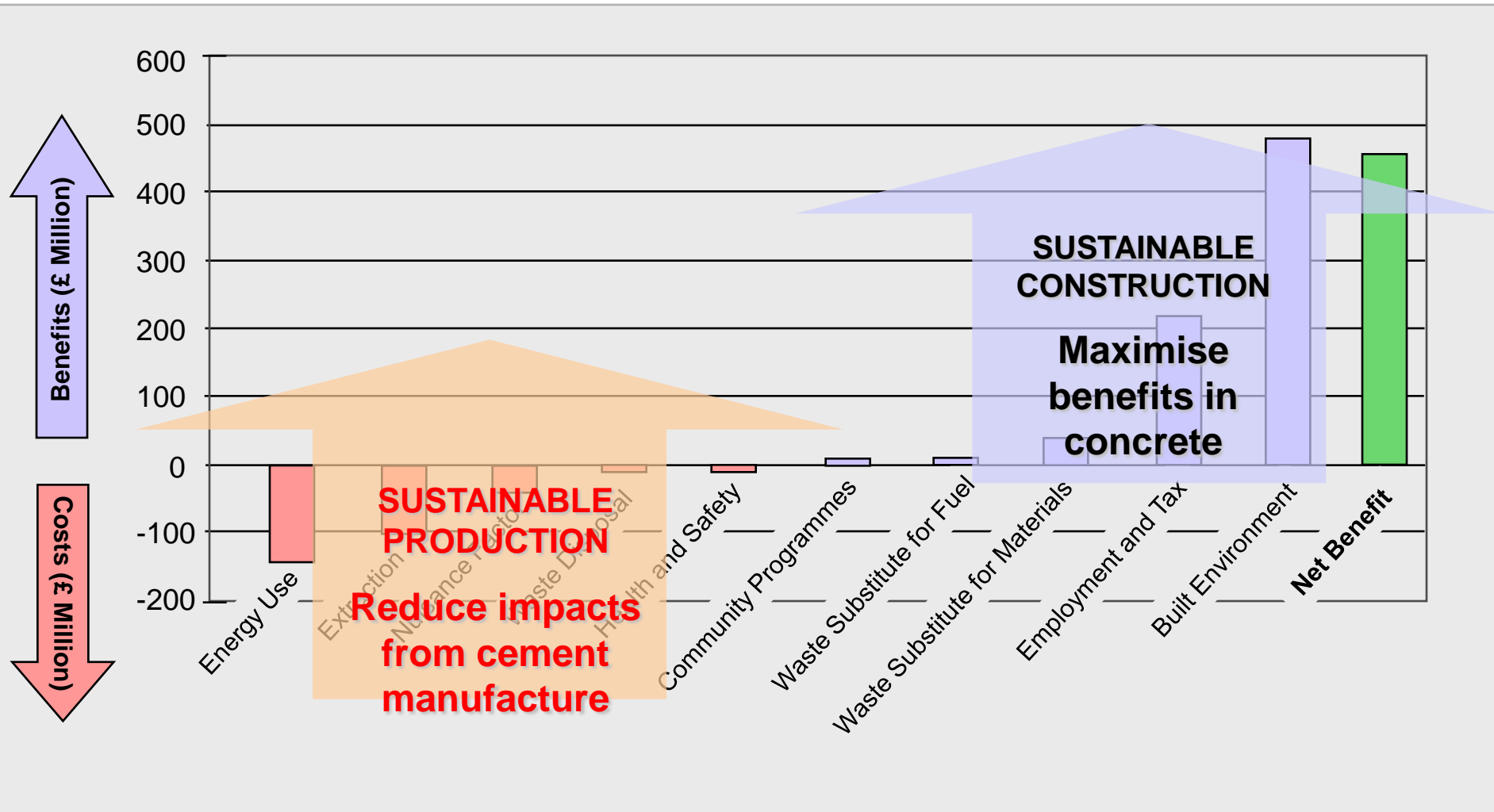
## Sustainability accounting model

David Collins  
2 February 2005

### Business case brainstorming: cement industry benefits and costs (for use in developing a sustainable development business case)



# Sustainable Development Business Case



# Sustainable Development

## UK cement industry initiative

### Key achievements:

- Reduction of direct CO<sub>2</sub> emissions by 29% compared to 1990: savings of over 3.9 million tonnes CO<sub>2</sub>.
- Fossil fuel consumption cut by over 23% between 1998 and 2006.
- One million tonnes of waste diverted from landfill in 2005: 15% of kiln fuels and almost 5% of virgin raw materials replaced by waste-derived materials.
- 27.5% improvement in specific energy consumption against a 1990 baseline.
- Following commitment to RHS – incident rate has fallen by 32% between 2003 and 2006.



*“Working Towards Sustainability 2”* 2007 report

# EA Sector Plan

## UK cement industry & Environment Agency agreement

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### Objectives:

1. Reduce consumption of natural resources per tonne of cement
2. Reduce process waste disposed of per tonne of cement
3. Reduce pollution from cement manufacturing
4. Reduce emissions of GHG per tonne of cement
5. Optimise use of wastes from other industries/sources
6. Develop site restoration and biodiversity plans
7. Improve engagement with EA and stakeholders
8. Work to risk-based regulatory/EMS
9. Promote product stewardship and supply chain benefits

**27%**  
**less NOX**  
**Emissions**

**58%**  
**less SO<sub>2</sub>**  
**emissions**

**60%**  
**less dust**

**12%**  
**direct CO<sub>2</sub>**  
**reduction**

**1Mt**  
**waste**  
**recovered**

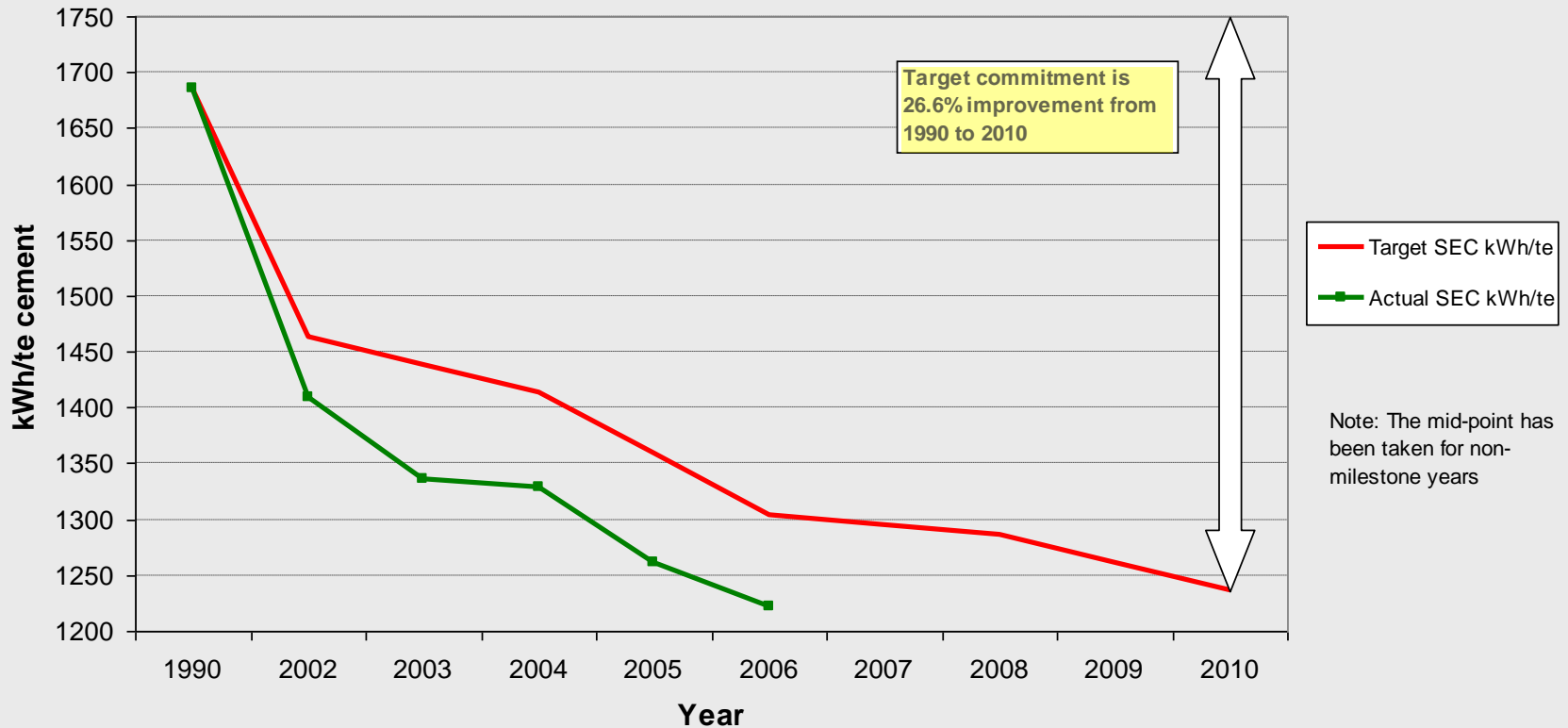
**75%**  
**less CKD to**  
**landfill**

# Carbon Strategy

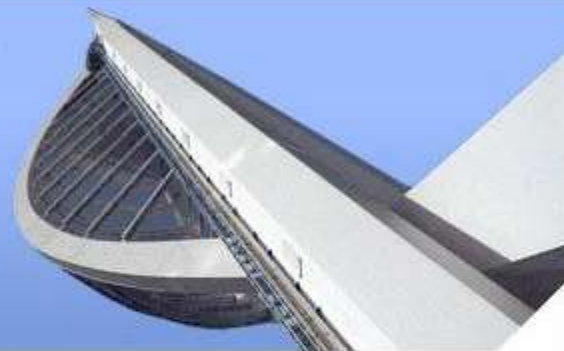
## Energy consumption reduction target

### Climate Change Agreement Performance 1990 to 2006

(Cement Specific Energy Consumption kWh/te )



Cement - imagine a world without it...



## Welcome to the UK cement industry website

Cement is the essential ingredient in concrete, the second most consumed substance in the world after water. Portland cement is a local product made in Britain and was even invented here. No school, house, road, hospital or bridge would be built without it.

The cement industry contributes £775 million annually to the UK economy. It operates 14 plants and produces around 12 million tonnes of Portland cement a year, which represents about 90 % of the cement sold in the UK. There are four major manufacturers: [Castle Cement](#), [CEMEX UK Operations](#), [Lafarge Cement UK](#) and [Tarmac Buxton Lime & Cement](#).

### Working Towards Sustainability

[Download a copy of the industry's latest sustainability report](#)



### Performance

### Highlights

- [Cement supplies and prices - the facts - see the press release](#)
- [Cement industry welcomes the appointment of new Construction Minister - see the press release](#)
- [Cement industry welcomes the appointment of new Climate Change Minister - see the](#)

### For Industry

Cement plays a critical role in the built environment

[The Industry >](#)

### For Schools

Learn why cement is an essential building material

[Education >](#)

### For Specifiers

For advice about using cement and concrete

[Concrete Specification >](#)

[Cement Specification >](#)

### For The Media

See our press releases, events, and key facts about the industry

[Media Centre >](#)

# Performance

## Corporate Responsibility Report of the UK cement industry

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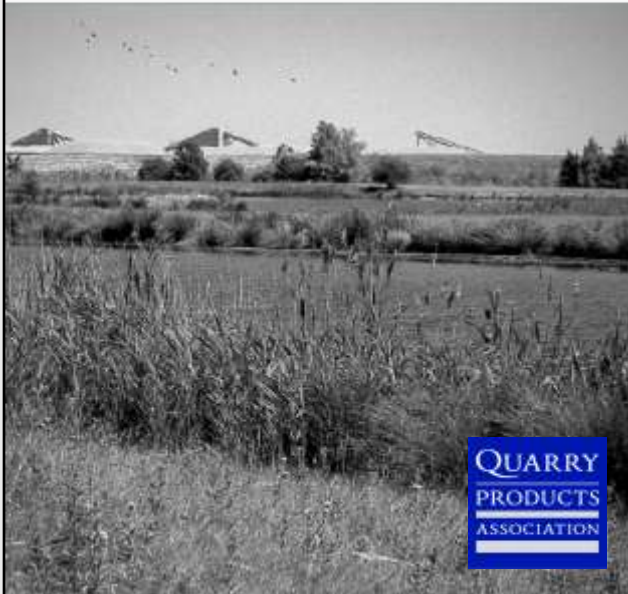
Annual *Performance* report, sets out:

- Economy and employment performance
- health and safety achievements
- progress against EA sector plan targets
- progress in implementing the “*Cement Makers’ Code*”
- summary update of “*working towards sustainability*”



# Concrete and Aggregates Initiatives

Sustainable development  
Building our strategy



QPA Sustainable Development Report  
**2005 Update**

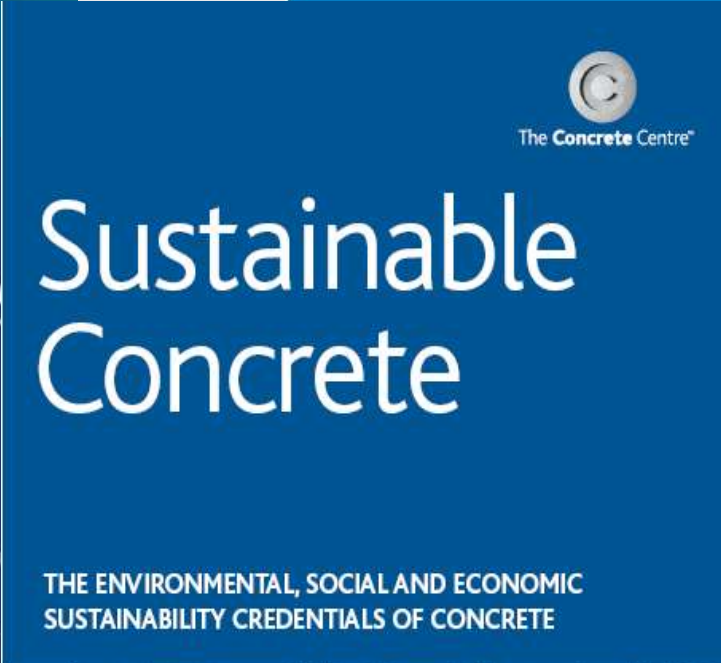


Sustainability White Paper - May 2007

"Towards a more sustainable precast industry"

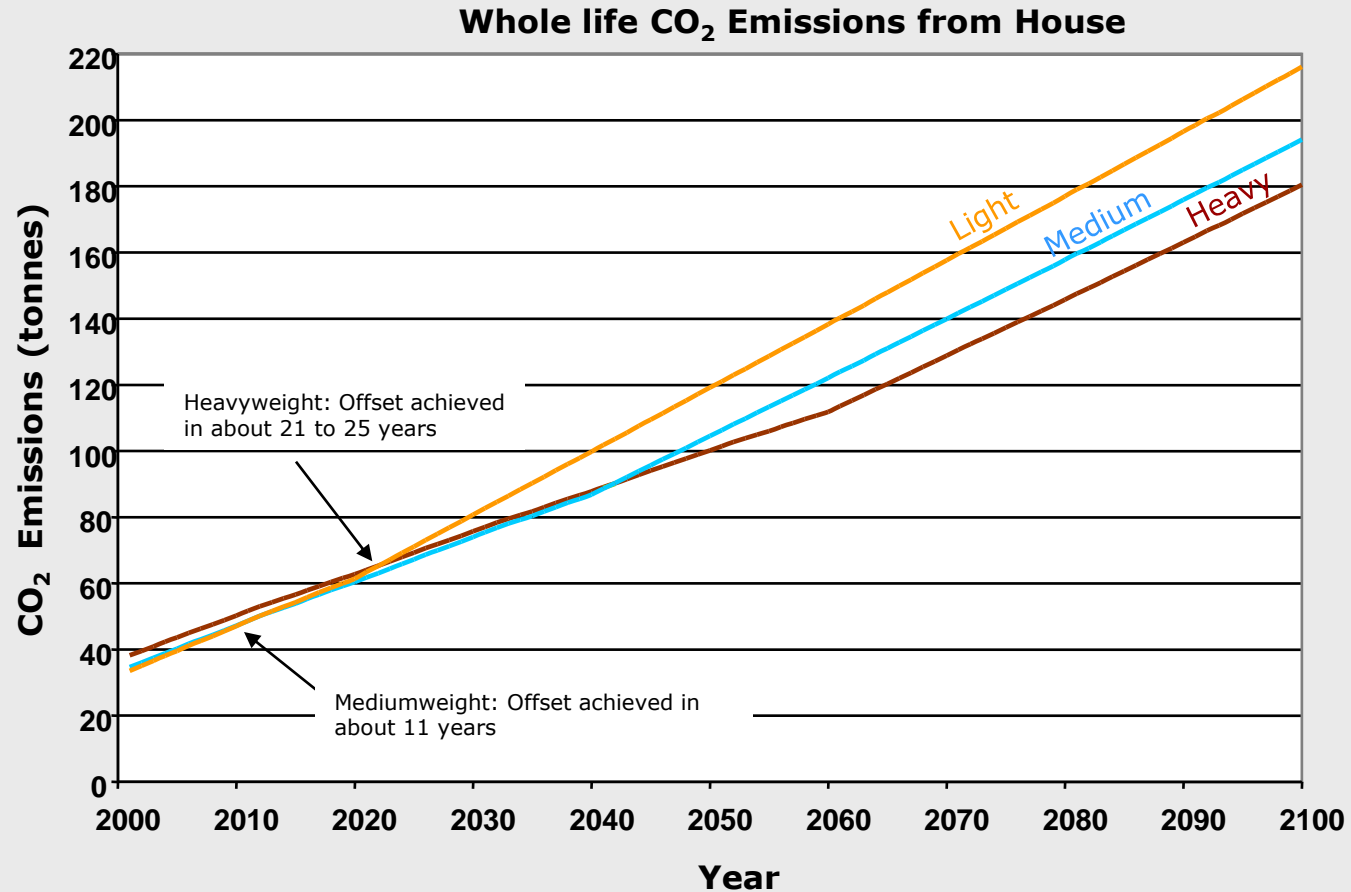
A document for discussion and comment.





# Downstream Benefits – Adaptation/Mitigation of Climate Change

## The Case for Thermal Mass

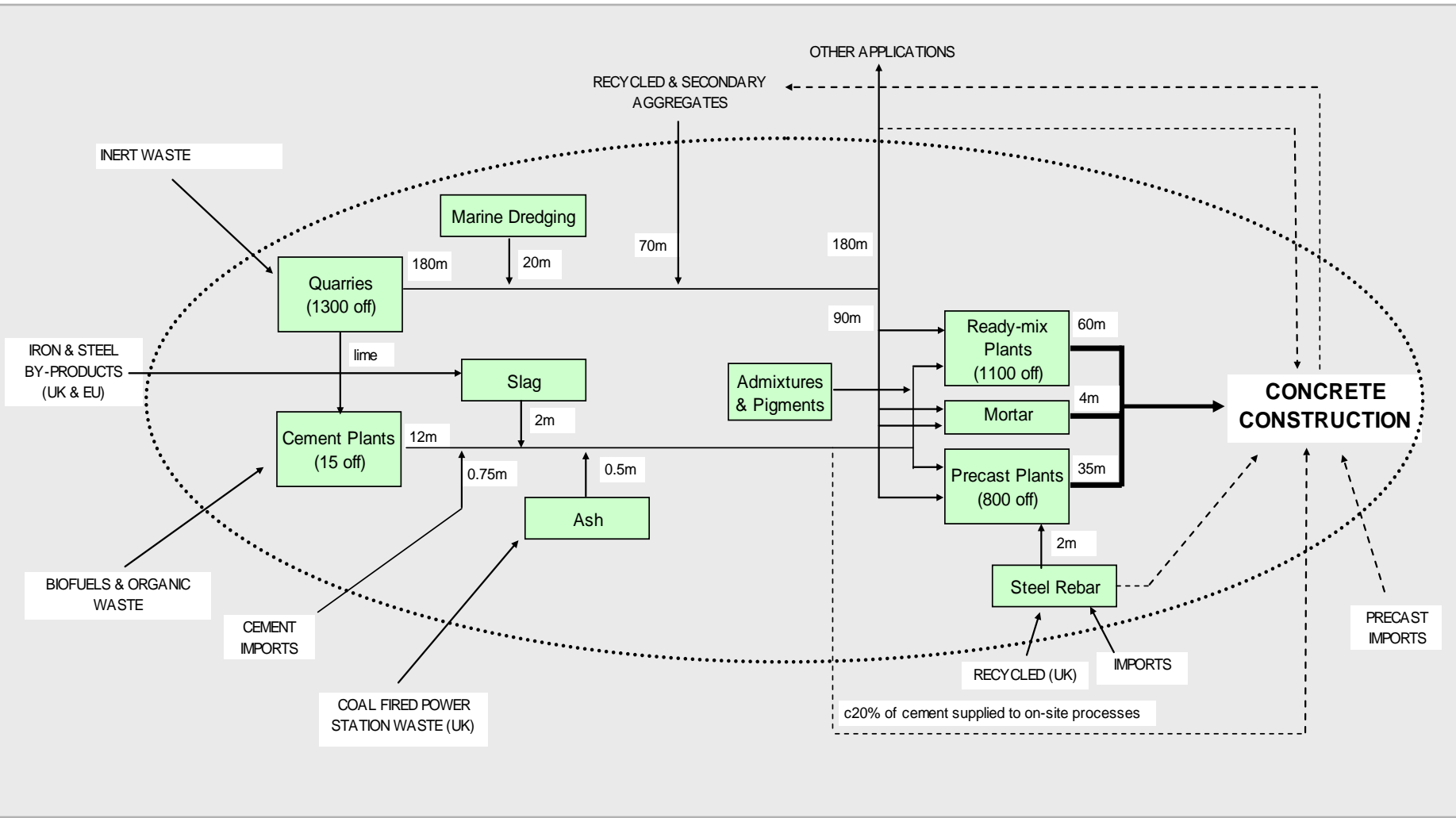


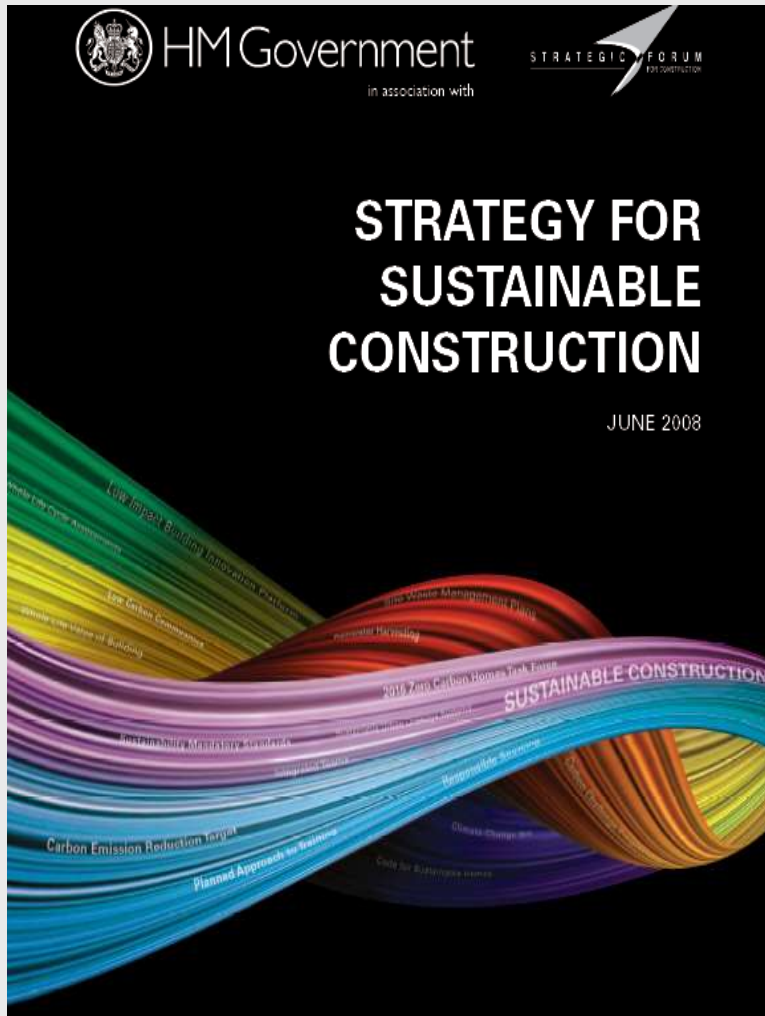
The screenshot shows the homepage of the Sustainable Concrete website. At the top, there is a green header with the text "SUSTAINABLE CONCRETE" and a world map. Below this is a navigation bar with links for Home, News & Events, Case Studies, Publications, FAQs, and Contact Us. On the left side, there is a sidebar menu with links for "What is Sustainability?", "Measuring Sustainability", "Concrete", "Sustainable Concrete", and "Sustainable Design and Construction", along with a search box and a "Go" button. The main content area features a welcome message, a paragraph about the website's design by the UK Concrete Platform Sustainable Construction Task Group (UKCP SCTG), and a "MYTH BUSTER" section. The myth buster states: "A tonne of concrete produces a tonne of carbon dioxide." and is labeled "FALSE!". It explains that 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). On the right side, there is a grid of logos for various industry organizations: BRITISH PRECAST, BCA, The Concrete Centre, BRITISH READY-MIXED, QPA (Providing Essential Materials), CONCRETE SOCIETY, C S M A, UNITED KINGDOM QUALITY ASH ASSOCIATION, BAR, and CAP.

[www.sustainableconcrete.org.uk](http://www.sustainableconcrete.org.uk)



# Common Framework?...10 Production Industries





## The means

- procurement
- design
- innovation
- people
- better regulation

## The ends

- climate change mitigation
- climate change adaptation
- water
- biodiversity
- waste
- materials

# Responsible Sourcing Scheme



 2012 Vision

 Strategic objectives

 Concrete 'Commitments'

*Optimat report, July '08*



# Vision : Cement & Concrete

## Sustainable Construction Material of choice

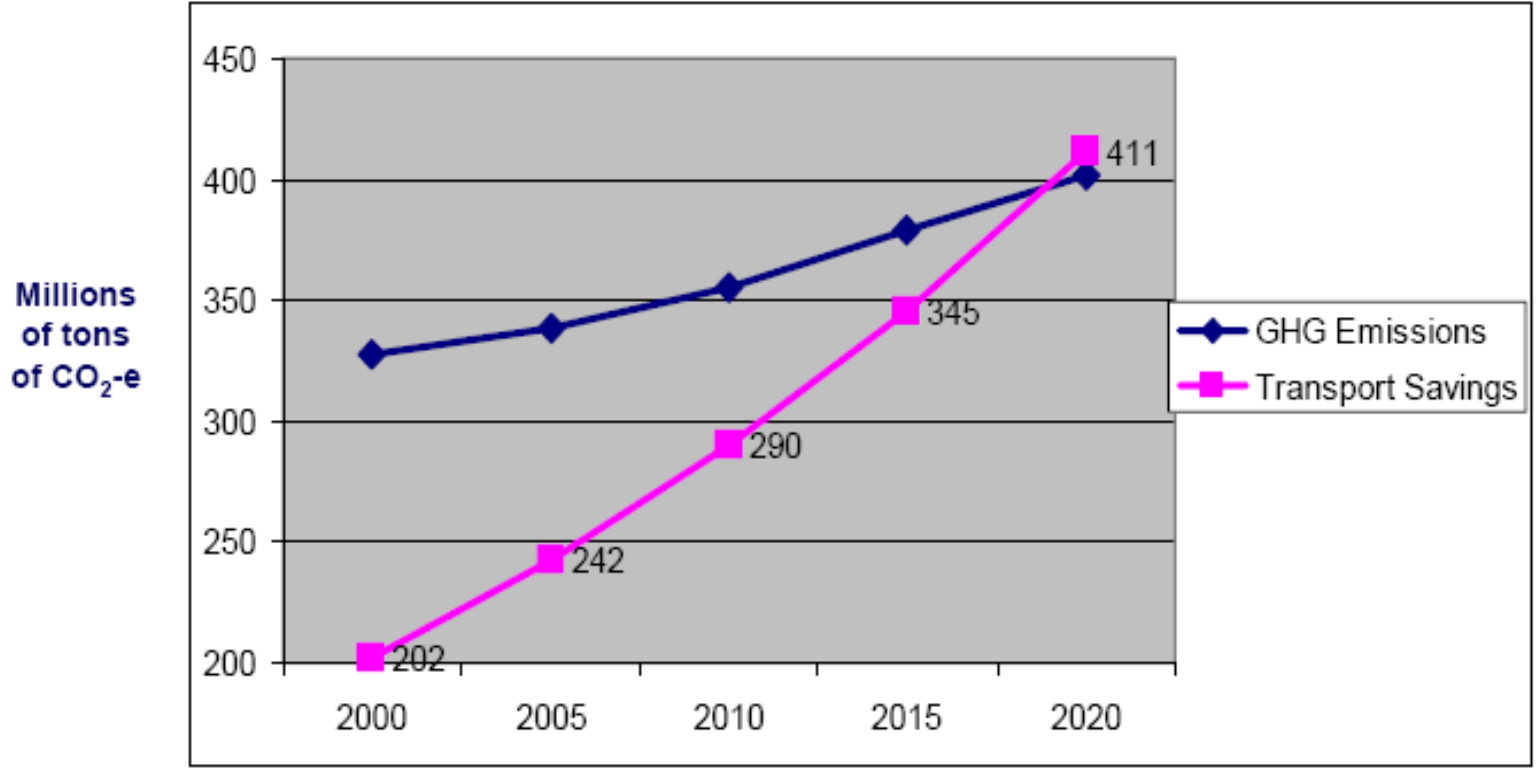
41

- **CO2 – 26% reduction achieved**
- **Energy:**
  - **0.822 Kg/T** > **Alt fuels and Materials**
  - **0.4?** > **Blended cements**
  - **0.2?** > **Carbon Capture & Storage**
- **Carbon Capture & Storage – post combustion capture**
  - **Costs – Euros €20/tonne**
  - **Efficiency – 20% energy penalty**
- **Re-carbonisation – 5-10% + 15% end-of-life**
- **Construction benefits: Thermal mass; durability; fire; flood defence; transport; safety; societal**

**= Zero Carbon future**



## Aluminum Can Be GHG Neutral by 2020



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

## Cement could be climate neutral by using its concrete benefits....

Wastes as Fuels

Wastes as raw materials

*ECO BUILDINGS*



*BRIDGES  
TUNNELS*



Recarbonation and sequestration



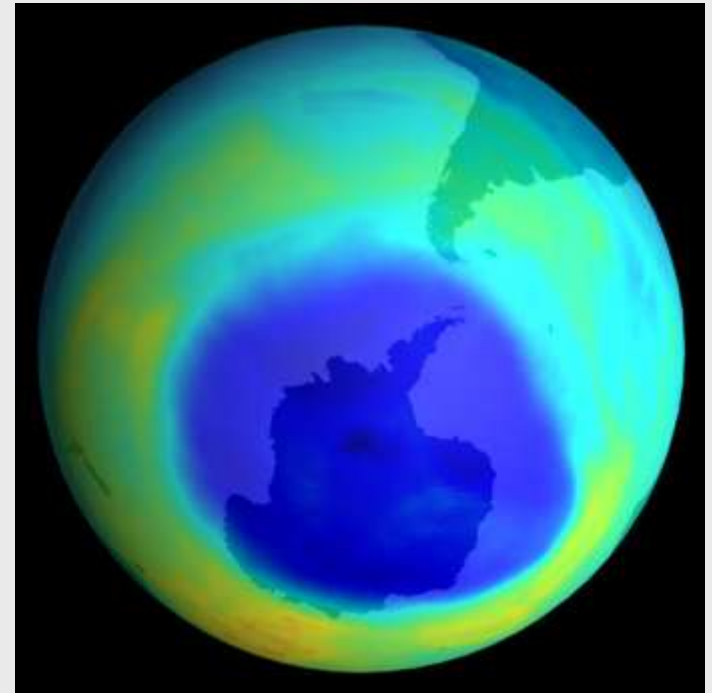
*ROADS*



“Ozone hole largest yet”  
(BBC, Sep 2000)

“Ozone hole heading for Europe”  
(BBC, Nov 2001)

“Ozone hole stable, say scientists”  
(BBC Aug 2006)



Ozone hole in 2003  
(courtesy of NASA)