International collaboration for decarbonising the steel and cement industry

24th October for the NEFI conference

Department for Energy Security & Net Zero

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Who are we?

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Resource Efficiency & Industrial Symbiosis Analysis

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Agenda

- Steel and cement industry
- International initiatives
- UK Research on industrial resource efficiency
- Aligning emission accounting standards on steel and cement

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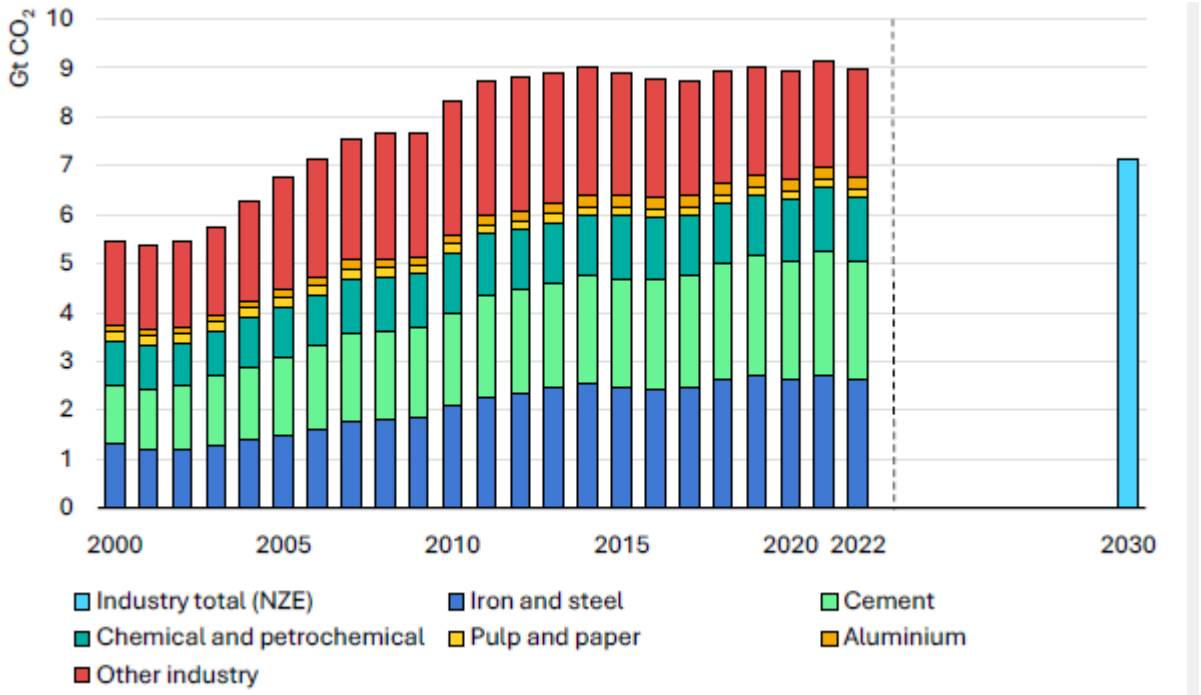
The steel and cement sectors are not on track to achieve a Paris-aligned emissions pathway

Direct CO2 emissions from industry in the Net Zero Emissions by 2050 Scenario, 2000-2030



Source: IEA (2023) Tracking Clean Energy Progress, Industry

- Industry has **potential to become the largest contributor of carbon emissions in less than a decade** unless investments in zero-carbon alternatives are rapidly accelerated.

- A significant number of new high-emission blast furnaces and cement plants are anticipated in the 2020s.

- Achieving deep decarbonisation within industrial sectors remains a challenge due to **a lack of commercially available technologies** for near-zero emission production of materials, associated **high costs of production**, and the **long-life span of heavy industry facilities** which risks "locking in" high emission infrastructure.

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Steel and cement represent 27% of UK industry emissions

Cement Industry UK

£18bn to UK GDP

74,000 directly employed

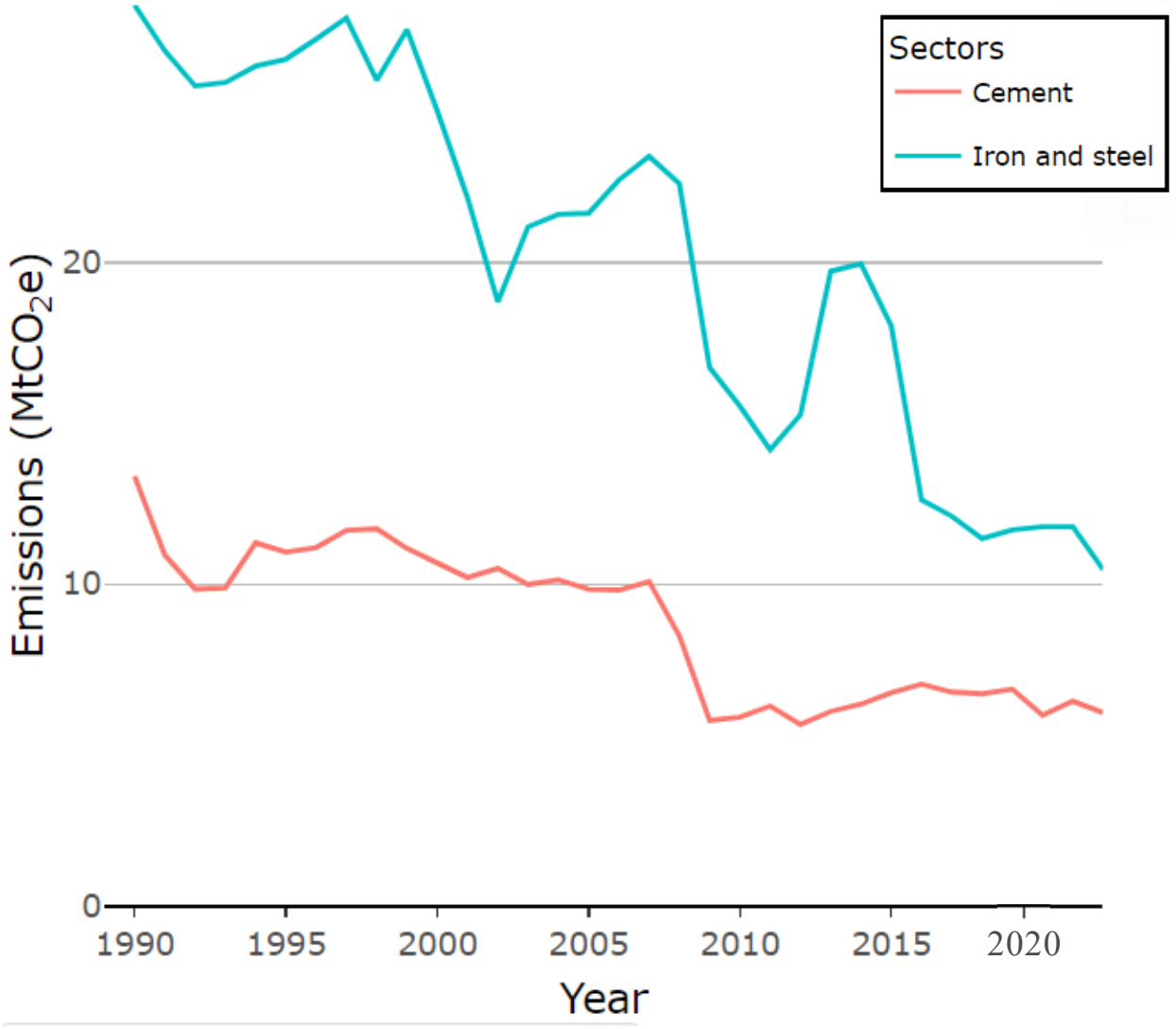
6MtCO$_2$e (~10% of industry emissions)

Iron & Steel Industry UK

£2.4bn economic output

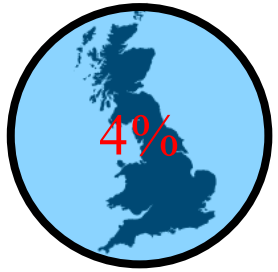
39,000 directly employed

10.5MtCO$_2$e (~17% of industry emissions)



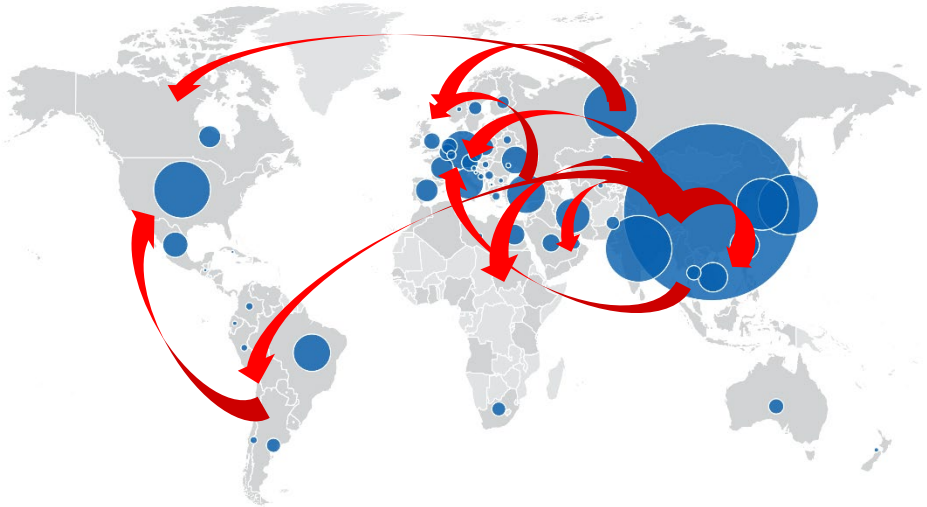
Complex supply chains of materials means despite significant domestic production, UK imports steel and cement and consumption is sensitive to changes in cost.

Globally, steel, cement and concrete represent 15% of emissions.



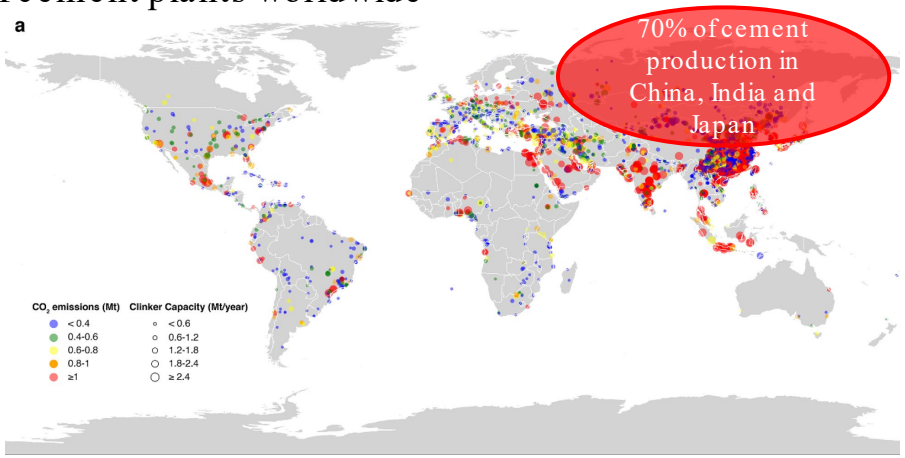
The industry represents 4% of UK territorial emissions, but there is potential risk of carbon leakage.

Map of world steel production and large net exports



Source: World Steel Association (2022)

Map of cement plants worldwide



Source: Chen et al (2022) A striking growth of CO_2 emissions from the global cement industry driven by new facilities in emerging countries

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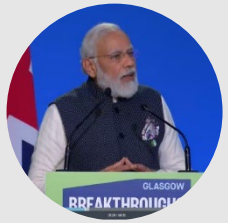
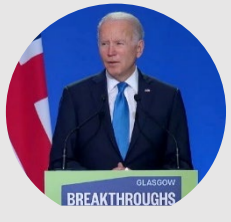
International Collaboration

The Breakthrough Agenda provides continuity of action from COP-to-COP, supported by 59 countries

BREAKTHROUGH AGENDA

UN CLIMATE CHANGE CONFERENCE UK 2021
IN PARTNERSHIP WITH ITALY





Breakthrough Agenda launched by world leaders at COP26

COP27 SHARM EL-SHEIKH EGYPT2022

First Breakthrough Agenda Priority Actions launched at COP27

COP28 UAE

Buildings Breakthrough and Cement Breakthrough launched at COP28

COP29 Baku Azerbaijan

Updated Priority Actions to be launched at COP29

Now backed by 59 countries covering over 80% of global GDP

The Breakthrough Agenda annual process has been delivering at every COP since 2021

BREAKTHROUGH AGENDA

An internationally-recognised, annual, COP-centred, collaborative process backed by **59 countries,** with **150+ initiative partners**…

…all **working together** to enable the delivery of **priority actions** across (currently) **seven key sectors**.

Coordinate → **Prioritise** → **Enhance** → **Track**

Breakthrough Agenda's Commitments: Goals

BREAKTHROUGH AGENDA

Power

Clean power is the most affordable and reliable option for all countries to meet their power needs efficiently by 2030.

Co-leads: Morocco and UK
Launched: COP26
Signatories: 36
Sector Facilitator host: IRENA

Road Transport

Zero emission vehicles are the new normal and accessible, affordable, and sustainable in all regions by 2030.

Co-leads: India, US and UK
Launched: COP26
Signatories: 34
Sector Facilitator host: ICCT

Steel

Near-zero emission steel is the preferred choice in global markets, with efficient use and near-zero emission steel production established and growing in every region by 2030.

Co-leads: Germany and UK
Launched: COP26
Signatories: 31
Sector Facilitator host: UNIDO

Hydrogen

Affordable renewable and low carbon hydrogen is globally available by 2030.

Co-leads: India, US, UK
Launched: COP26
Signatories: 37
Sector Facilitator host: IPHE

Agriculture

Climate-resilient, sustainable agriculture is the most attractive and widely adopted option for farmers everywhere by 2030.

Co-leads: Egypt and UK
Launched: COP26
Signatories: 17
Sector Facilitator: TBC

Buildings (new at COP28)

Near zero-emission and resilient buildings are the new normal in all regions by 2030.

Co-leads: France and Morocco
Launch: at COP28
Signatories: 29 confirmed
Sector Facilitator host: Global ABC

Cement & Concrete (new at COP28)

Near zero-emission cement is the preferred choice in global markets, with efficient use and near-zero emission cement production established and growing in every region by 2030.

Co-leads: Canada and UAE
Launch: at COP29
Signatories: 11 confirmed
Sector Facilitator host: TBC

THE BREAKTHROUGH AGENDA IS TACKLING THE 7 MAJOR SECTORS THAT COVER MORE THAN

60% OF GLOBAL EMISSIONS.

The framework has identified 5 key policy areas for industrial decarbonisation

BREAKTHROUGH AGENDA

1. Standards and Definitions

Goal

1. Accelerate the adoption of common standards: enabling like-for-like comparison

2. Demand Creation

Goal

2. Growing demand for low carbon products: ensuring market certainty for first movers

3. Research, Development &Demonstration

Goal

3. Fast-track RD&D: to bring deep decarbonisation technologies to scale

4. Trade Conditions (steel-specific)

Goal

4. Expand dialogues on trade and decarbonisation: shoring up international markets

5. Finance &Investment

Goal

5. Scale international assistance: ensuring EMDEs access to technical and financial assistance

The coalition works together to deliver annually agreed priority actions to achieve this vision

BREAKTHROUGH AGENDA

Informed by the yearly **Breakthrough Agenda Report recommendations**, governments and initiatives deliver against annually agreed **Priority Actions** – areas **where governments agree stronger international coordination** is **urgently needed** to meet the **2030 vision**.

1. Standards and Definitions

Goal

Adopt common, interoperable, low-emissions and near-zero emissions standards and definitions for steel, cement, and concrete that are net-zero compatible to help enable like-for-like comparison, support cross-border trade, and provide clarity for consumers

Initiatives

Coordinating

Industrial Deep Decarbonisation Initiative of the Clean Energy Ministerial · IEA · Climate Club

Partnered with

Responsible Steel · worldsteel Association · GCCA · ISO · World Trade Organization

Examples of progress to date

- 38 steel producers endorsed the **Steel Standards Principles** which sought consensus from industry organisations and trade associations on common principles for **emissions measurement methodologies**.
- World Steel Association **mapping exercise of international steel standards** to aid further alignment and contribute to updates of leading standards.
- Publication of IDDI Guidance for **Product Category Rules Harmonisation**.
- Launch of Germany's **Low Emission Steel Standard (LESS)**, a voluntary product standard open to all steel producers, and **ResponsibleSteel version 2.1**.

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3. Research, Development &Demonstration

Goal

3. Fast-track RD&D: to bring deep decarbonisation technologies to scale

Industrial resource efficiency in the UK

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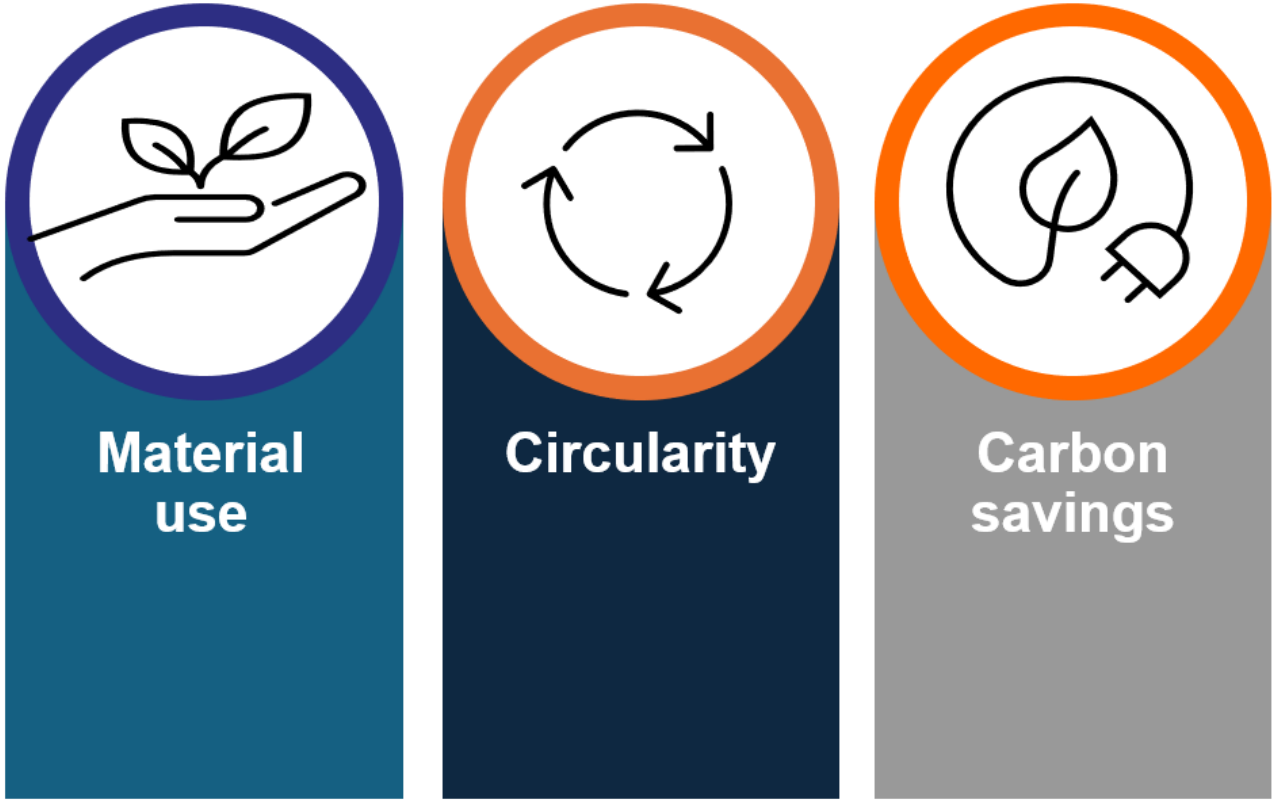
Introduction to Resource efficiency

- Resource efficiency means **optimising material use so that production requires with less raw material input.**
- Approaches for achieving resource efficiency are often reliant on a "**circular economy**" model of keeping resources within a closed loop rather than a linear system.



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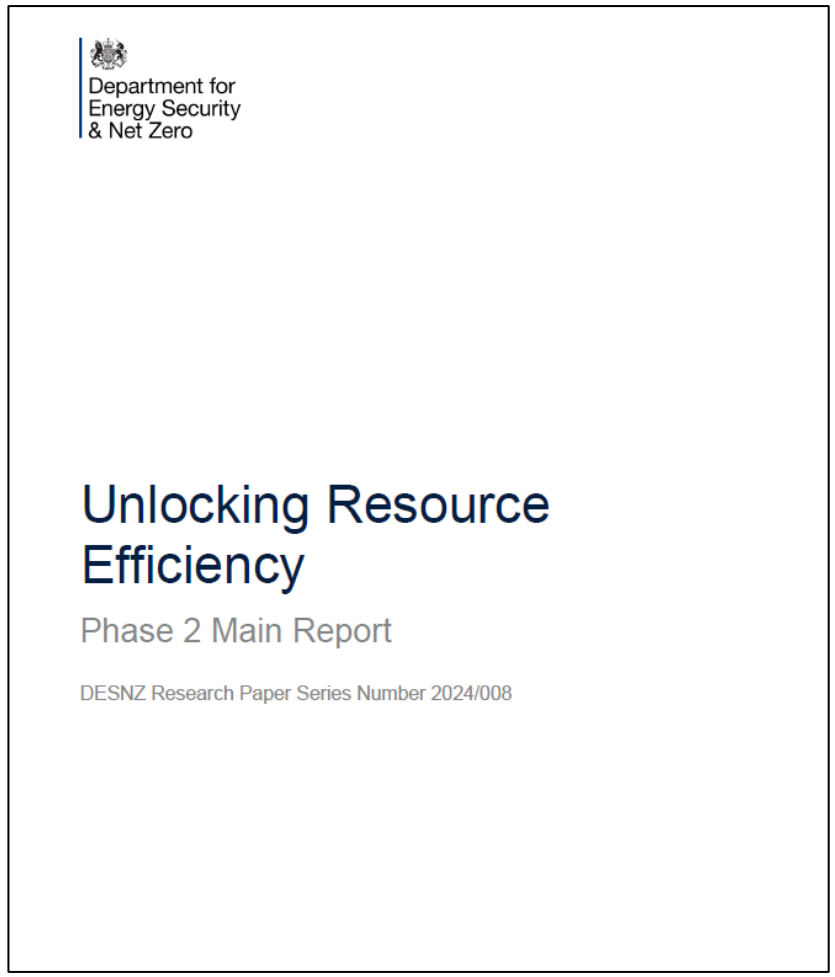
Research & analysis to unlock a resource efficient industry

Unlocking resource efficiency research project (2023)



Industrial Symbiosis: benefits, barriers, risks and costs (2024)

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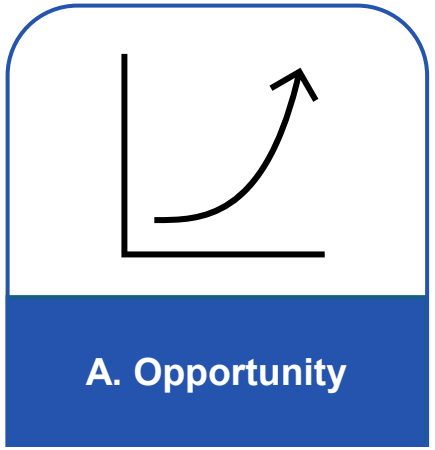
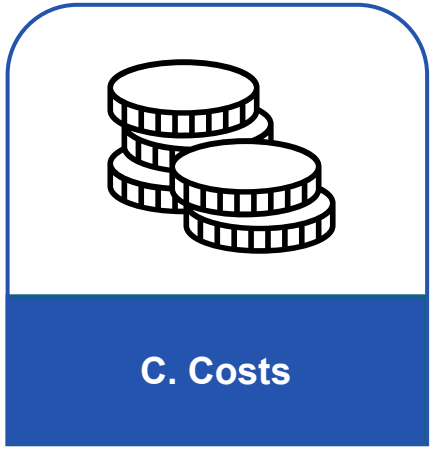
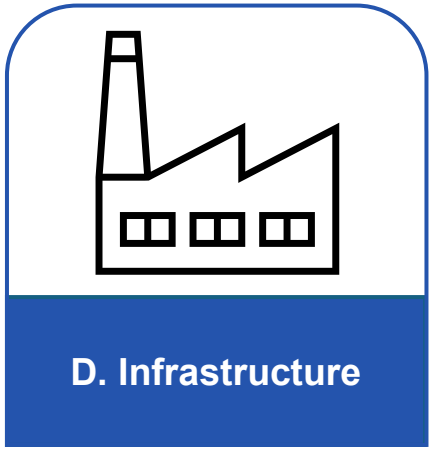
Research insights: Resource efficiency and industrial symbiosis







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Deep dive: Resource efficiency in the cement sector

Opportunities for RE in cement and concrete

- Substituting clinker in cement production
- Use of recycled concrete to replace clinker in cement production or raw aggregate in concrete.
- Lean design of concrete buildings
- Reducing wasted concrete
- Industrial symbiosis

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Goal

Adopt common, interoperable, low-emissions and near-zero emissions standards and definitions for steel, cement, and concrete that are net-zero compatible to help enable like-for-like comparison, support cross-border trade, and provide clarity for consumers

Aligning carbon accounting standards

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Green public procurement pledge

INDUSTRIAL DEEP DECARBONISATION
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

A public procurement pledge to:

1. Require disclosure of steel and cement emissions
2. Require project whole life carbon assessments
3. Require procurement of low emission steel/cement

UK public procurement analysis (2021) by the Infrastructure projects Authority

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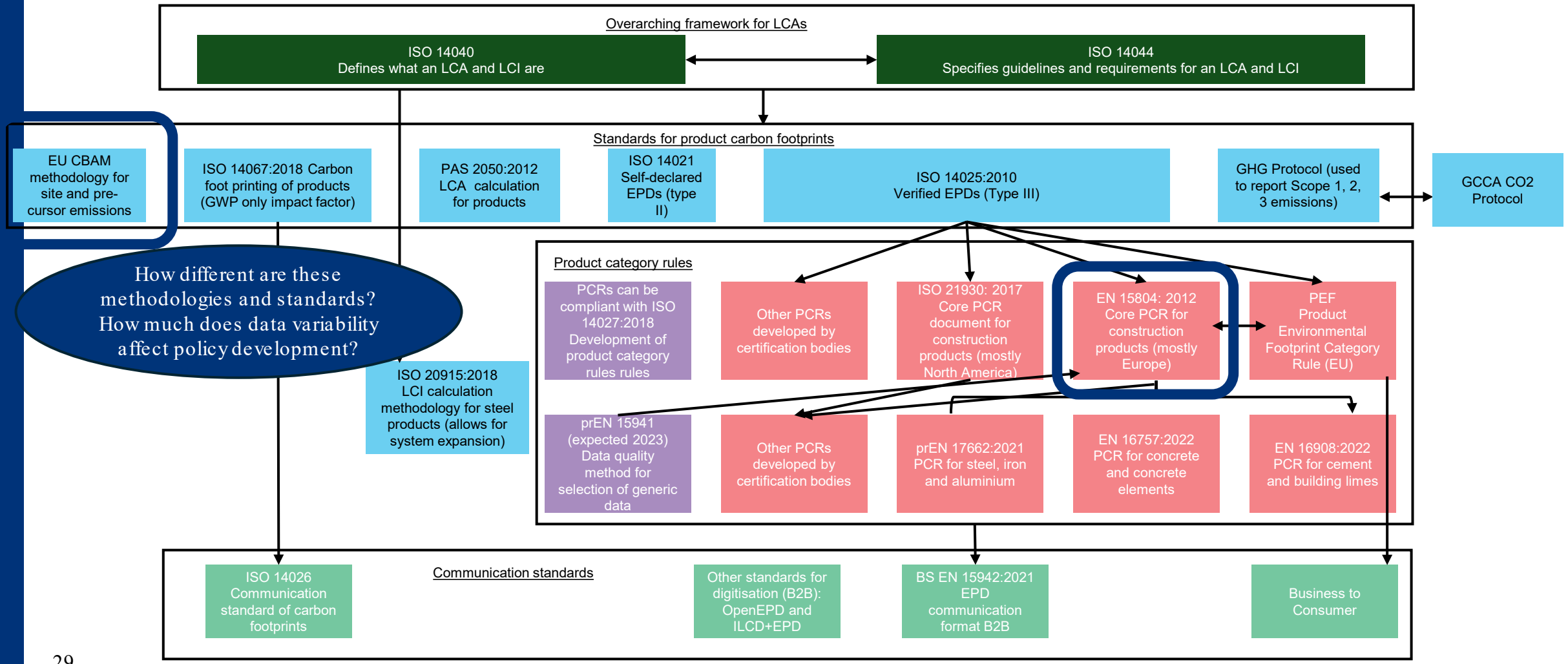
Many standards for assessing emissions of steel, cement and concrete



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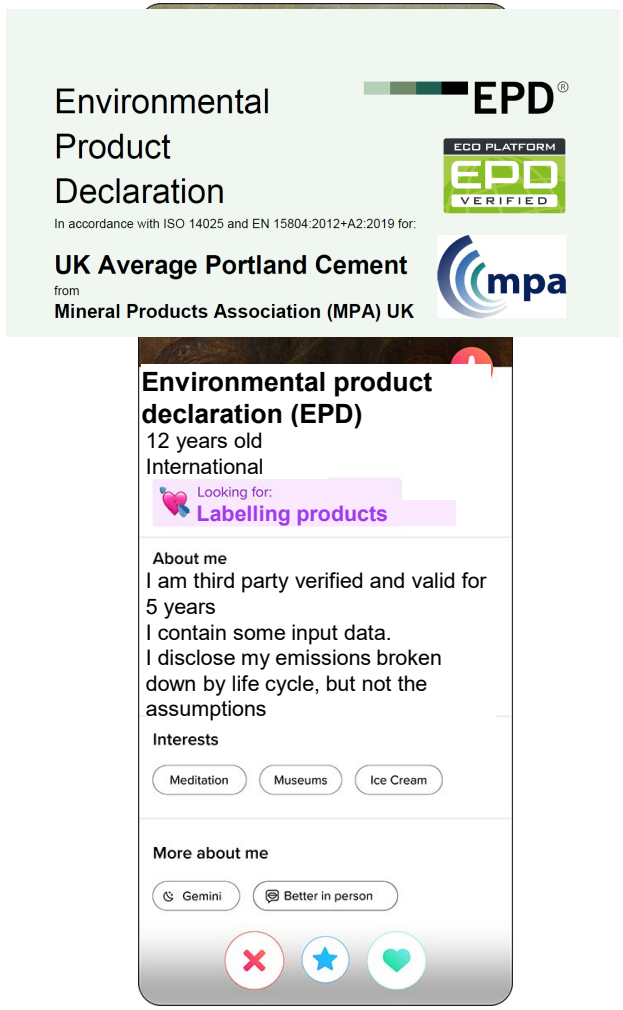
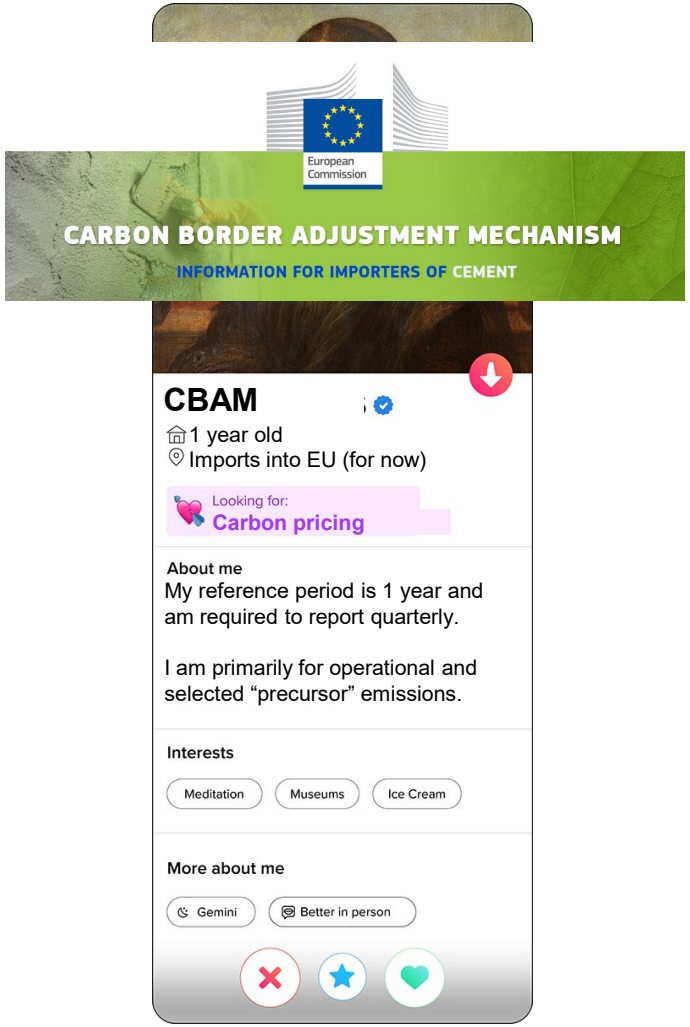
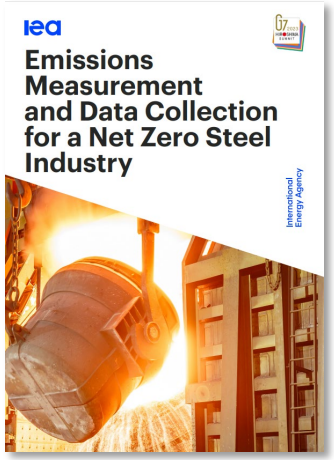
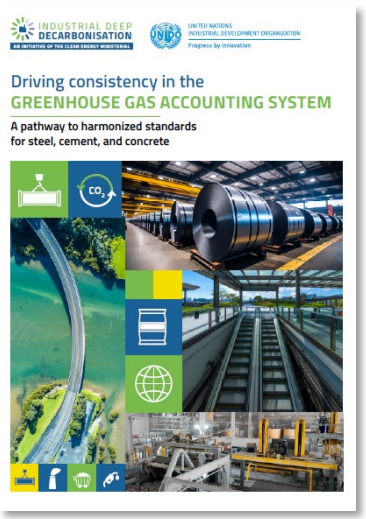
How different can standards be?





Guidance for interoperability of standards





Steel and cement contribute contribute ~50% of embodied emissions in buildings

WLCP.Co
Whole Life Cycle Policy Coalition for the built environment

Global Alliance for Buildings and Construction

1. Improve data collection and digital infrastructure to collect emissions data
2. Agree on complex LCA methodological aspects (e.g. biogenic carbon, CCUS)
3. Upskill policy makers to consider embodied emissions and create a central place to find relevant information e.g. on public procurement, market acceleration, implementation challenges of policies, building codes, etc.
4. Diversify the voices working on Whole Life Cycle policies and standards in the built environment

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