Global Cement and Concrete Association

CONCRETE FUTURE

Definitions of Low Carbon Cement and Concrete for Green Procurement: Launch of GCCA Definitions

15th October 2024

12:30 – 13:30 (LONDON)

Definitions of Low Carbon Cement and Concrete for Green Procurement: Launch of GCCA Definitions

Nicolas Antoniou
Sustainable Design and Construction Manager
GCCA

Speaking on:
"Measuring and Reporting of EPDs"

Dr Andrew Minson
Sustainable Design and Construction Director
GCCA

Speaking on:
"Cement and Concrete Definitions"

GCCA Membership

Our Members

Adani Cement (pending application)
Asia Cement Corporation
Breedon Group
BUA Cement
Buzzi S.p.a.
Cimenterie Nationale
Cementir Holding
Cementos Argos
Cementos Moctezuma
Cementos Pacasmayo
Cementos Progreso
CEMEX
Çimsa Cement
CNBM
CRH
Dalmia Cement
Dangote
Emirates Steel Arkan
Fletcher Building
GCC
Heidelberg Materials
Holcim
Hima Cement
Huaxin Cement
JK Cement
JK Lakshmi Cement (pending application)
JSW Cement
Medcem
Misr Cement Group
Molins
Nesher Israel Cement Enterprises
Norm Cement
Northern Region Cement Company (Saudi Arabia)
Orient Cement
PT Solusi Bangun Indonesia
SCHWENK Zement
SECIL
Siam Cement Group
Siam City Cement
Taiheiyo Cement
TCC Group Holdings CO., LTD.
TITAN Cement Group
TPI POLENE
UltraTech Cement
UNACEM
Vassiliko Cement
Votorantim Cimentos
YTL Cement
Yura Cement

National & Regional Association Partners

Asociación de Fabricantes de Cemento Portland – Argentina
Asociación de Productores de Cemento – Peru
Associação Brasileira de Cimento Portland – Brazil
Association of German Cement Manufacturers (VDZ) – Germany
Association Professionnelle des Cimentiers – Morocco
Betonhuis – Netherlands
BIBM – Europe
CANACEM – Mexico
Canadian Precast Prestressed Concrete Institute
Cement Association of Canada
Cement Concrete & Aggregates Australia
Cement Industry Federation – Australia
Cement Manufacturers Association – India
Cement Manufacturers Ireland
China Cement Association
Concrete NZ – New Zealand
European Cement Association (CEMBUREAU)
European Federation Concrete Admixtures
European Ready Mixed Concrete Organisation
Federación Iberoamericana del Hormigón Premezclado – LatAm
Federación Interamericana del Cemento (FICEM) – LatAm
Japan Cement Association
Korea Cement Association
Mineral Products Association – United Kingdom
National Ready Mixed Concrete Association – USA
Portland Cement Association – USA
South India Cement Manufacturers Association
Thai Cement Manufacturers Association
The Spanish Cement Association (Oficemen)
Turkish Cement Manufacturers Association (TürkÇimento)

Why Concrete Matters?

Concrete is the backbone of modern society

Concrete provides a durable and versatile foundation for the infrastructure society needs, from roads and bridges to buildings and dams.

Its strength and longevity enable the development of urban environments, supporting economic growth and enhancing the quality of life for communities around the world.

Few of the Incredible Benefits of Concrete


Albedo


Availability


Balancing the energy grid

Carbon uptake


Circular economy


Concrete for heating (Electro-conductive)


Concrete roads


Design for disassembly


Disaster resilience


Durability

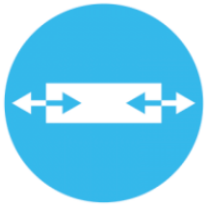

Fire resistance


Healthy buildings


Passive cooling using thermal mass

Photocatalytic concrete


Porous concrete


Prestressed concrete


Self-healing


Strength


Structure as finish


Versatility


Wide range of placements

Built Environment and the Role of Concrete

Concrete is fundamental to infrastructure key assets and hence concrete is key to delivering the vast majority of UN sustainable development goals.

UNOPS, a UN agency, has published a report which identified that the built environment supports society in reaching 92% of the 169 targets in the 17 UN SDGs.

This 92% figure derives from consideration of all parts of the built environment: infrastructure (water, waste, energy, transport and digital communications), buildings and facilities.

92%

UNOPS, a UN agency, has published a report which identified that the built environment supports society in reaching 92% of the 169 targets in the 17 UN SDGs.

Concrete is essential to our lives – but we have to reduce its emissions."

John Kerry, United States
Special Presidential Envoy for Climate

Concrete and cement are not just fundamental to constructing roads, bridges and buildings.

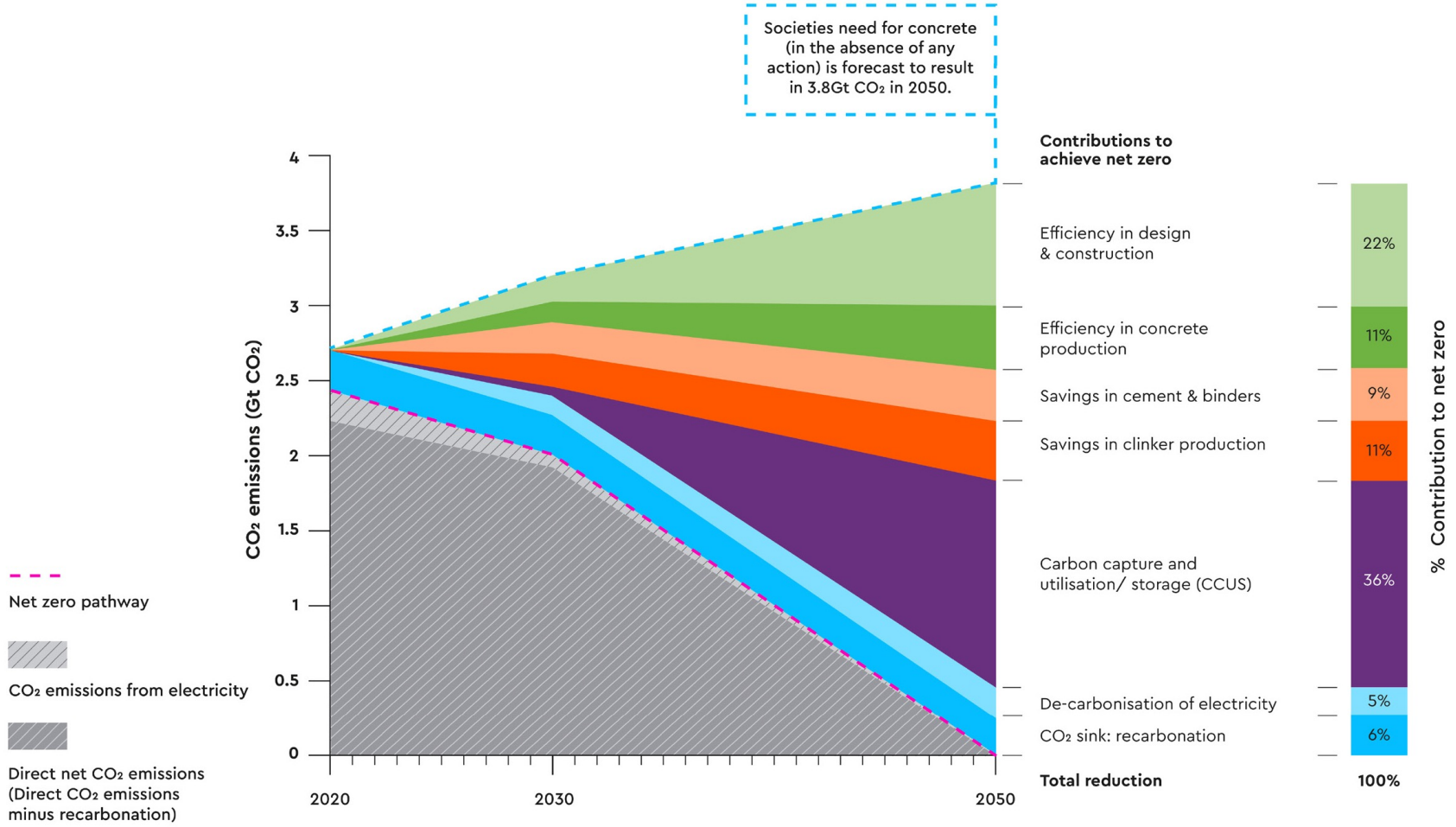
You are fundamental to building a better world...

Three quarters of the infrastructure that will exist in 2050 has yet to be built.

António Guterres, Secretary-General of the United Nations

Global Roadmap to Zero

https://gccassociation.org/cement-industry-net-zero-progress/

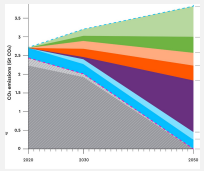


Country Roadmaps

Country roadmaps – GCCA Net Zero Accelerator Initiative

A key step in regulatory transition and financing discussion

KEY DELIVERABLES

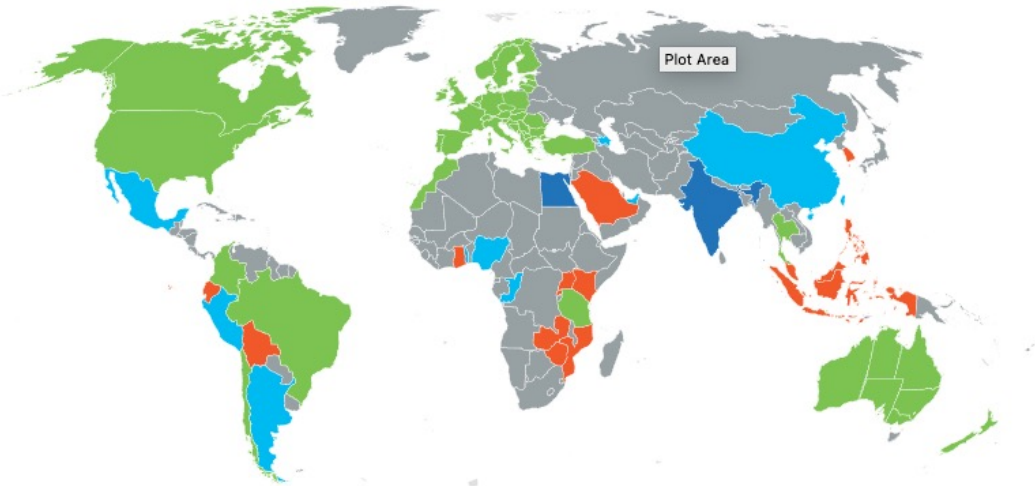


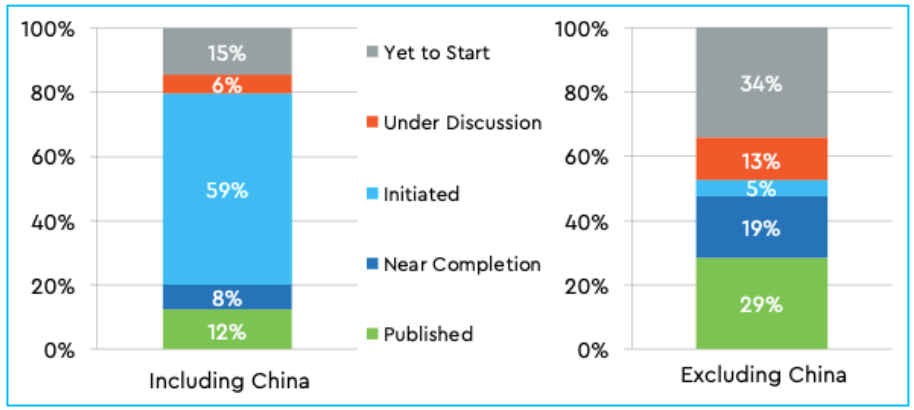
Roadmap Levers and CO_2 impact
Per lever, quantification of potential CO_2 reduction 2030 & 2050

Policy
Per lever, identification of enabling policies

Lighthouse Projects
Per lever, identification of lighthouse projects

Progress of Roadmaps around the globe





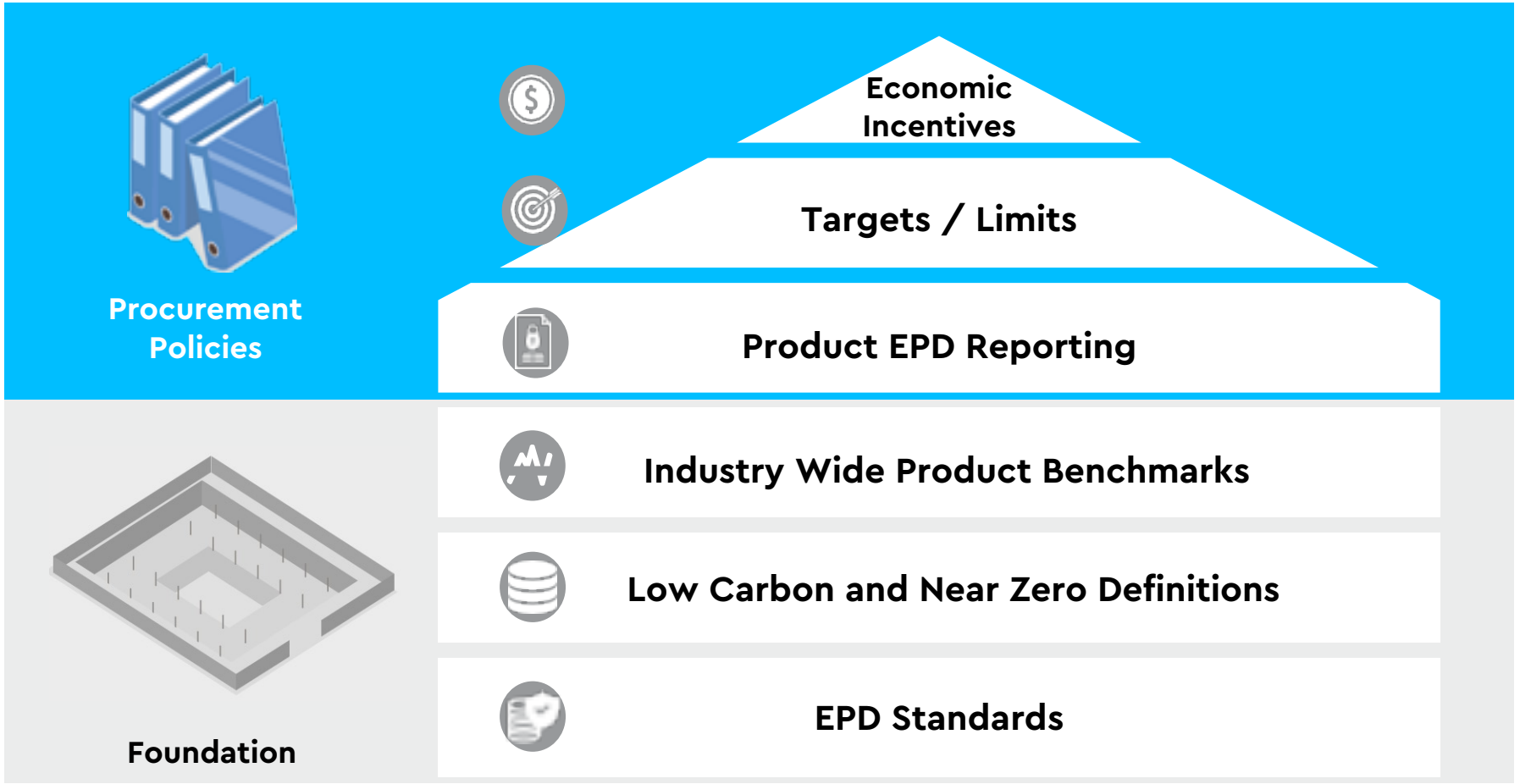
GCCA Climate Policy and Position Papers

- Circular Economy
- Carbon Pricing
- Carbon Capture Utilisation and Storage
- Co-Processing
- Blended Cement and SCM
- Low Carbon Product Procurement
- Cement Definitions for Low Carbon and Near Zero
- Concrete Definitions for Low Carbon and Near Zero

Policy and Position Papers provide:

- Position statement
- Policy recommendations
- Commitments from GCCA members

Low Carbon Procurement



Nicolas Antoniou

Sustainable Design and Construction Manager

Common Reporting Mechanism: Environmental Product Declarations (EPDs)

Benefits:

- Standardised rules for creating EPDs across construction materials
- Existing infrastructure for EPDs (program operators, verifiers, software tools)
- EPDs include carbon footprint indicator (ECO_2e or GWP)
- Familiarity with EPDs among project stakeholders

Challenges:

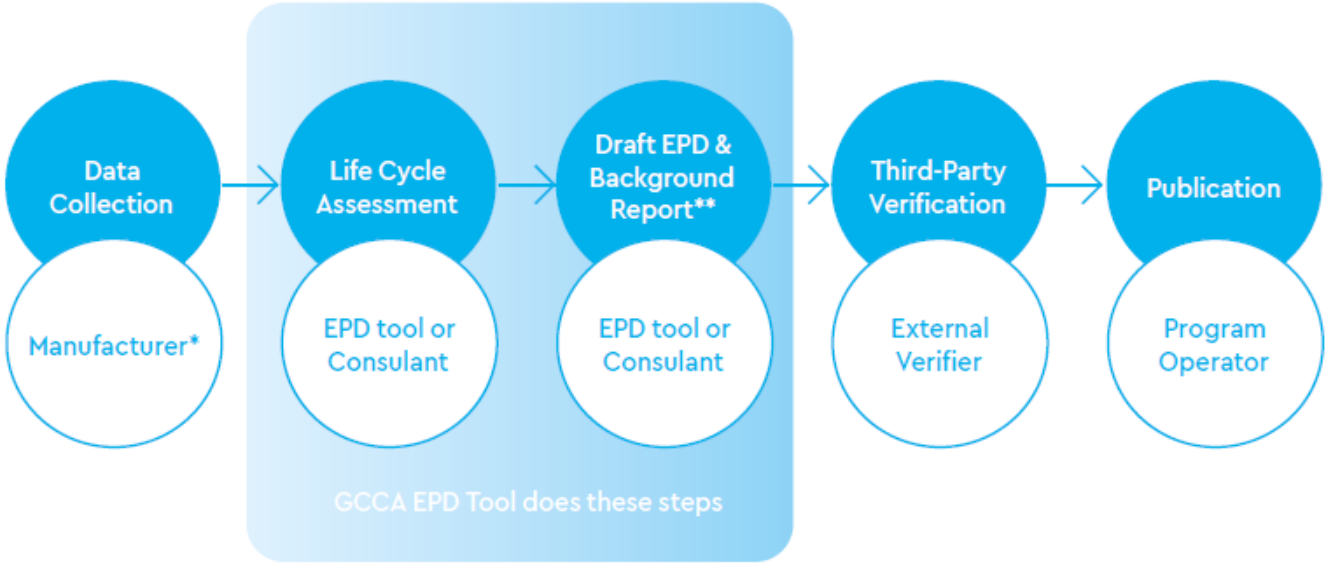
- Inconsistencies due to:
  - Different standards (e.g. EN 15804 vs. Nth America)
  - Differences in life cycle stages considered (cradle-to-gate, etc.)
  - Variation in non-product specific data (e.g. different databases)

Solution:

- IDDI initiative aims for EPD standards to align
- ALL LCP initiatives should account for the challenges and seek to ensure consistent reporting
- Global LCP should account for unresolved regional differences

GCCA EPD Tool

Supports companies to prepare Environmental Product Declarations (EPDs) for clinker, cement, concrete, aggregates and precast products.



** The manufacturer manages all stages and liaises with many points of contacts*
*** The background report contains confidential information and is only used by the external verifier*

Find out more: ***gccaepd.org***

Global Cement and Concrete Association

CONCRETE FUTURE

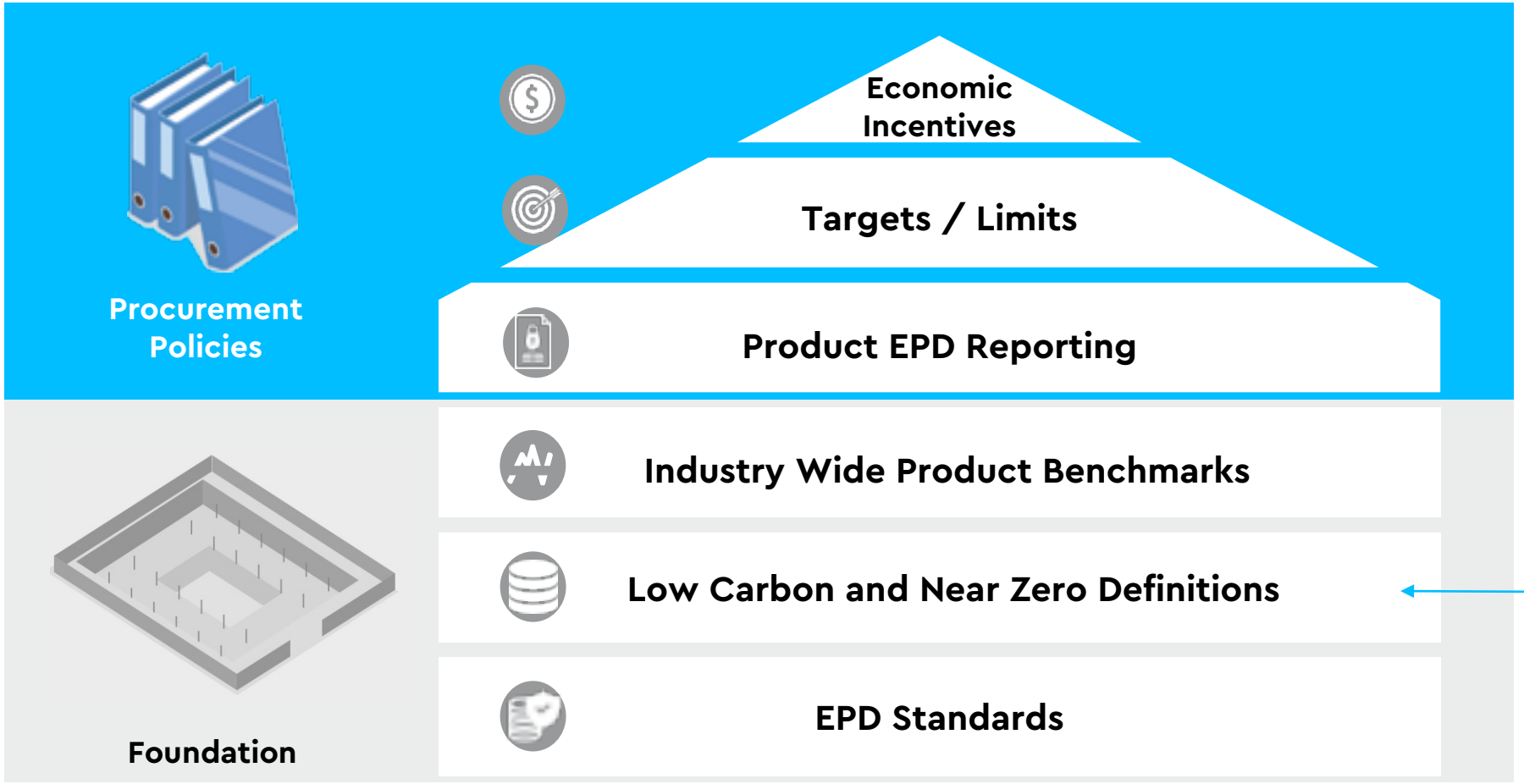
Upcoming Webinar: December 2024

"Environmental Product Declarations – An overview of EPDs and the GCCA EPD Tool"

Andrew Minson

Concrete and Sustainable Construction Director

Low carbon Procurement



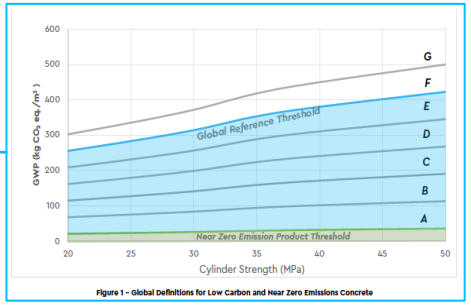


Figure 1 – Global Definitions for Low Carbon and Near Zero Emissions Concrete

Cement CO_2 and Energy Protocol

- The Cement CO_2 and Energy protocol V3 is **based on calculation methods that are compatible with IPCC 2006 Guidelines** for National Greenhouse Gas Inventories* issued by the Intergovernmental Panel on Climate Change (IPCC), and with the revised WRI / WBCSD Greenhouse Gas Protocol (2004).

  Note : None of the above-mentioned reference documents have been revised since their respective year of publication

- The GCCA is soon to finalise a revision of its CO_2 and Energy protocol to align with new guidance from SBTi, ISO guidelines (see next slide), and technological advancements like CCUS and calcined clays. **The new CO_2 and Energy Protocol will be available early 2025.**

Cement CO_2 and Energy Protocol: aligned with ISO Standards

In Version 3:

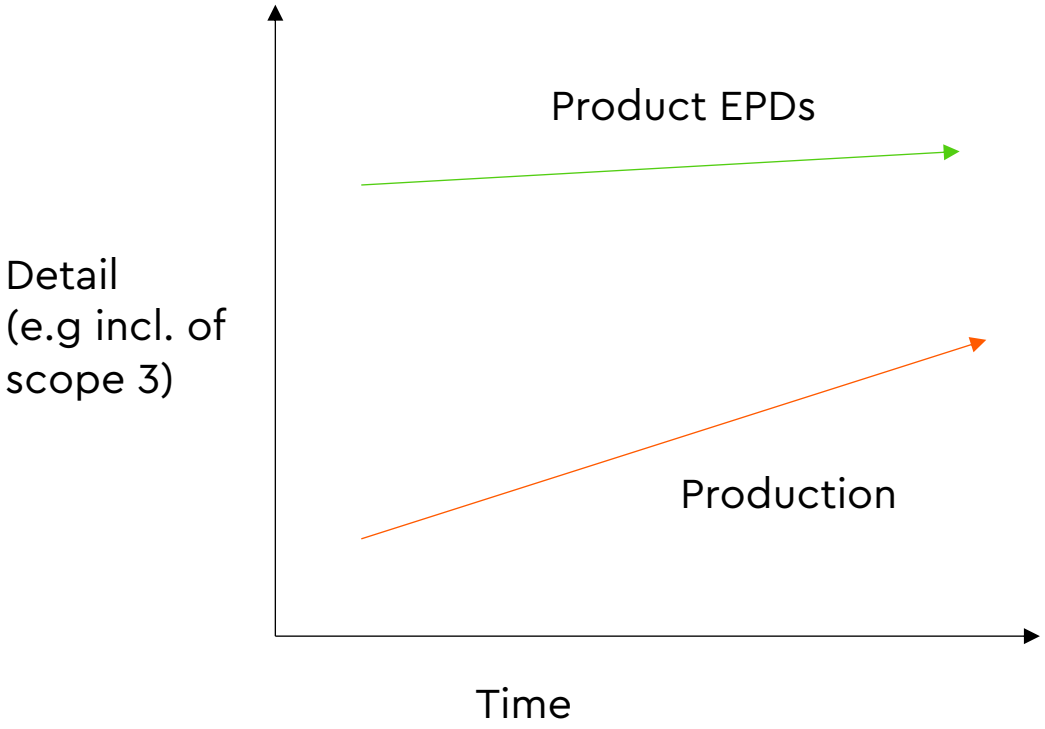
ISO Standards	Full Name
ISO 14064-1: 2006	Greenhouse gases. Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals. International Organization for Standardization, Switzerland

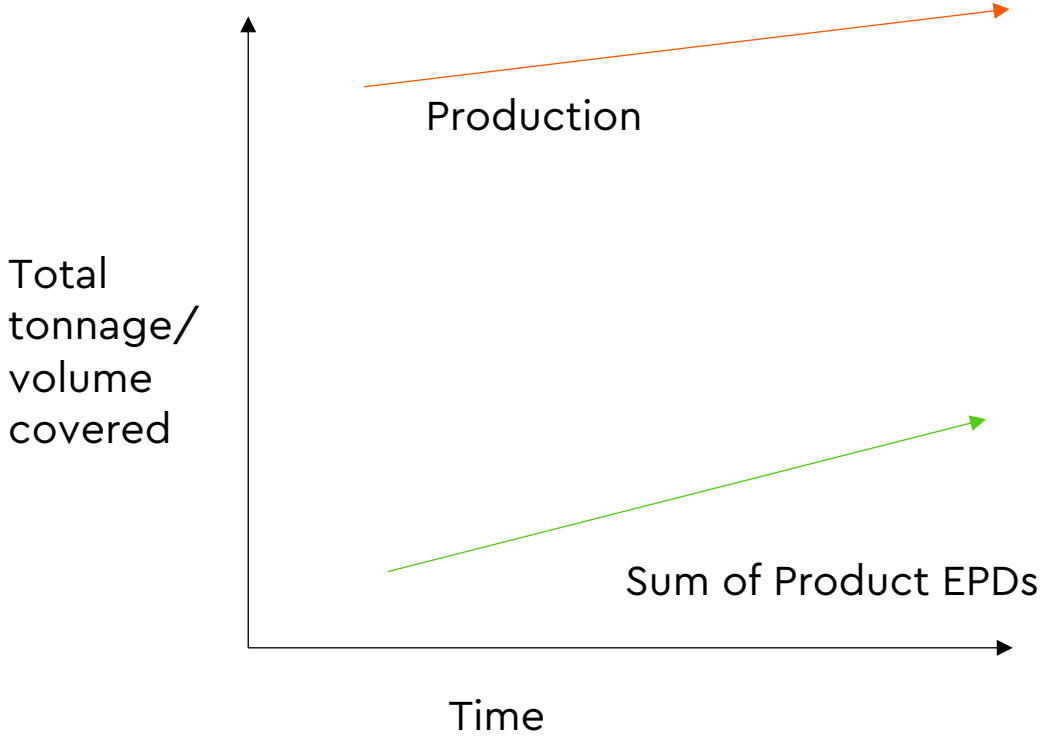
In the upcoming Version 4.X:

ISO Standards	Full Name
ISO 19694-1:2021	Stationary source emissions — Determination of greenhouse gas emissions in energy-intensive industries — Part 1: General aspects
ISO 19694-3:2023	Stationary source emissions — Determination of greenhouse gas emissions in energy-intensive industries — Part 3: Cement industry
ISO 14064-1:2018	Greenhouse gases — Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals
ISO 14064-2 : 2019	Greenhouse gases — Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements
ISO 14067:2018	Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification

Carbon Accounting: Congruent not identical

Production and Product: Complimentary



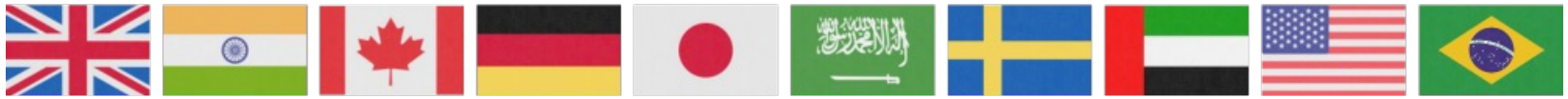


Industrial Deep Decarbonisation Initiative (IDDI)

"The Clean Energy Ministerial's IDDI is a global coalition of public and private organisations who are working to stimulate demand for low carbon industrial materials." (https://www.unido.org/IDDI)

Member Countries:

- Co-led by the United Kingdom and India.
- Canada
- Germany
- Japan
- United Arab Emirates
- Saudi Arabia
- Sweden
- United States
- Brazil



Industrial Deep Decarbonisation Initiative Pledges

Level One

Starting no later than 2025, require disclosure of the embodied carbon in cement/concrete and steel procured for public construction projects.

Level Two (in addition to Level 1)

Starting no later than 2030, conduct whole project life cycle assessments for all public construction projects, and, by 2050, achieve net zero emissions in all public construction projects.

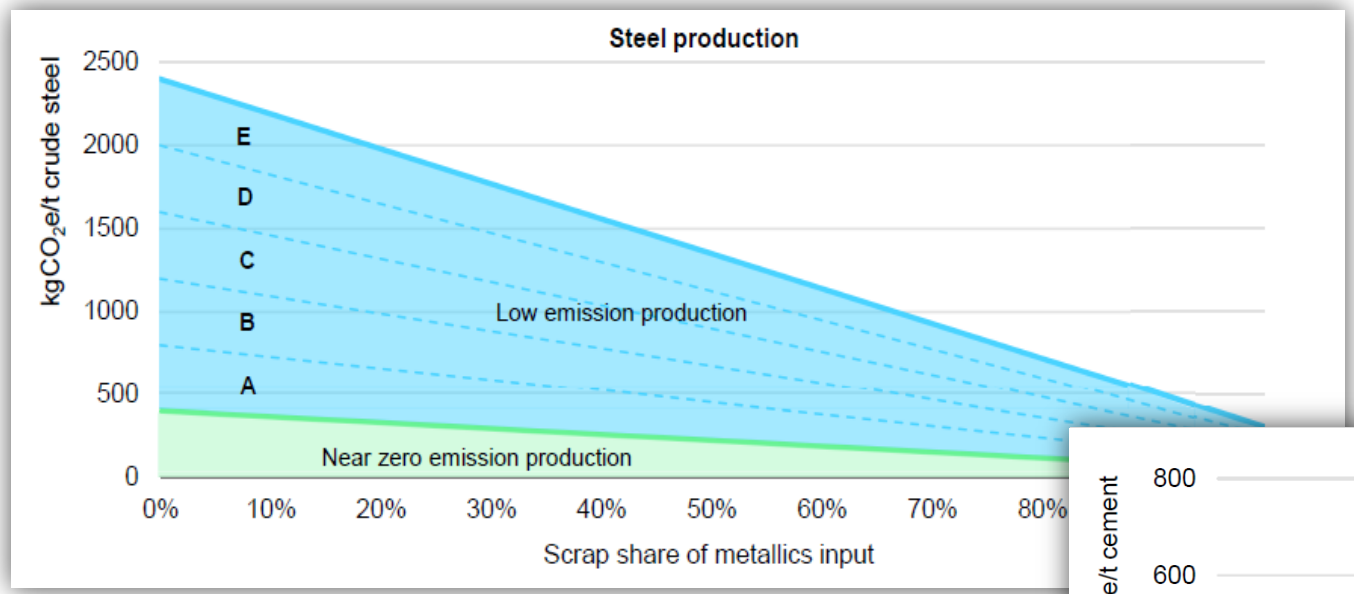
Level Three (in addition to Levels 1 and 2)

Starting no later than 2030, require procurement of low emission cement/concrete and steel in public construction projects, applying the highest ambition possible under national circumstances.

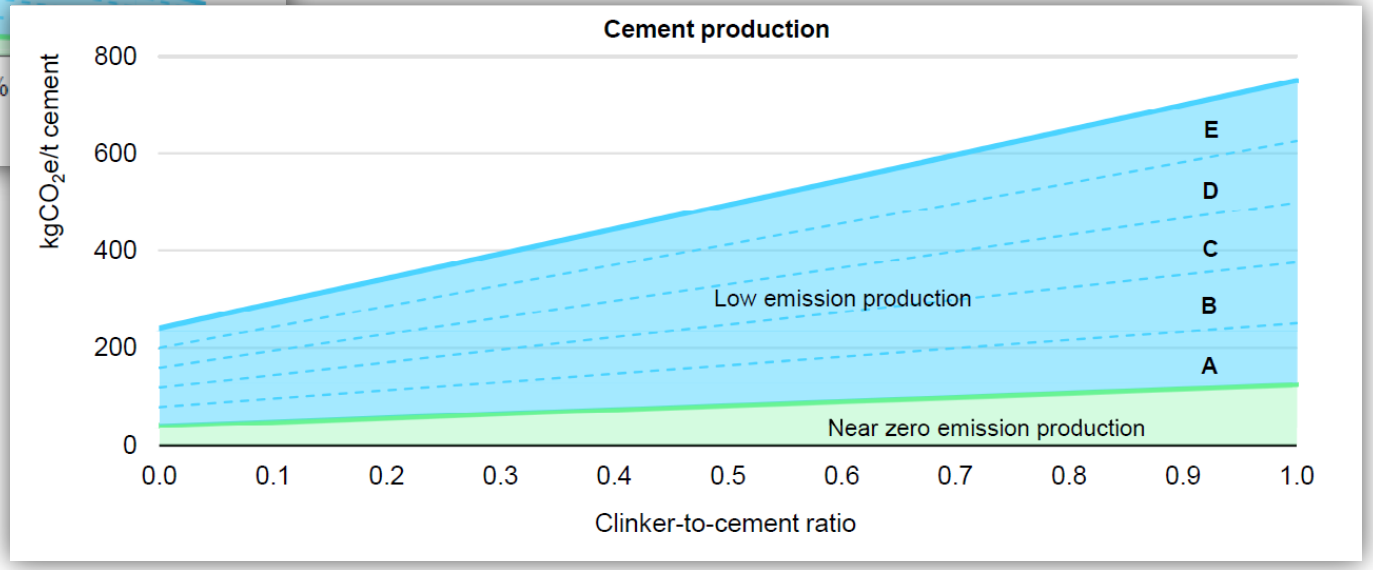
Level Four (in addition to Levels 1, 2 and 3)

Starting in 2030, require procurement of a share of cement and/or crude steel from near zero emission material production for signature projects.

IEA definitions for low and near zero emission steel and cement

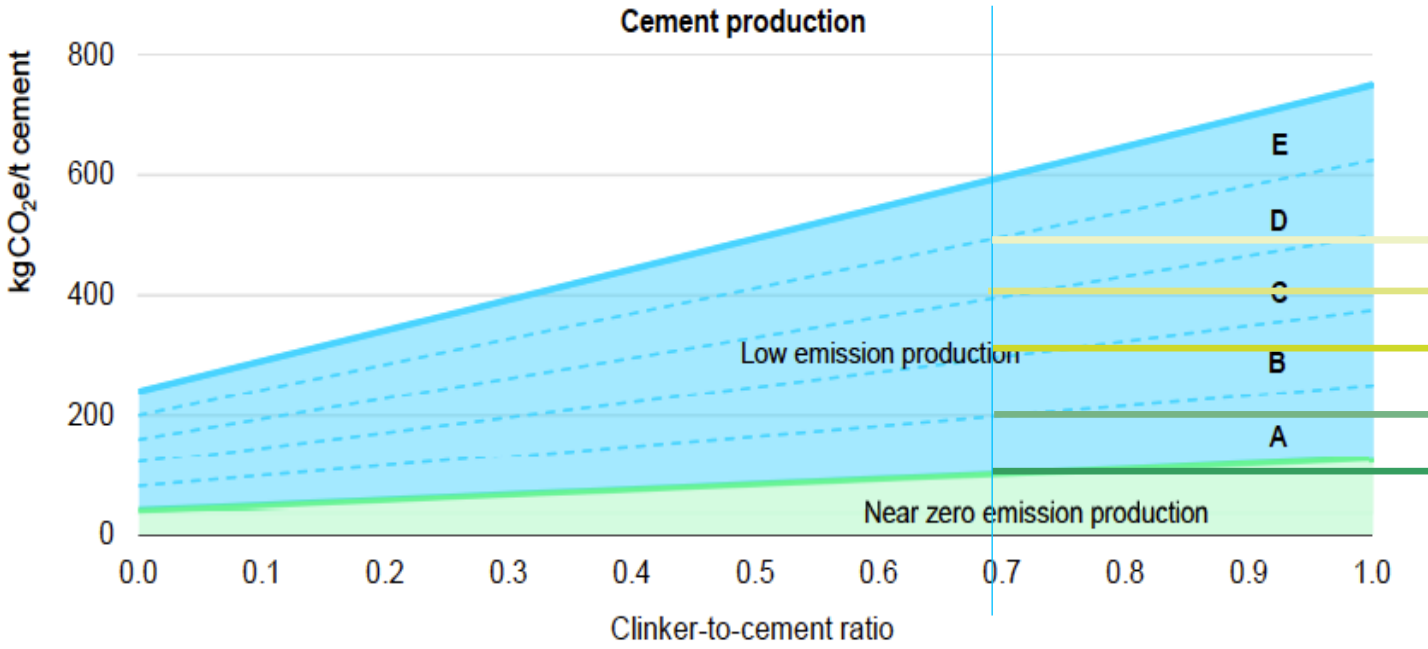


IEA Report:
"Achieving Net Zero Heavy Industry Sectors"
May 2022

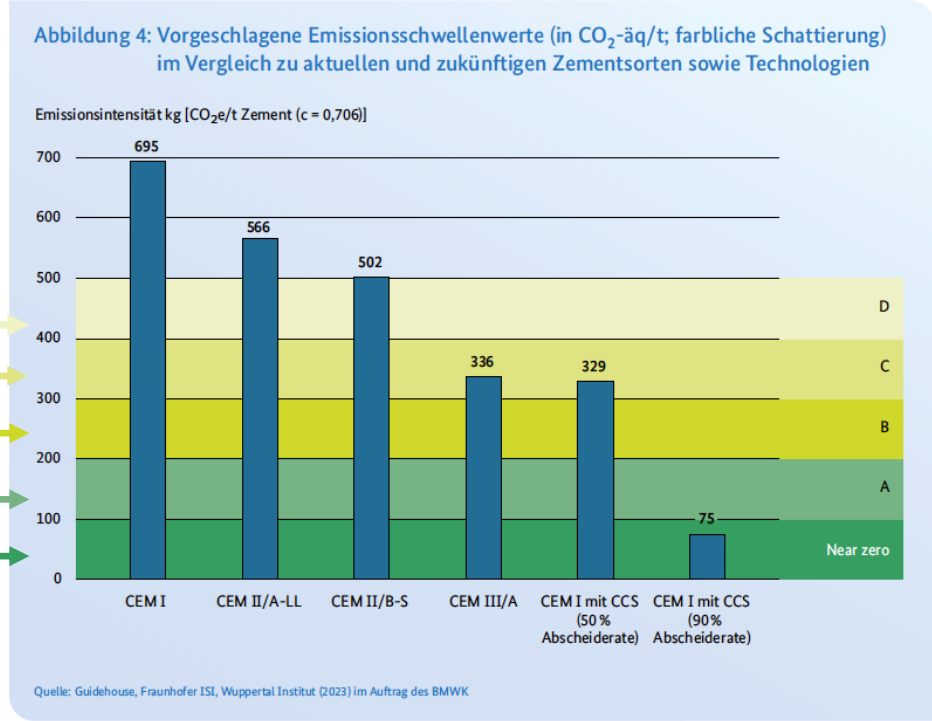


- Separation of definitions and targets
- Same static bands for all countries
- "Near zero" band defined by destination at 2050
- Upper bound of band "E" defined recognising current good practice
- Five low carbon emission bands "A to E" , with equal spacing

IEA Cement Definition and German Application (member of IDDI)



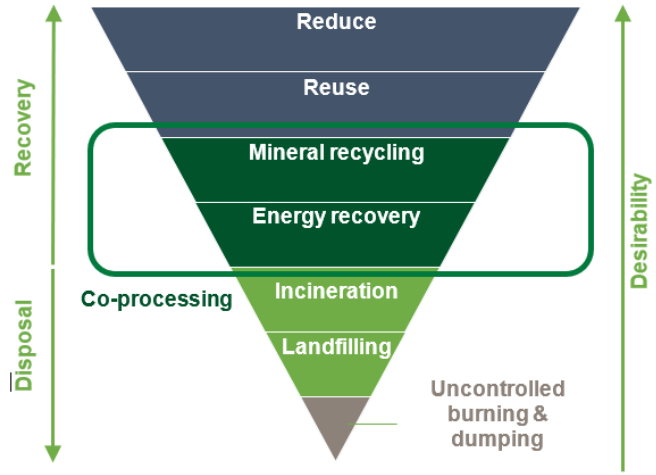
Notes: See the Technical Annex for the formulation of the low emission production thresholds.



- Exercised option to fix clinker cement ratio. Chose 0.706
- Guidance to use net EPD values to determine what band product is in

What is co processing?

- Treatment of waste in cement kiln : **Energy recovery and mineral recycling**
- Waste that cannot be managed technically or economically by prevention, reduction, reuse or recycling
- More sustainable, compared to waste-to-energy, incineration, or landfill.



What is polluter pays principle?

- **UNEP**: National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that **the polluter should, in principle, bear the cost of pollution,** with due regard to the public interest and without distorting international trade and investment. (Source: Rio Principle 16) ***UNEP*** *website accessed Oct 2024*
- **EU**: The polluter pays principle is a simple idea at the core of EU environmental policy: **those responsible for environmental damage should pay to cover the costs**. *EU website accessed Oct 2024*

Accounting Definitions

- Gross GWP: emissions minus bio-based emissions
- Net GWP: gross emissions minus emissions from non-biogenic waste

ECRA Online Seminar

“Green markets and incentives for low carbon and near zero carbon cement, concrete and concrete buildings“

30 October 2024, 9:00 CET

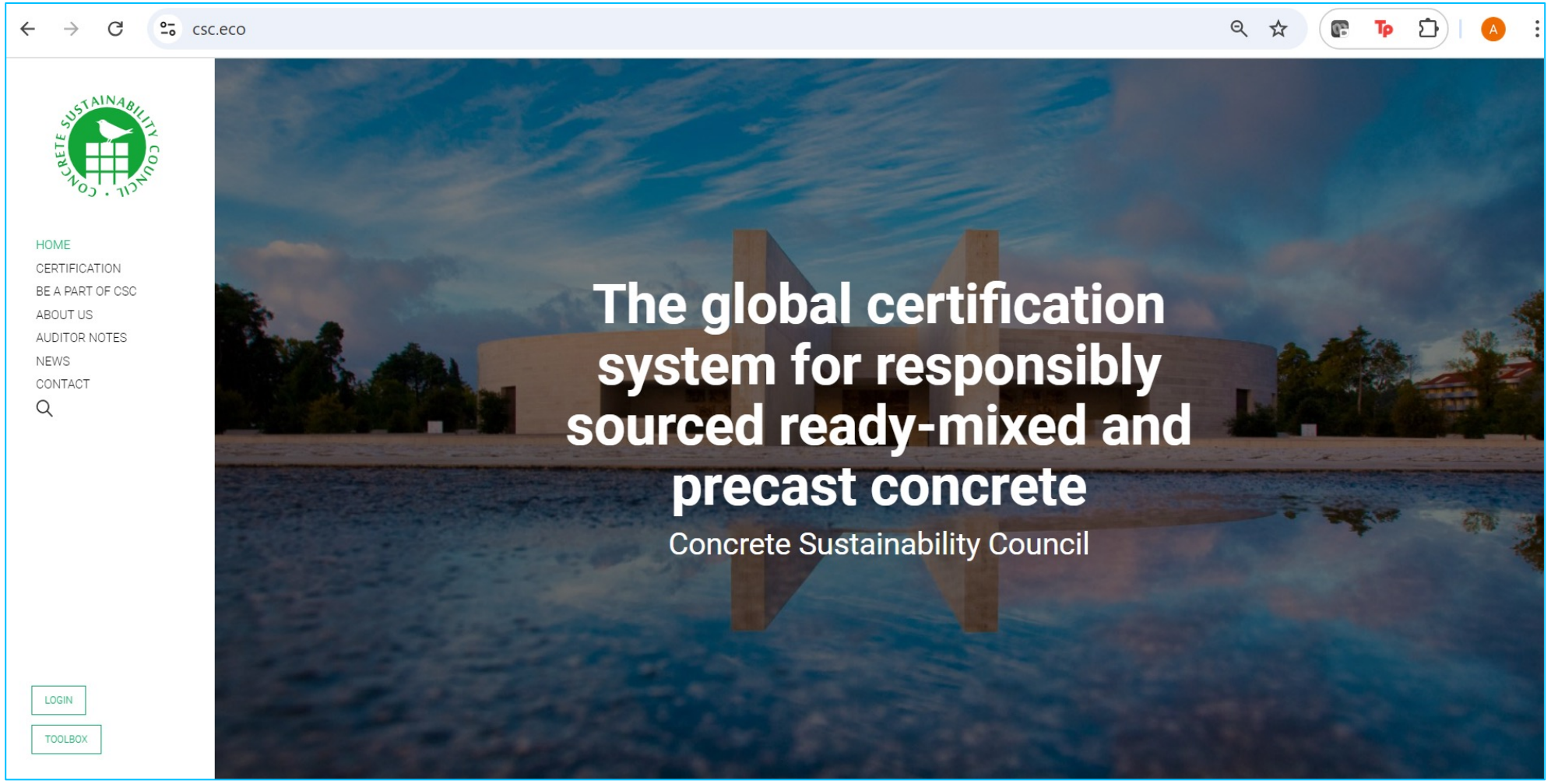
european cement research academy

Registration

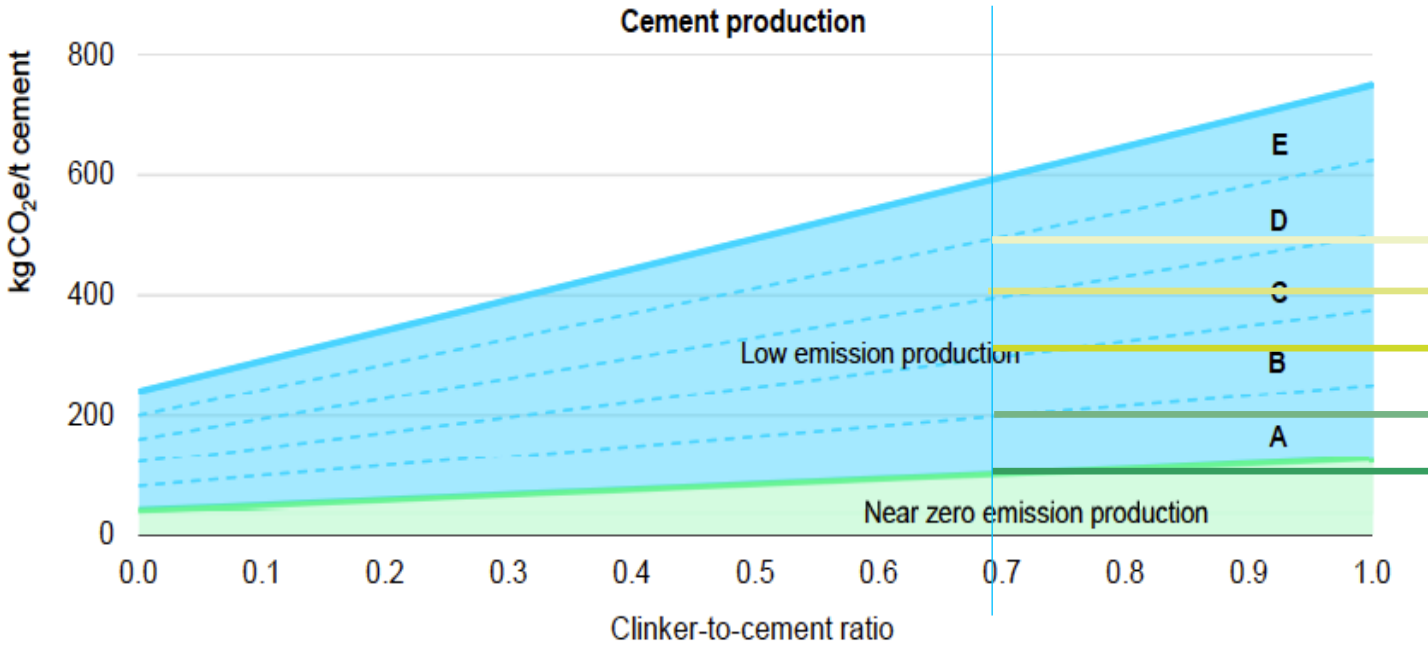
www.ecra-online.org/seminars

From low carbon cements to low carbon concrete structures	Christoph Müller (ECRA)
Green markets for climate-friendly raw materials	Stela Ivanova (German Federal Ministry for Economic Affairs and Climate Action, BMWK)
CO_2 Label for cement	Christoph Müller (VDZ/ECRA)
The Concrete Sustainability Council approach	Andreas Tuan Phan (CSC)
Definitions of Low Carbon Cement and Concrete for Green Procurement	Andrew Minson (GCCA)
Greenhouse gas-reduction in concrete construction – The German approach to standardization	Udo Wiens (German committe on reinforced concrete)
Decarbonisation of concrete construction - Practical issues	tba

Concrete Sustainability Council



IEA Cement Definition and German Application (member of IDDI)



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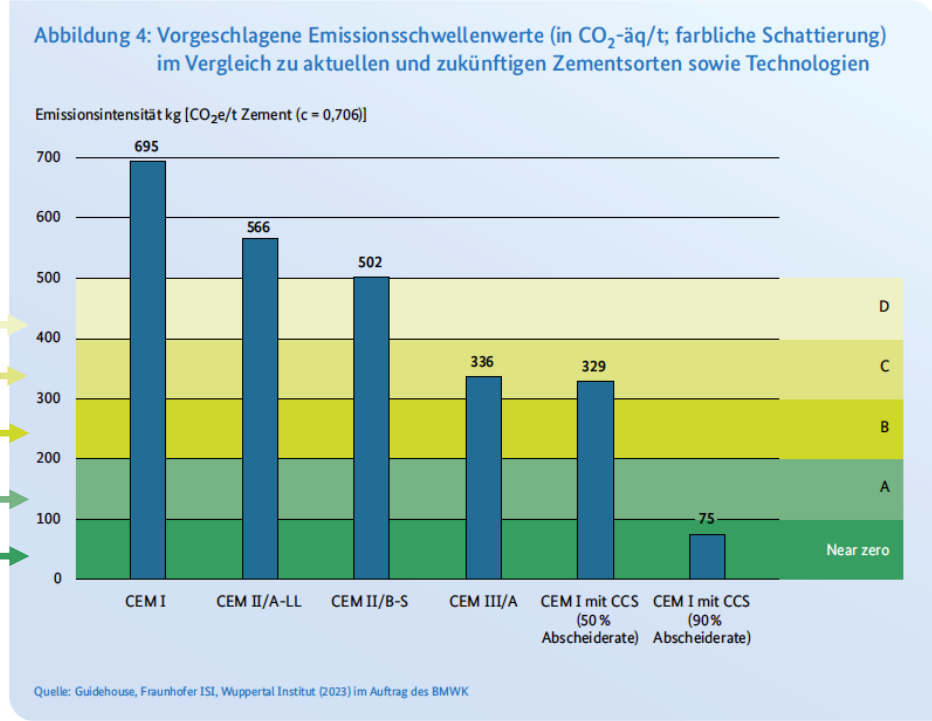


- Exercised option to fix clinker cement ratio. Chose 0.706
- Guidance to use net EPD values to determine what band product is in

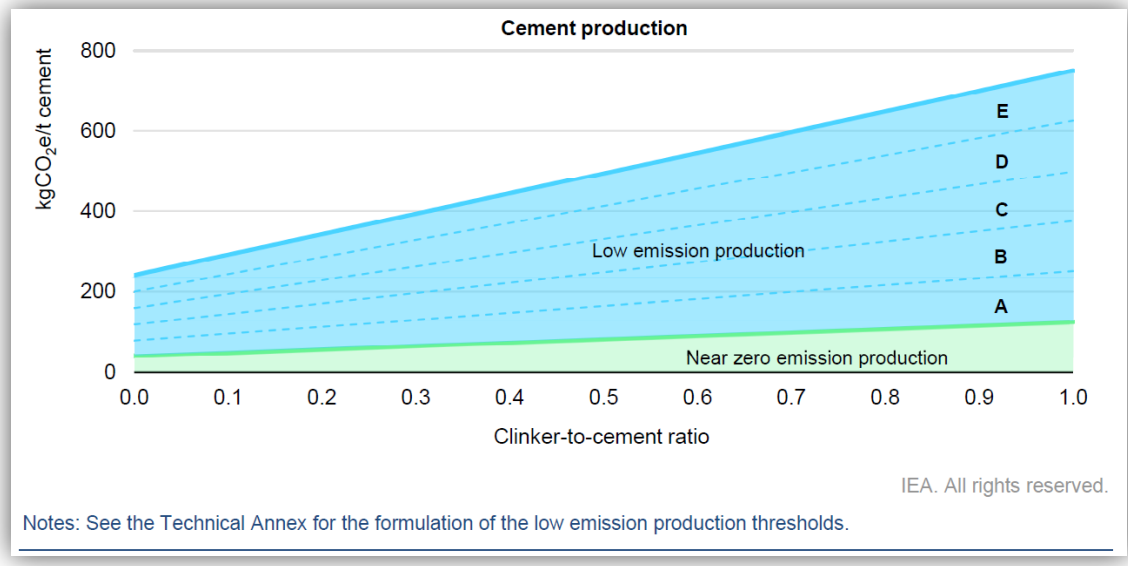
GCCA Low Carbon and Near Zero Cement Definitions

GCCA Position:

1. Adoption of IEA definitions for Low Carbon and Near Zero Cement **AND** use of static clinker to cement ratio by countries.
2. Environmental Product Declarations (EPDs) as the basis for carbon footprint reporting, following ISO 21930:2017 and EN 15804 treatment of waste CO_2e emissions ("Net" GWP).

Notes:

- Countries to choose appropriate static clinker to cement ratio based on national averages
- "Net" GWP accounting chosen to align with EN 15804, ISO 21930, and GCCA 2050 Roadmap for Net Zero Concrete.
- Cement bands represents "net" values for CO_2e/t cement
- Country normalisation for different EPD practice expected

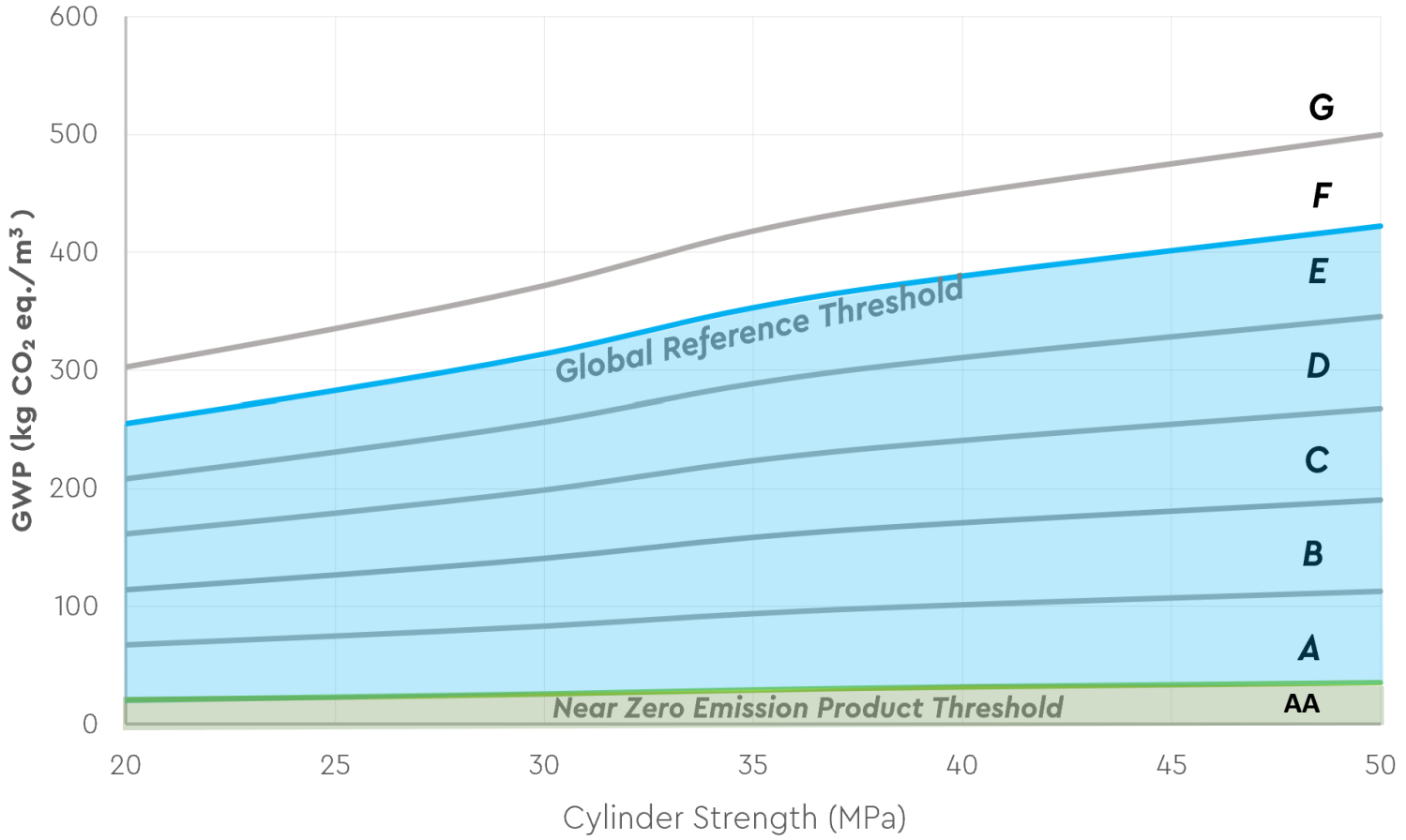


GCCA Low Carbon and Near Zero Concrete Definitions

GCCA proposal developed with intention that it can be adopted by IDDI.

The following slides are fully GCCA and are not adopted or endorsed by IDDI in any way.

GCCA Low Carbon and Near Zero Concrete Definitions



Concrete categories

Concrete divided into categories because it is not one product

- Categories based on strength classes, because that performance characteristic impacts more concretes than any other*
- Special readymixed concrete which is defined by other performance characteristics may need to be excluded at start of process
- Application to readymixed (approach to precast for discussion)

**note that even this is a simplification because concrete's specified for a particular strength but different exposures may require different mixes and hence different ECO_2 . Likewise, construction processes can determine the mix.*

GCCA Low Carbon and Near Zero Concrete Definitions

Be congruent with IEA definitions for Cement, in terms of:

- Separation of definitions and targets
- Five low carbon emission bands "A to E" , with equal spacing/range
- "Near zero" band defined by destination at 2050
    - uses IEA cement GWP data as input
    - uses Global Roadmap 2050 forecasts
    - zero contribution from all constituents and processes except cement
- Upper bound of band "E" defined, recognising current good practice
- Same static bands for all countries

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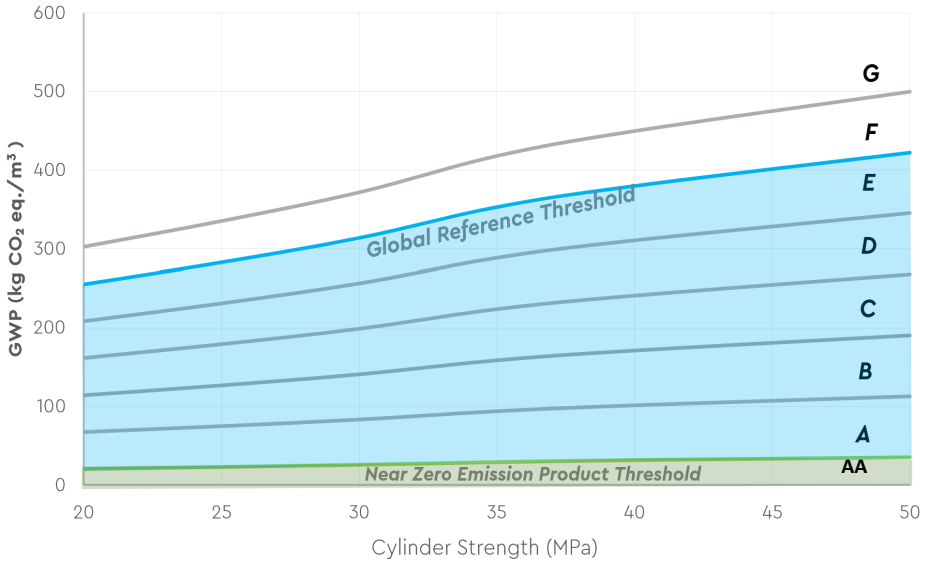
An IDDI requirement is consistent global reporting by countries

Also a benefit for multi country developers, investors, clients, producers is consistent definitions

GCCA Methodology for Concrete Definitions



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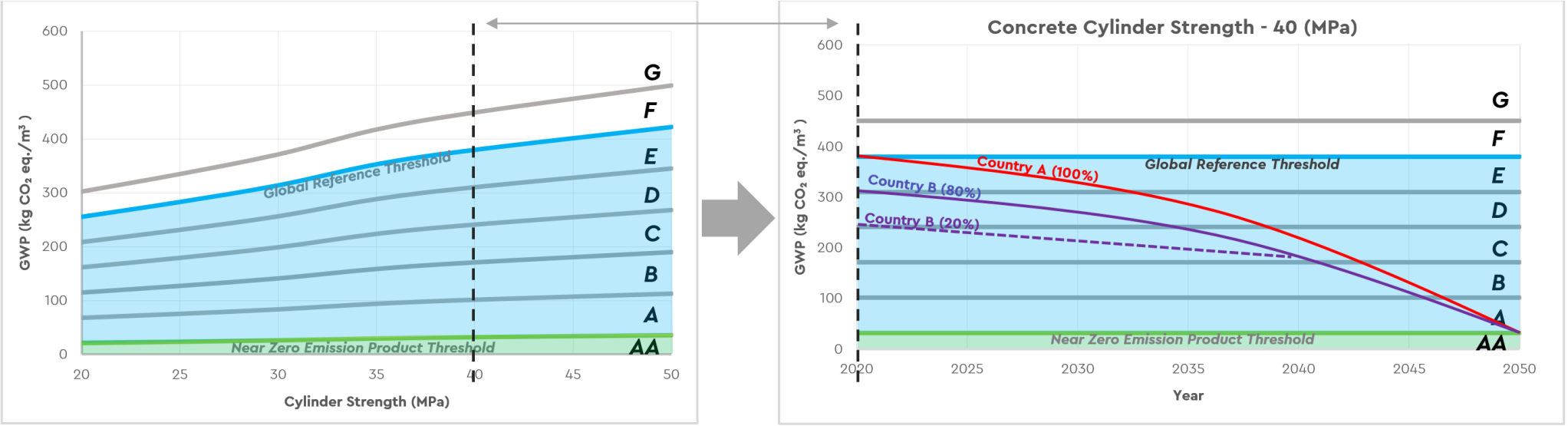
In addition:

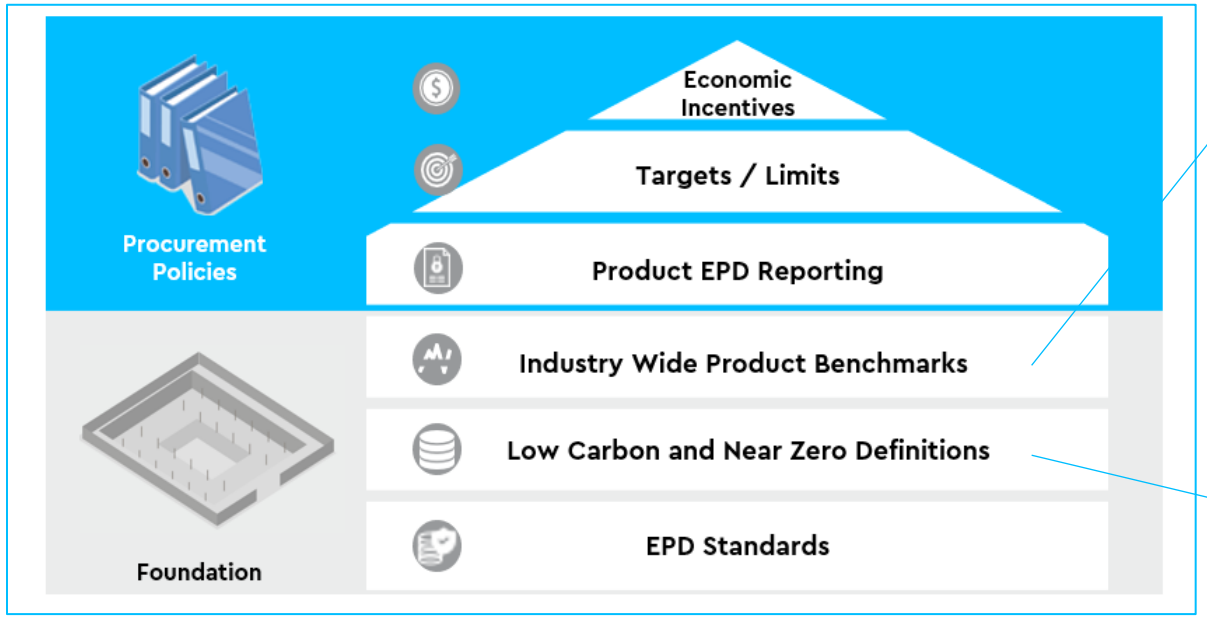
- Bands
  - "F" and "G" bands introduced to allow wider engagement
  - Near Zero named "AA"
  - Carbon negative can be added and named "AAA"
- Categorised on strength
- GWP from EPDs
- Clinker/cement sliding scale NOT applied

Country Specific Targets

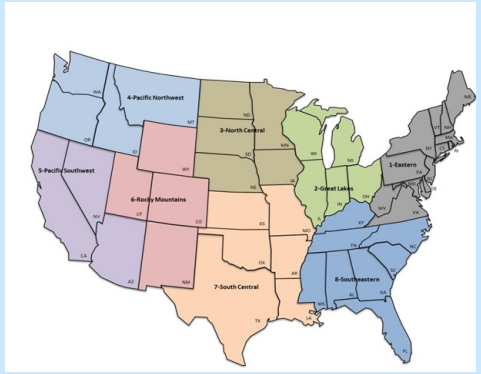


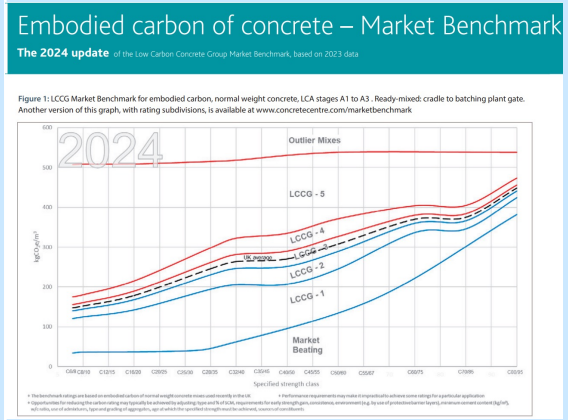
- Country A target is for 100% of concrete with a GWP value below a decreasing target starting at the global reference threshold in 2020.
- Country B, being more advanced in the decarbonisation journey, has a more ambitions starting point: a target to procure 80% of concrete with a GWP below band D and 20% below band C.

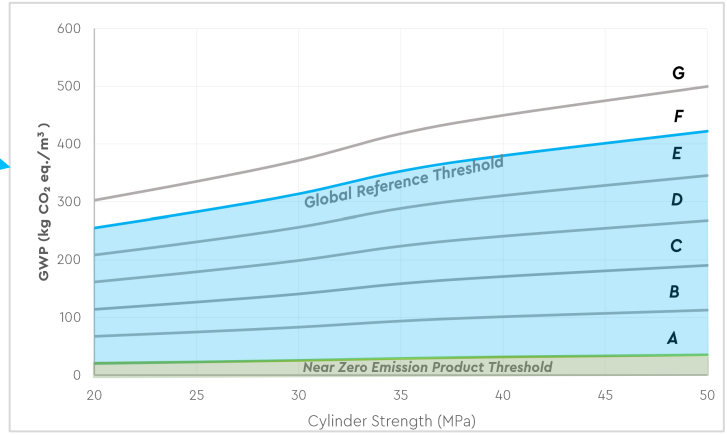
Industry Wide Benchmarks
Country/State/Local/Client



USA	United Kingdom
NRMCA Member National and Regional LCA Benchmark	**LCCG Market Benchmark (MPA)**



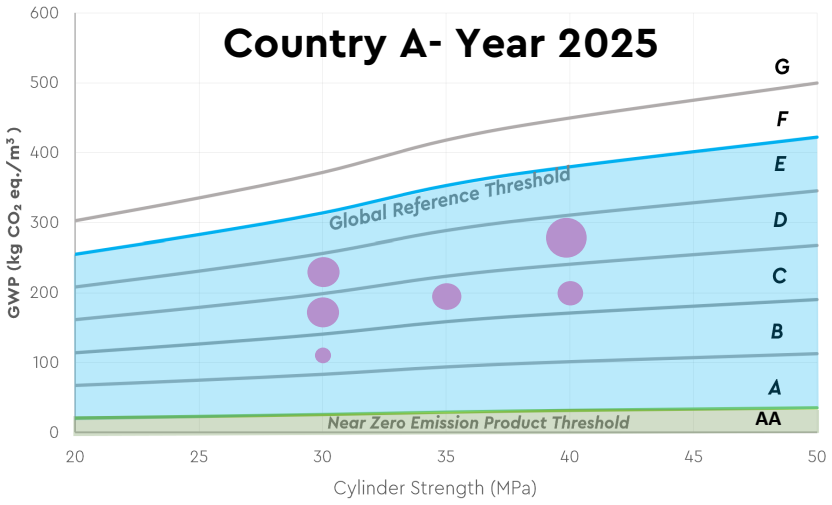




How do countries report data

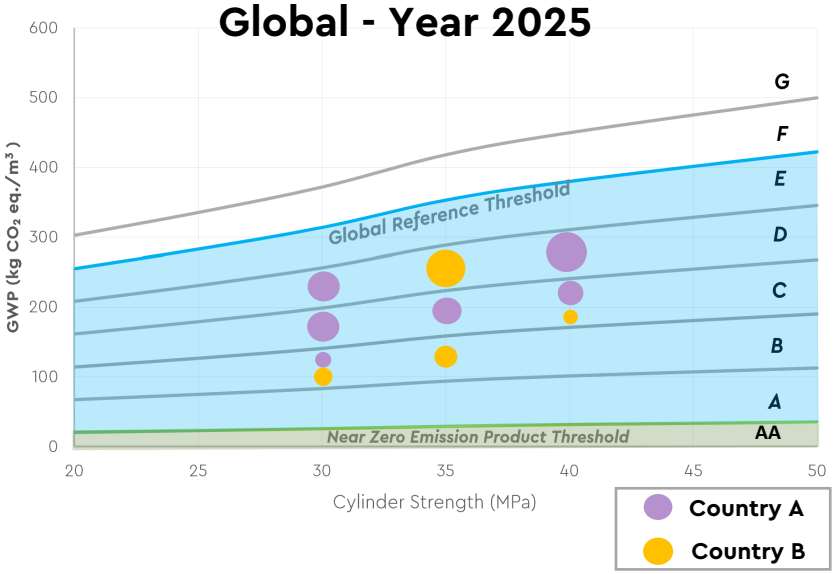
Country data reporting

Country data (% in each band) plotted on country graphs and reported.



Report country data for global reporting

Aggregated reporting



Explanation:

global bands = country bands
but
value of global bands ≠ value of country bands

Normalisation

Normalisation may be required to account for different PCR standards and practises in a country.

Proposed Global Banding is based on:

- Cylinder concrete strength
- Net GWP
- A1-A3 EPD modules
- EN 15804 (eg economic allocation for ggbs)

Any deviation from the above in a country, would need to be accounted for by a specific country normalisation.

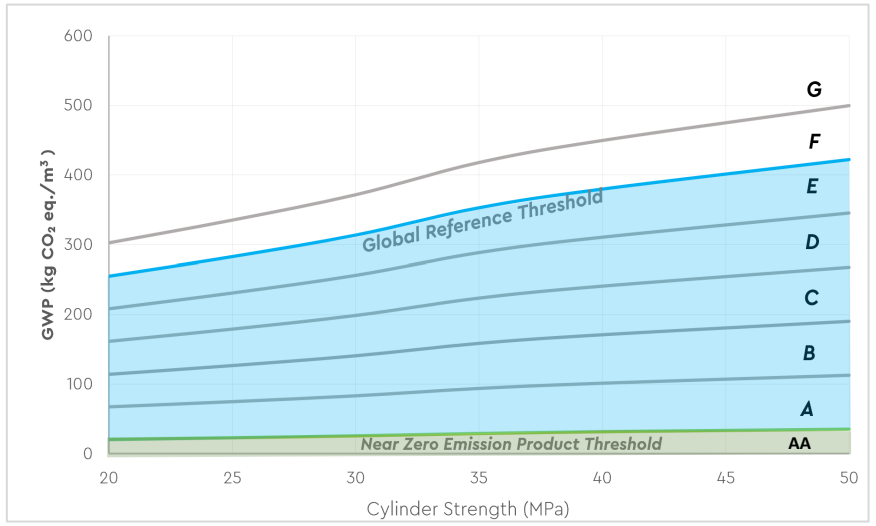
Normalisation - Example

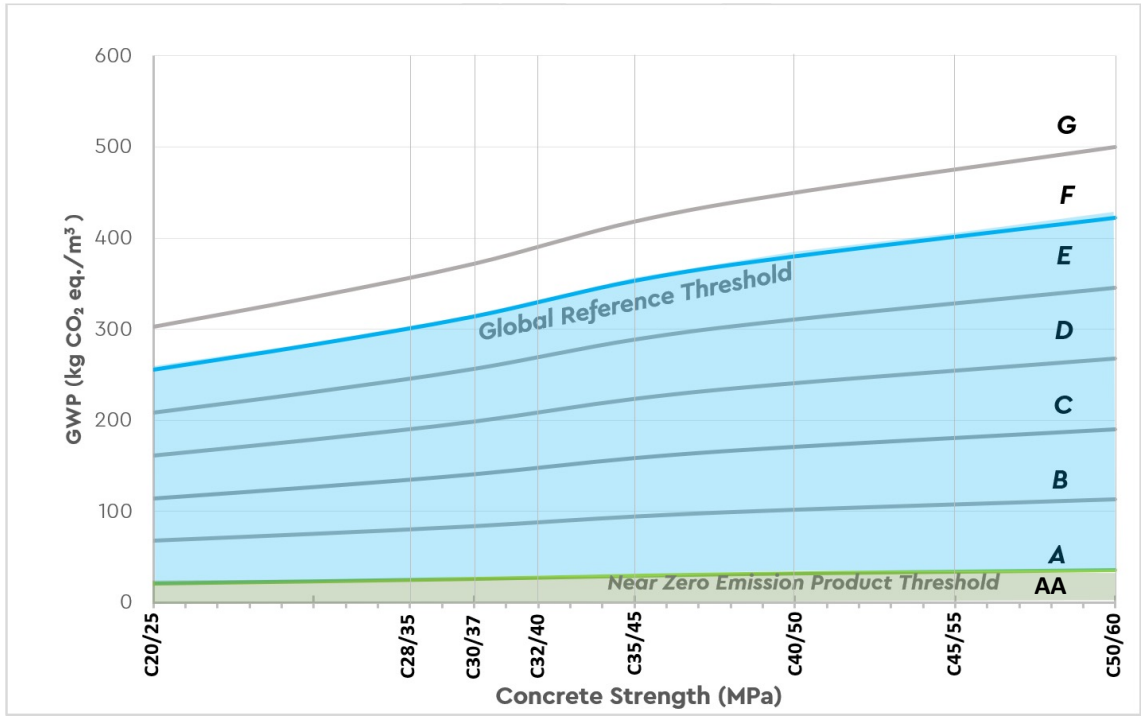
The example below illustrates how the global banding can be amended for a country that uses both cylinder and cube strength as reference.

Nomenclature: **C 20/25**

Cylinder strength

Cube strength

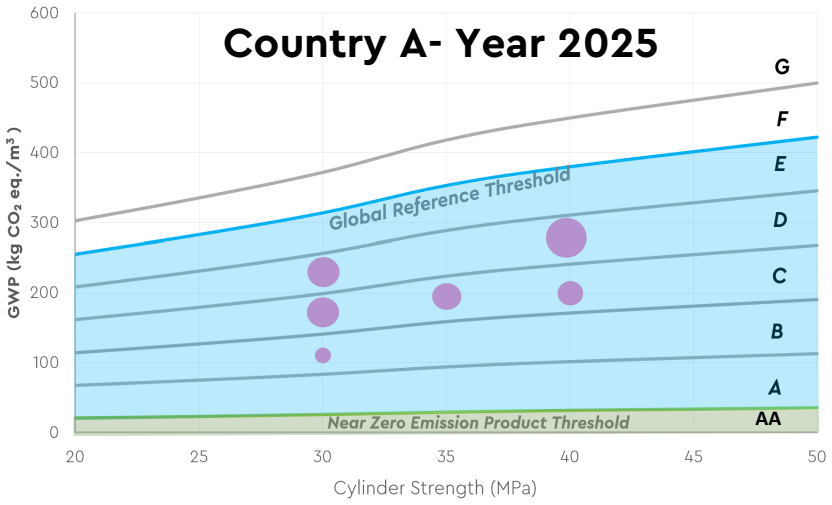




How do countries report data – still possible following normalisation

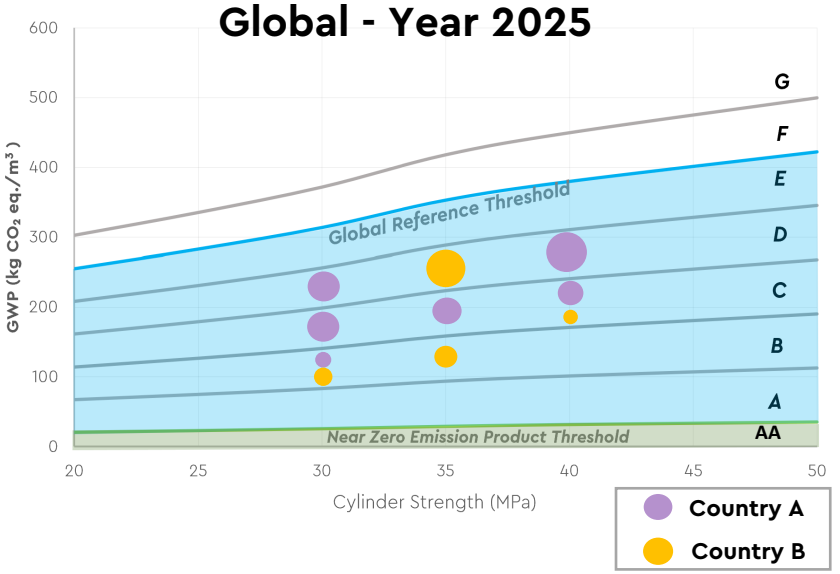
Country data reporting

Country data (% in each band) plotted on country graphs and reported.



Report country data for global reporting

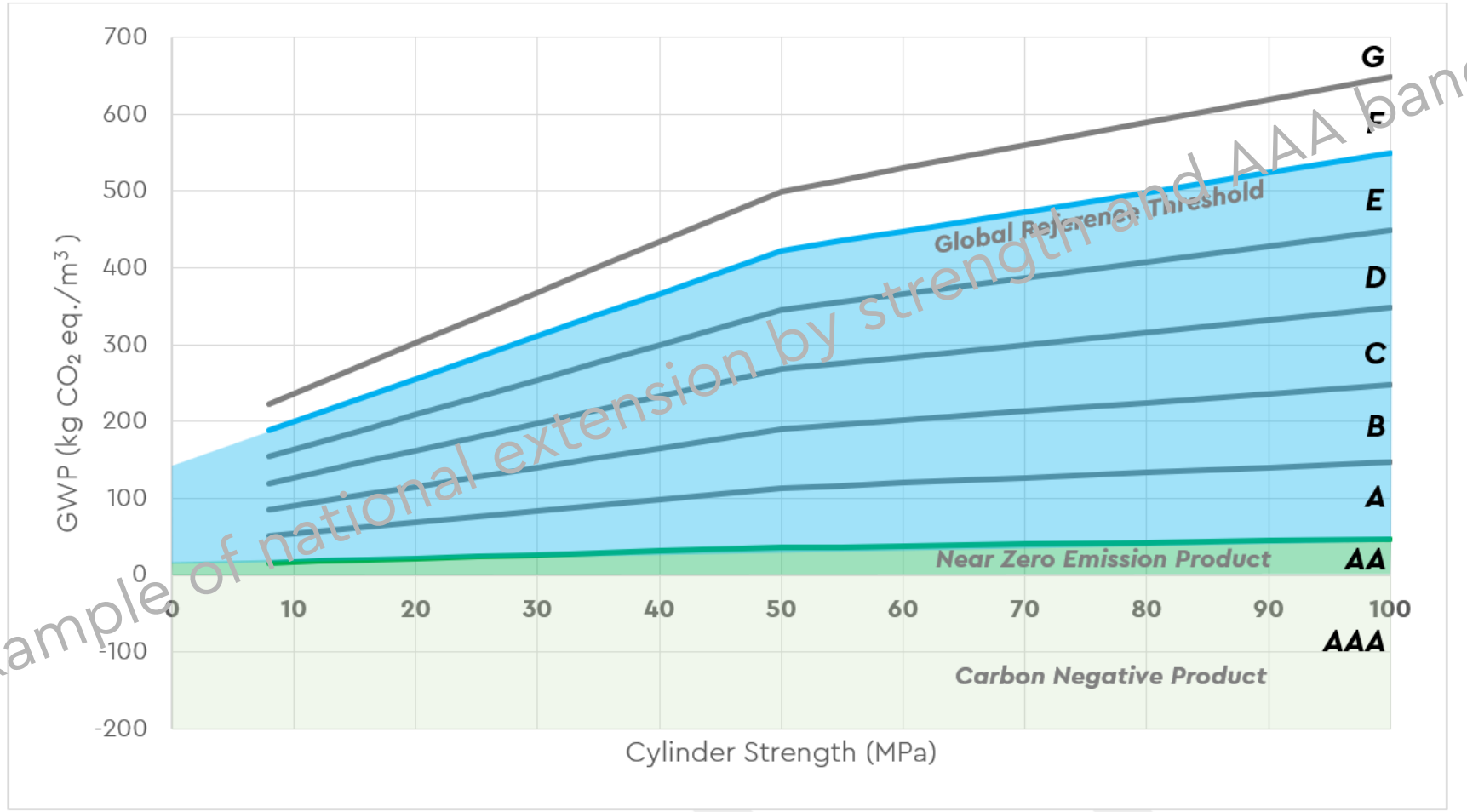
Aggregated reporting



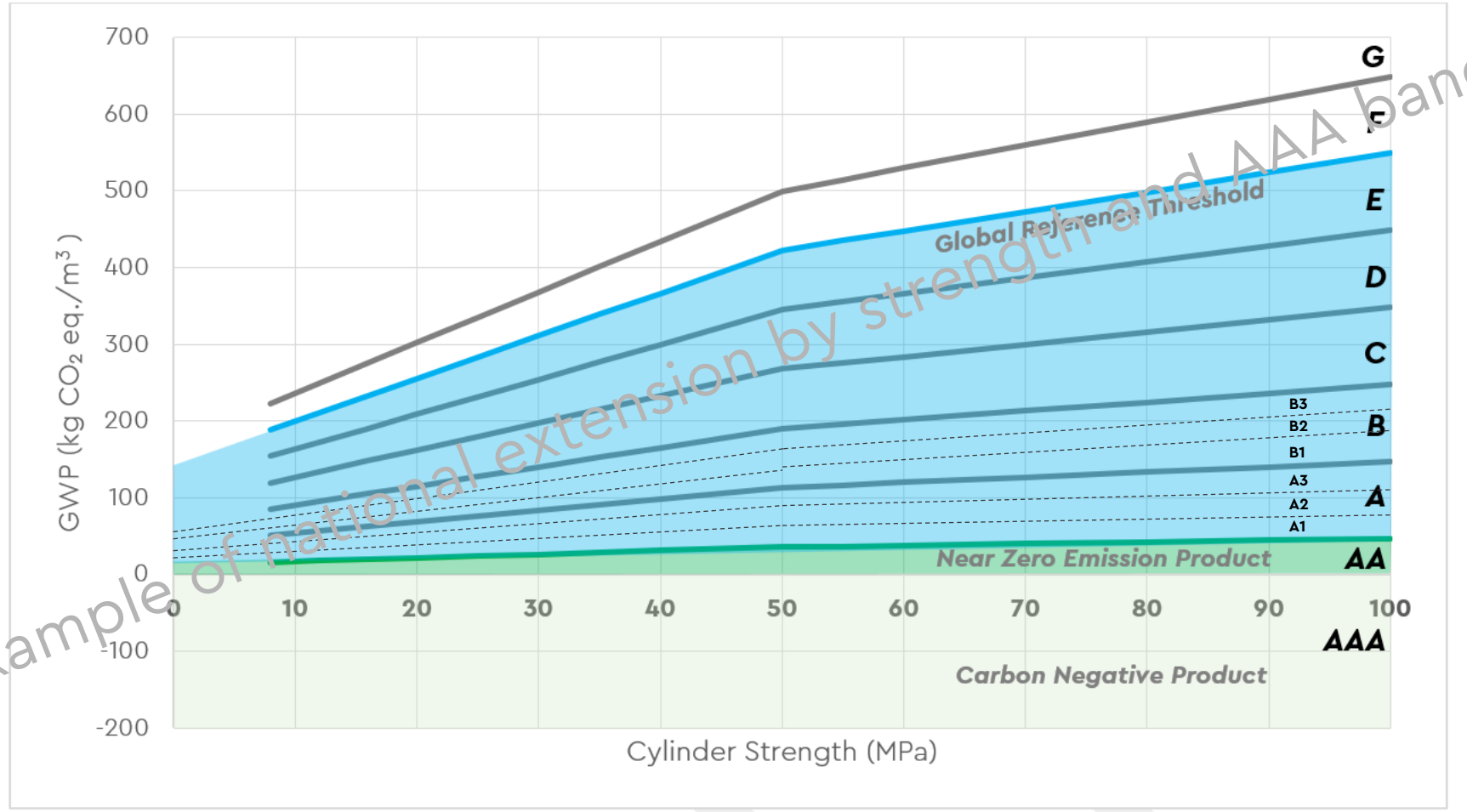
Explanation:

global bands = country bands
but
value of global bands ≠ value of country bands

Optional Country Extension: Strength Range / Carbon Bands



Optional Country Refinement: Sub Bands



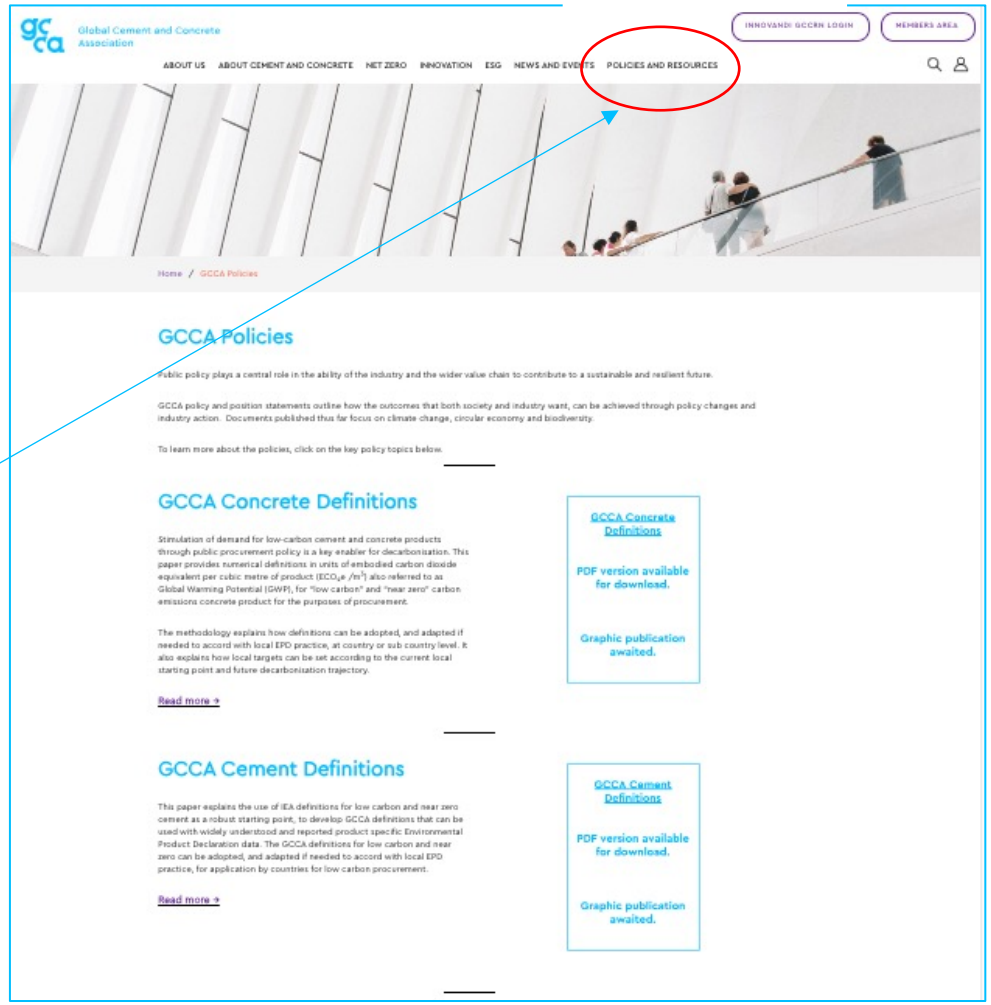
Find out more

- GCCA Concrete Definitions

and

- GCCA Cement Definitions

are available GCCA website under "Policies"



This webinar recording and slides presented will be made available on our site → GCCA Events.

Global Cement and Concrete Association

CONCRETE FUTURE

Q&A

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Andrew.Minson@GCCAssociation.org

Global Cement and Concrete Association

CONCRETE FUTURE

Upcoming Webinar: Oct. 29, 2024

"The role of the cement industry in fighting plastic pollution – INC-5 Plastic Treaty Road to Busan Webinar"

Registration Link is in the chat

Global Cement and Concrete Association

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Thank you for joining us!