



**EL ROL DEL
CEMENTO &
CONCRETO
DE CARA
AL CAMBIO
CLIMÁTICO**



**CONGRESO
Cemento & Concreto
Verde 2050**



11 AL **15** **2026**
MAYO



Santiago,
Chile

**Visión Global de Esquemas de
Clasificación para Cemento y
Concreto de Bajo CO2**

Matías Polzinetti
Director Área Concreto FICEM

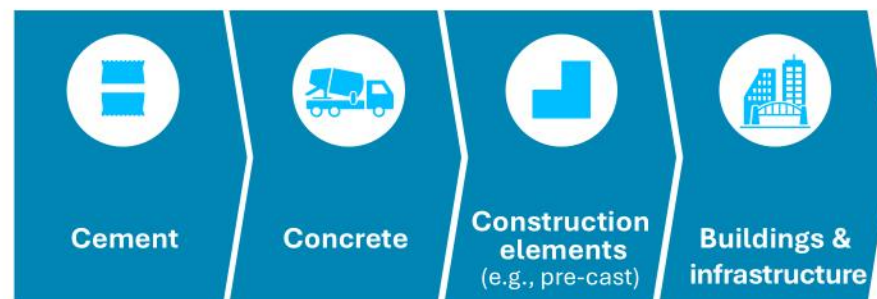
Importance of CoC mechanisms



Cement and concrete decarbonization is economically viable if all value-chain is involved but sustainable products are commercially unrewarded (for now)

Deep decarbonization is **capital-intensive** and raises production costs, yet the **impact on end-products is bearable**

Product value chain - Indicative premium of deeply decarbonized cement vs. traditional standard emissions OPC¹



But there are **challenges inherent** to the cement & concrete **market nature**



Cement is sold mainly in local, project-based transactions focused on minimizing upfront cost



Producers often lack long-term contracts or premium pricing to recover decarbonization investments

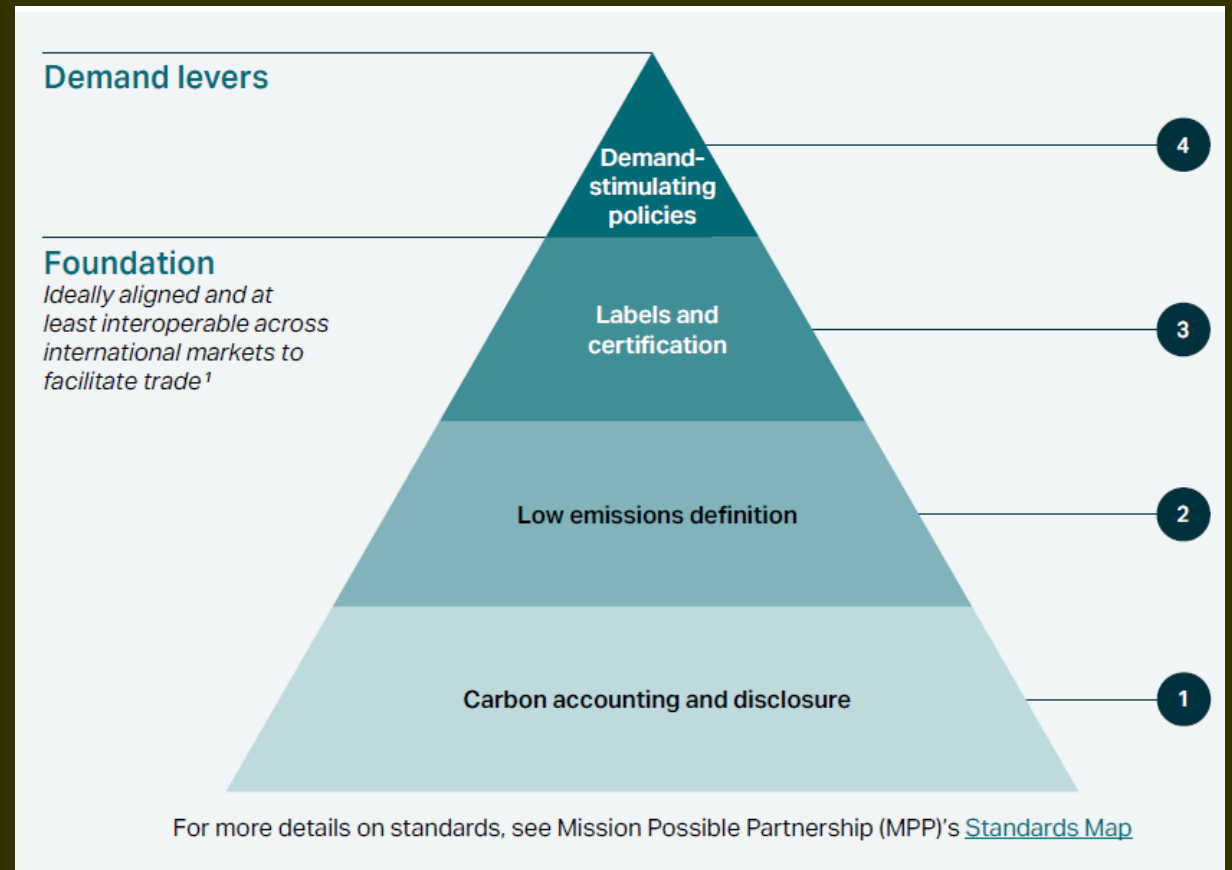


End-users that value low-carbon products usually don't buy cement directly, so their willingness doesn't reach the producers

1. Ordinary Portland Cement; 2. Calculated based on current technologies and construction methods | Note: Simplified value chain and approximate figures
Source: BCG analysis

DEFINIR Y CLASIFICAR PRODUCTOS EN FUNCIÓN AL CO₂ EMBEBIDO ¿POR QUÉ?

1. Estandarización de la **comunicación ambiental**
2. **Comparabilidad y transparencia** en compras verdes
3. Herramienta de **política sectorial** para reducción de emisiones
4. **Traducción operativa de información técnica** preexistente estructurada en EPDs
5. **Reducción de ambigüedad** en el mercado
6. Establecimiento de **supuestos metodológicos comunes**
7. **Diferenciación de productos** según CO₂ embebido
8. Marco para **productos de bajo carbono y esquemas futuros** (Anticipar definiciones externas)



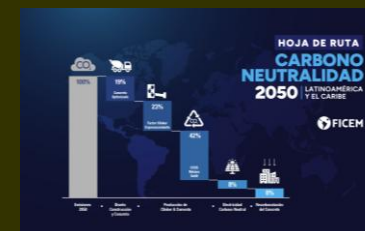
Fuente: Green Demand Policy Handbook. ITA. Noviembre 2024

TIMELINE GLOBAL

① Cemento ② Concreto



Roadmap GCCA
Net Zero 2050



Lanzamiento
HR FICEM 2050
Carb.
Neutralidad

2021

2019

2020

2022

2023

2024

2025

2026



CIC Green HK
Jun 2019

②



Svensk
Betong
Nov 2019

②



CLK: 0.72 t/t clk
CTO: 0.47 t/t cto

①



② CSC-CO2
Module
Ene 2022

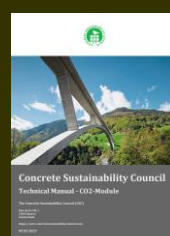
May 2020

Dic 2020

① ②

Dic 2020

① ②



IRA (USA)
Ago 2022

① ②



FMC
Nov 2022

① ②



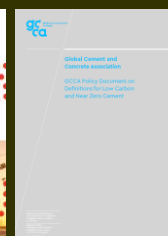
MECLA
Australia
May 2024

②



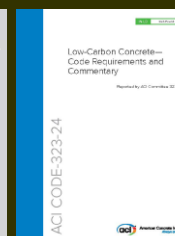
ConcreteZero
Jul 2024

②



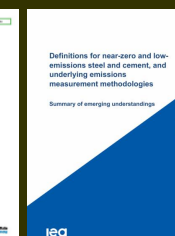
GCCA LCR
Oct 2024

① ②



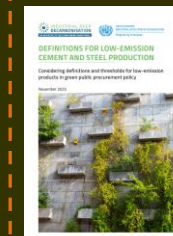
ACI 323
Nov 2024

②



IEA
Nov 2024

①



IDDI
Nov 2025

① ②

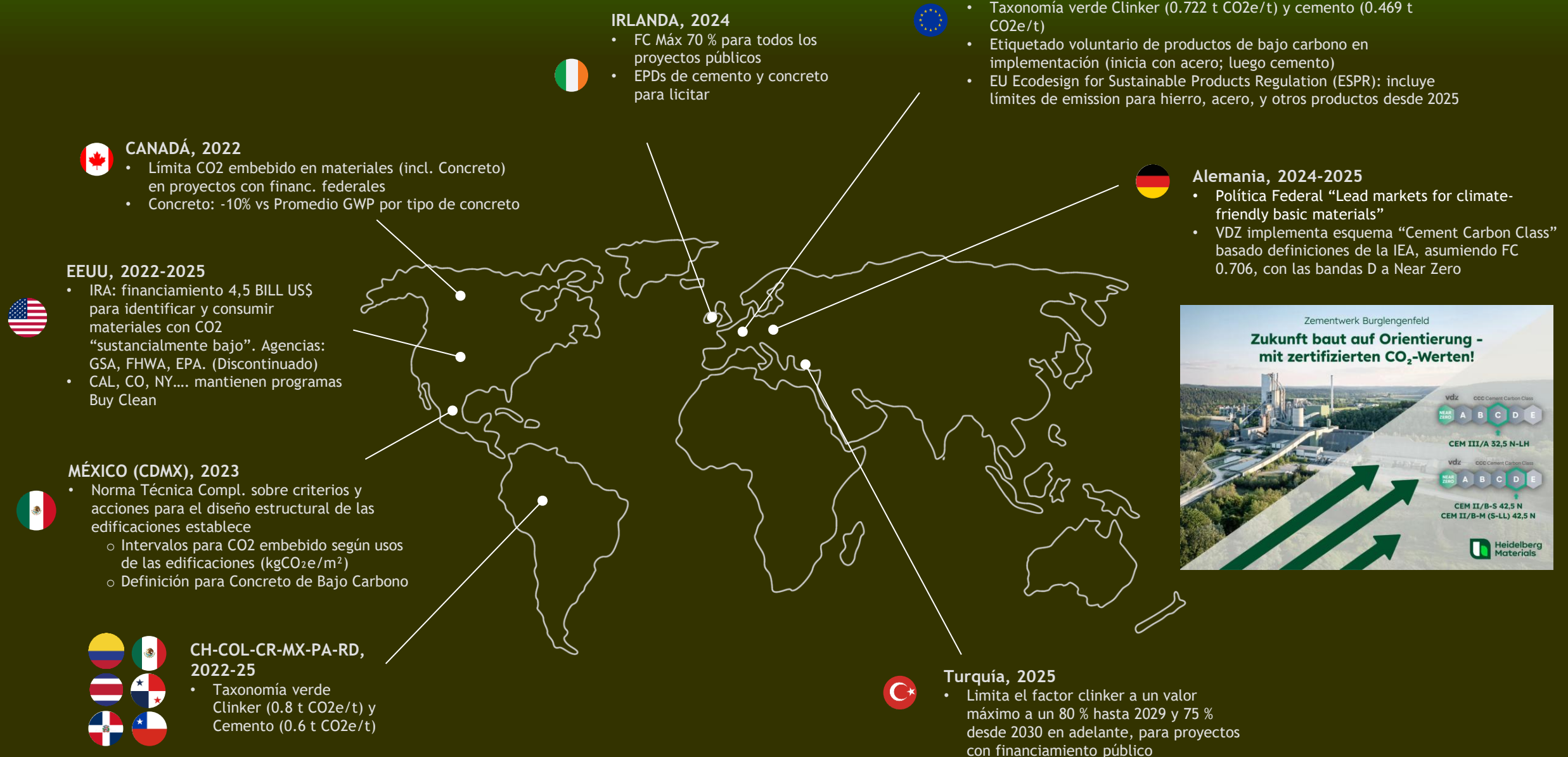


CLK: 0.8 t/t clk
CTO: 0.58 t/t cto

TAXONOMÍA VERDE ①

CLK: 0.8 t/t clk
CTO: 0.6 t/t cto

ANTECEDENTES INTERNACIONALES

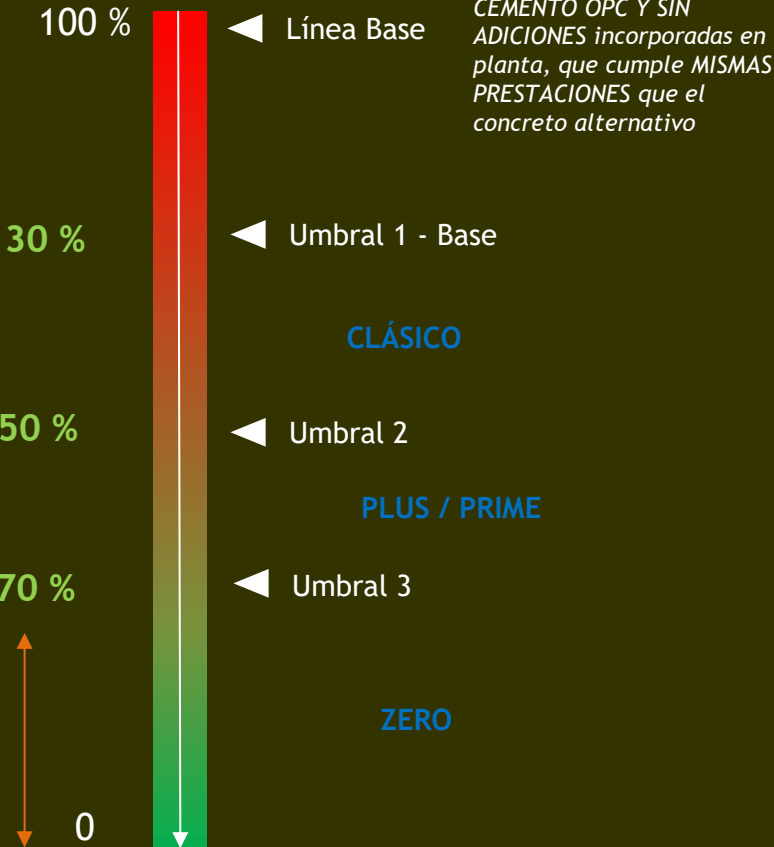


MODELOS EMPRESA (VIGENCIA DESDE 2020-21)

CEMENTO



CONCRETO

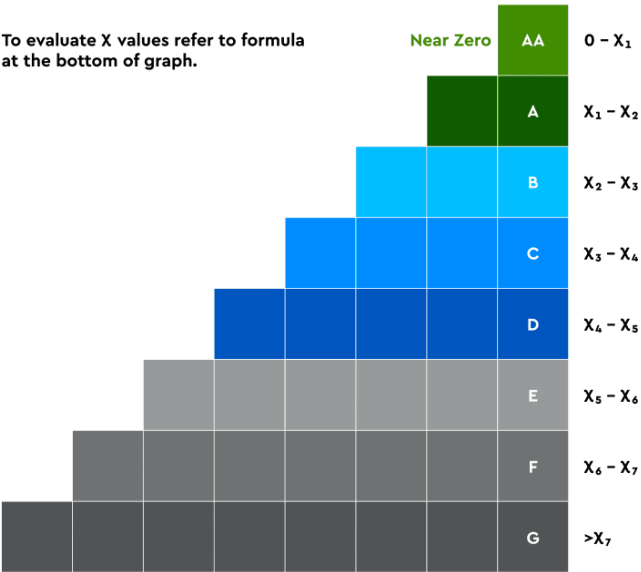


Fuentes de consulta: [Cemento Vertua - Cemex CO – Cemex](#); [Concreto Vertua; CEMEX alcanza en Colombia récord en ventas de concreto sostenible Vertua - Cemex CO – Cemex; 2024-05-06.pdf](#); [Holcim trae a Colombia la más amplia gama de concretos sostenibles del mundo](#); [Holcim Argentina lanza las EcoEtiquetas en sus productos y soluciones](#); [Habitat Sustentable](#); [Argos celebra los cinco años de su Cemento Verde, que se produce en Sogamoso y otras dos plantas – Boyacá 7 Días](#); [PCA EPD Portland Athena Final revised Nov2023](#); [Declaraciones Ambientales de Producto](#); [La apuesta de Cementos Argos para reducir su impacto en el medio ambiente](#); [Argos, Cemex y Holcim apuestan a los cementos con bajas emisiones de dióxido de carbono](#)

ANTECEDENTES INTERNACIONALES - CEMENTO

Global Low Carbon Ratings for Cement (GCCA)

To evaluate X values refer to formula at the bottom of graph.



Where:
 $X_i = (40 + 85 * CCr) * i$

CCr: Clinker to Cement ratio
Note: Countries choose CCr to establish country ratings.
Germany chose national average 0.706



FC 95% E: 725
Factor Clinker de referencia AA: 120

FC 70% E: 600
AA: 100

FC 50% E: 505
AA: 84

kg CO₂/t cto

GSA

(Discontinuado)

U.S. General Services Administration Inflation Reduction Act Low Embodied Carbon Material Requirements

April 10, 2025

Cement

- GSA IRA LEC Cement Requirements
 - As an alternative to concrete, GSA's IRA Limits for cement may be applied to the cement being used in the concrete mix.
 - A concrete EPD accounts for the whole mix design, including quantitative impacts of specific cements, aggregates, and admixtures.
 - If a concrete EPD is provided to demonstrate compliance, a cement EPD doesn't need to be submitted to GSA. Cement is an input to concrete mixes, and its GWP is accounted for in the concrete EPD.

GSA IRA Limits for Low Embodied Carbon Cement (EPD-Reported GWPs, in kilograms of carbon dioxide equivalent per metric ton - kgCO ₂ e/ t)		
Top 20% Limit	Top 40% Limit	Better Than Average Limit
751	819	858

751



TAXONOMÍA VERDE LATAM (PAÍSES)

CEMENTO: 600 kg CO₂/t cto



580 kg CO₂/t cto

ANTECEDENTES INTERNACIONALES - CEMENTO



FMC commitment

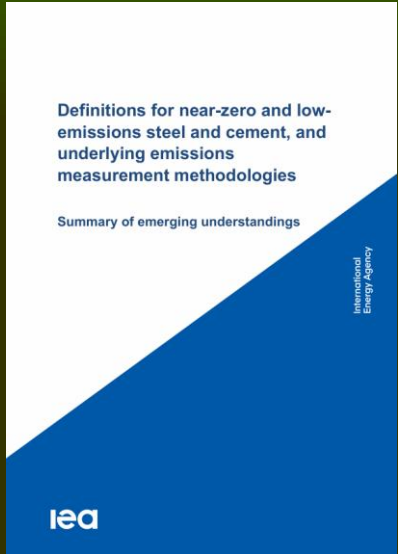
Commitment overview

FMC members commit to purchasing/ensuring at least 10% (by volume) of their, or their projects', cement/concrete per year is low-emissions cement/concrete satisfying the following criteria:

1. Cement with embodied carbon below 184kg CO₂e/tonne of cement!
2. Concrete that is below a set of embodied carbon limits based on specified compressive strength

Embodied carbon should be calculated using a "cradle-to-gate" systems boundary, which includes typical EPD modules A1 (raw material supply), A2 (transport) and A3 (manufacturing). This boundary is consistent with implementation partner guidance, as well as both product-specific and industry-average EPDs. In cases where buyers purchase products that contain concrete but also include other materials or emissions sources, it is important to ensure that a GWP value that solely focuses on concrete emissions is also provided. This will help ensure FMC alignment can be assessed.

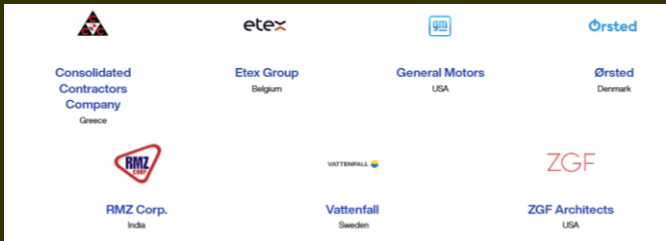
For further details on the FMC cement and concrete commitment, including information on breakthrough technologies and SCMs, please see the overview [here](#).



For cement, progressive according to the clinker-to-cement ratio, falling between the following:

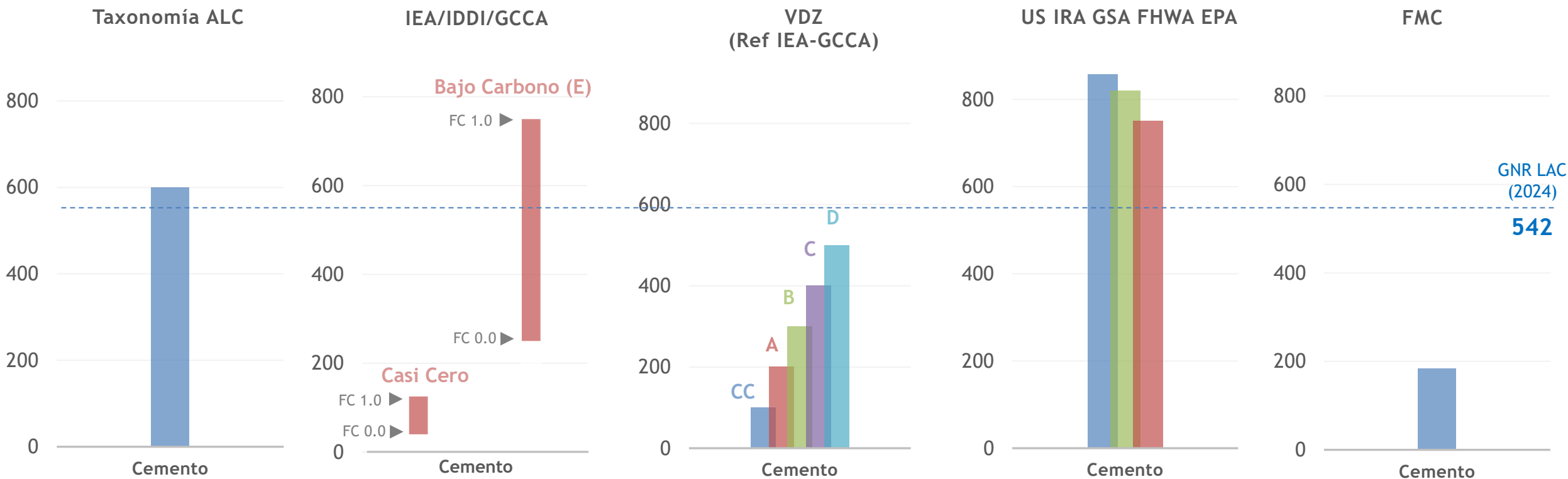
- 100% clinker⁶ 125 kg CO₂-eq per tonne of cement
- no clinker 40 kg CO₂-eq per tonne of cement (noting that cement production without clinker has not been proven at commercial scale).

To accelerate the scaling of low-emissions cement & concrete, members commit to purchasing or ensuring that by 2030, 10% (by volume) of their, or their projects', cement or concrete per year is at FMC low-emissions levels.



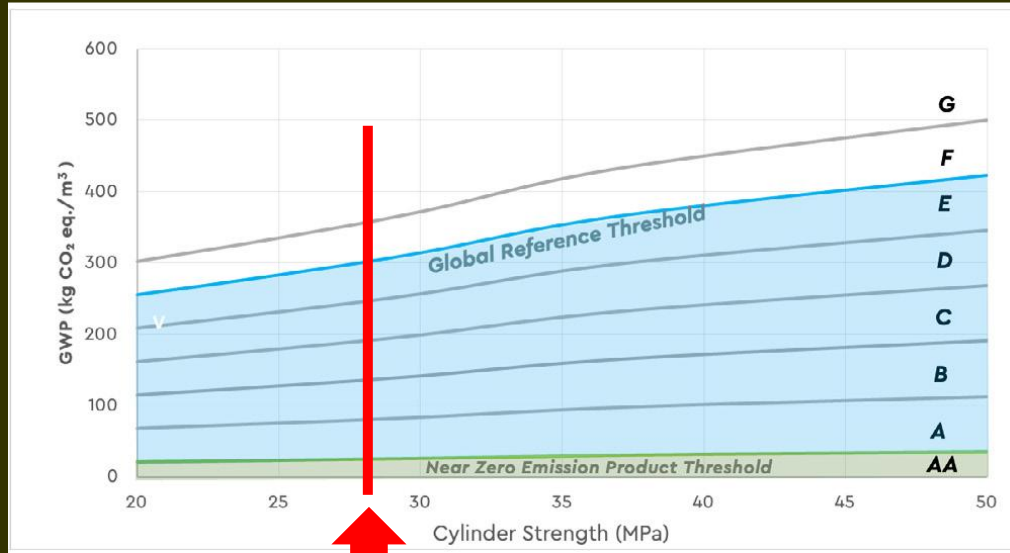
CCC classes for cement		Requirement (GWP) CO ₂ Equ / t cement
Climate-friendly	D	400 ≤ GWP < 500
	C	300 ≤ GWP < 400
	B	200 ≤ GWP < 300
	A	100 ≤ GWP < 200
	Near Zero	< 100

ANTECEDENTES INTERNACIONALES - CEMENTO

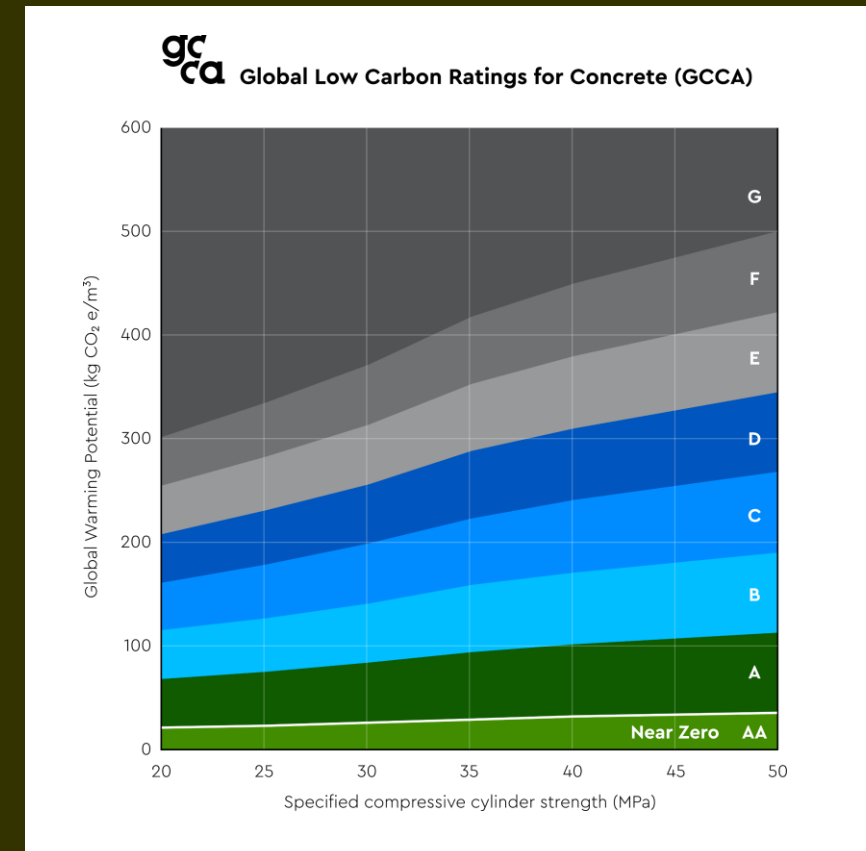


ANTECEDENTES INTERNACIONALES - CONCRETO

GCCA Low Carbon & Near Zero Concrete



Clasificación basada en kg CO₂e vs RC
RMX, precast y bloques de mampostería de concreto



	Concrete Cylinder Strength (MPa)					
	20	25	30	35	40	50
Top of band F	302	335	372	418	450	500
Top of band E	255	283	314	353	380	422
Top of band D	208	231	256	288	310	345
Top of band C	161	179	199	224	241	268
Top of band B	115	127	141	159	171	190
Top of band A	68	75	83	94	101	113
Near Zero Emission Product	21	23	26	29	32	36

Table 2: Global Definitions for Low Carbon and Near Zero Emissions Concrete – Tabulated form (kg CO₂ eq./m³)

ANTECEDENTES INTERNACIONALES - CONCRETO

LCCG / Innovate UK-ARUP-ConcreteZero

ARUP

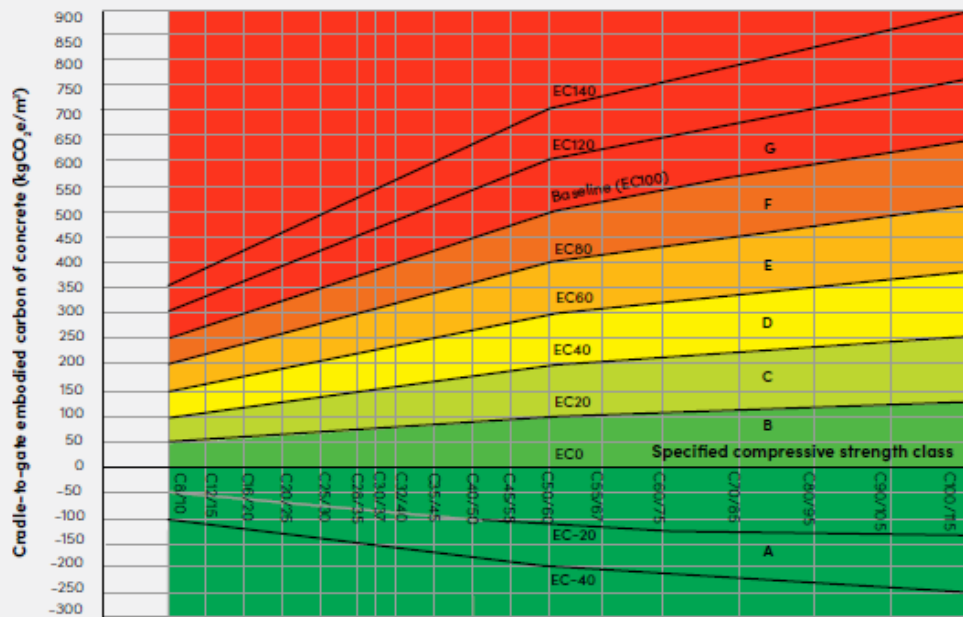


Innovate UK



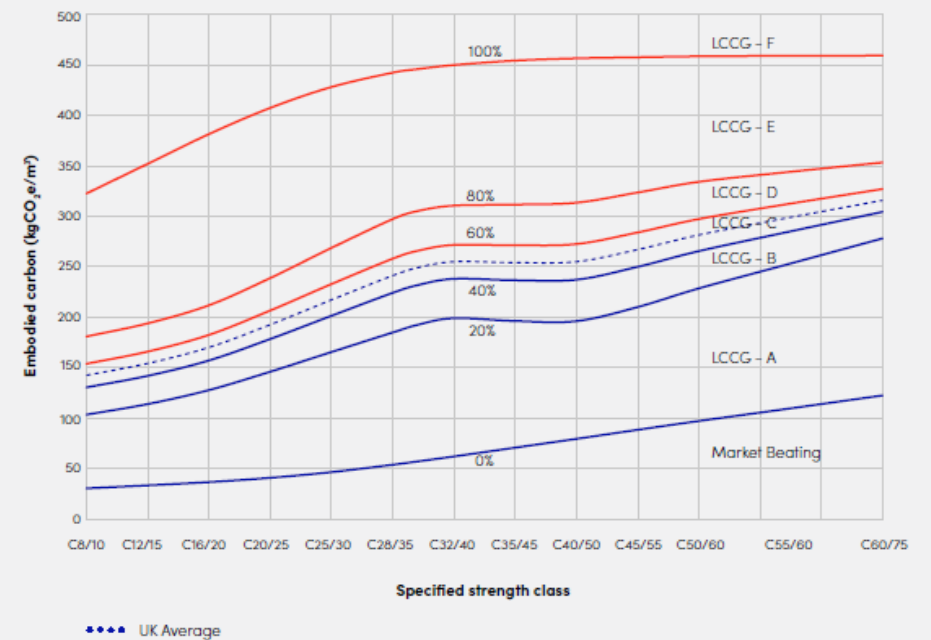
CLIMATE GROUP
**CONCRETE
ZERO**

Figure 3: The Universal Classification for embodied carbon of concrete with extended bands to account for more carbon-intensive and carbon-negative concrete.



- Línea base estática (Teórica con datos de mercado)
- Bandas equidistantes
- Todos los concretos pueden clasificarse
- Incluye opción concreto carbono negativo
- Doble pendiente con punto de inflexión

Figure 1: The LCCG Market Benchmark, 2023 update.*



- Esquema dinámico - Benchmark anual
- Bandas según mercado actual, con percentiles (0-20-40-60-80-100)

ANTECEDENTES INTERNACIONALES - CONCRETO



(Discontinuado)

U.S. General Services Administration Inflation Reduction Act Low Embodied Carbon Material Requirements

April 10, 2025

Concrete

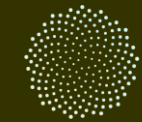
• GSA IRA LEC Concrete Requirements

Specified concrete strength class (compressive strength [f'c] in pounds per square inch [PSI])	GSA IRA Limits for Low Embodied Carbon Concrete (EPD-Reported GWPs, in kilograms of carbon dioxide equivalent per cubic meter - kgCO ₂ e/ m ³)		
	Top 20% Limit	Top 40% Limit	Better Than Average Limit
≤2499	228	261	277
3000	257	291	318
4000	284	326	352
5000	305	357	382
6000	319	374	407
≥7200	321	362	402

Add 30% to these numbers for GWP limits where high early strength¹ concrete mixes are required for technical reasons.

As an alternative to concrete, GSA's IRA Limits for cement may be applied to the cement being used in the concrete mix.

- Opción preferente al cemento
- +30% para Concreto de Alta Resistencia Inicial



First Movers
Coalition

FMC commitment



Commitment overview

FMC members commit to purchasing/ensuring at

Embodied carbon should be calculated using a "cradle-to-gate" systems boundary, which includes typical EPD modules A1 (raw material supply), A2 (transport) and A3 (manufacturing). This boundary

Specified compressive strength (Mpa)	Embodied carbon (kg CO ₂ e/m ³)
0 - 17.24	70
17.25 - 20.68	78
20.69 - 27.58	96
27.59 - 34.47	117
34.48 - 41.37	124
41.38 - 55.16	144
55.17 - 68.95	164
68.96 - 82.74+	184



Deutschland						
CO2-Klassen	C20/25	C25/30	C30/37	C35/45	C45/55	C50/60
Maximal zulässige Treibhausgasemissionen [netto kg CO ₂ -Äq. / m ³]*						
Branchenreferenzwert	213	237	261	286	312	325
Level 1 (↓ ≥ 30%)	149	166	183	200	218	228
Level 2 (↓ ≥ 40%)	128	142	157	172	187	195
Level 3 (↓ ≥ 50%)	107	119	131	143	156	163
Level 4 (↓ ≥ 60%)	85	95	104	114	125	130
*) Da das GCCA-Tool (Vgl. K. 4.4 des Hintergrundberichtes) Ecoinvent-Hintergrunddatensätze für Gesteinskörnung und Transporte verwendet, die konservativer sind als die entsprechenden Datensätze für Deutschland in der GaBi-Datenbank, dürfen die Branchenreferenzwerte des Durchschnittsbetons CEM I in Tabelle 2 bei Berechnung des Treibhauspotenzials mit dem GCCA-Tool um 14 kg CO₂-Äq/m³ erhöht werden, wenn im GCCA-Tool mit Standardwerten (default values) für Gesteinskörnung und Transporte gerechnet wird. Für andere Software-Tools, die die gleichen Ecoinvent-Hintergrunddatensätze verwenden wie das GCCA-Tool, gilt dies ebenso. Wird abweichend nicht mit den Standardwerten für die Parameter Gesteinskörnung und Transport gerechnet, sondern mit individuellen Werten, gelten die oben genannten Werte. Einen Hintergrundbericht zu den Referenzwerten finden Sie hier: https://www.csc-zertifizierung.de/downloads/						

Fuente: Concrete Sustainability Council Technisches Handbuch - CO₂-Modul. Der Bundesverband Transportbeton ist der Regionale Systembetreiber des CSC für Deutschland. BTB. 10.01.2022

ANTECEDENTES INTERNACIONALES - CONCRETO

ACI 323

PROYECTOS

$$GWP_{project\ avg} \leq \alpha GWP_{benchmark\ avg}, \text{ where } \alpha = 0.85$$

8 Regiones

Table A.3.1g—Region 7 (South Central) GWP benchmark values by class strength

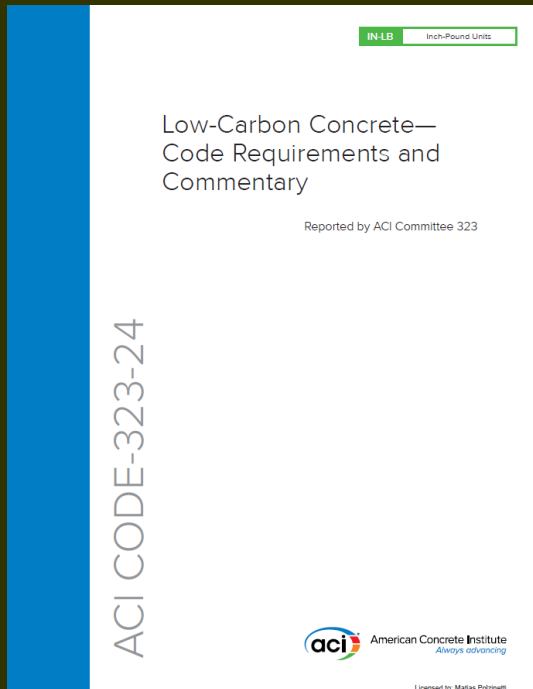
Specified strength class (f'_c) at 28 days, psi	Normalweight concrete $GWP_{benchmark}$ is kg CO ₂ e/yd ³ concrete	Lightweight concrete $GWP_{benchmark}$ is kg CO ₂ e/yd ³ concrete
2501 to 3000	188	358
3001 to 4000	219	391
4001 to 5000	258	425
5001 to 6000	273	Not applicable
6001 to 8000	313	Not applicable

4 Tipologías

Table 5.3.1—Building requirements by gross floor area

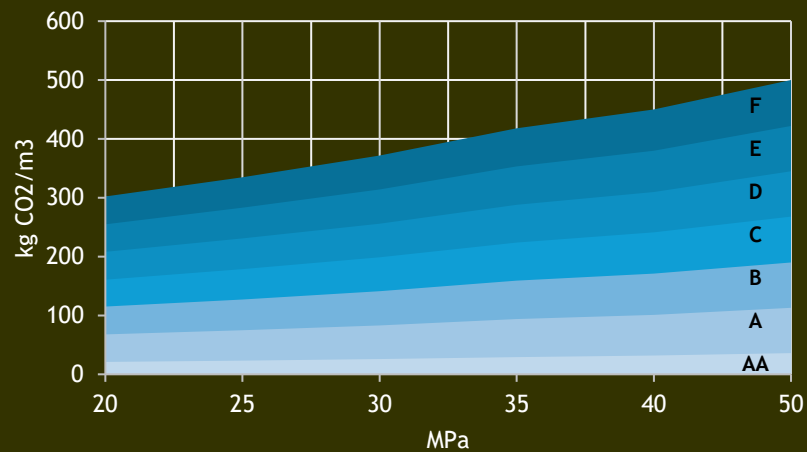
Building project tier	Building gross floor area	GWP limit	Minimum documentation requirements
BL1	$\geq 50,000 \text{ ft}^2$	$GWP_{project\ avg} \leq \alpha GWP_{benchmark\ avg}$	5.3.2, 5.3.3
BL2	$< 50,000 \text{ ft}^2$ and $\geq 5000 \text{ ft}^2$	None	5.3.2, 5.3.3
BL3	$< 5000 \text{ ft}^2$	[No Title]	5.3.3

- Atributo asignado al proyecto (No por concretos individuales)
- Concreto colocado en obra (in situ), f'c. esp entre 17 y 55 MPa
- Benchmark Regional (8 Regiones USA)
- Alcance *cradle-to-gate* (A1-A3)
- Diferenciación concreto de densidad normal y liviano

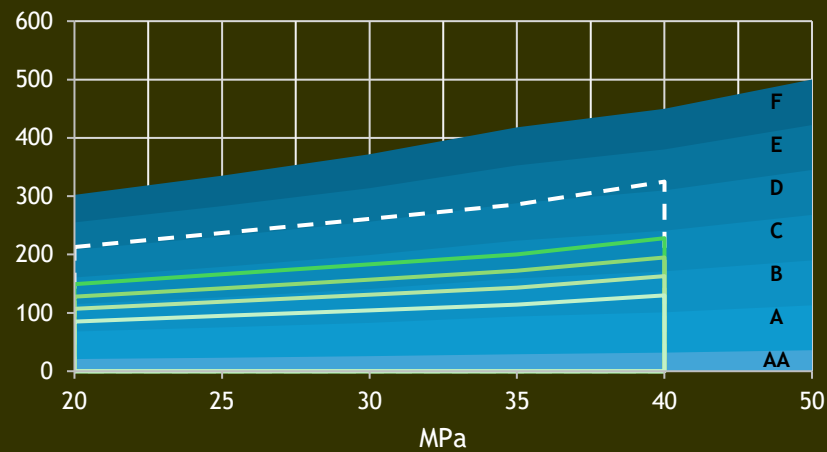


ANTECEDENTES INTERNACIONALES - CONCRETO

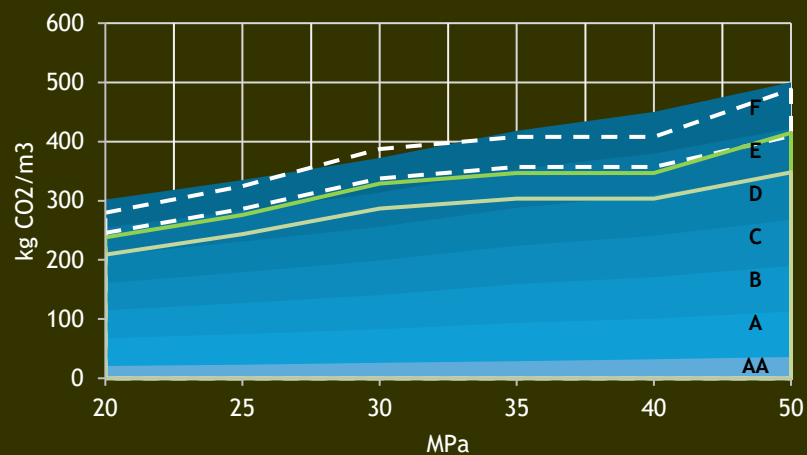
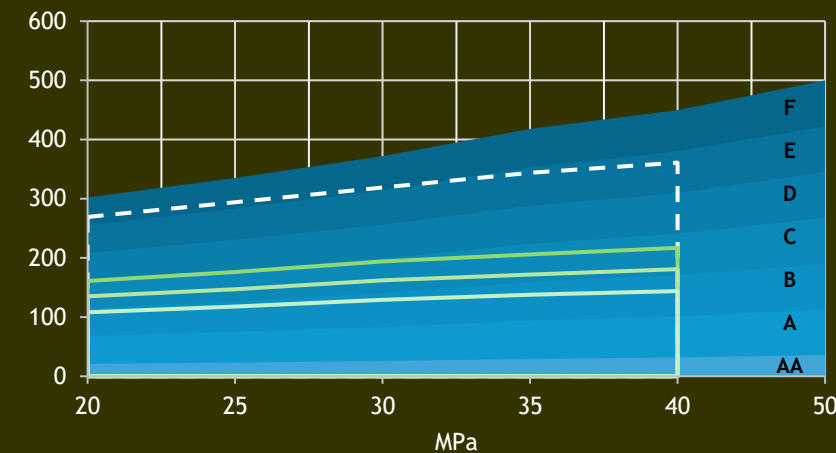
GCCA



CSC (LB Alemania)
30-40-50-60 %

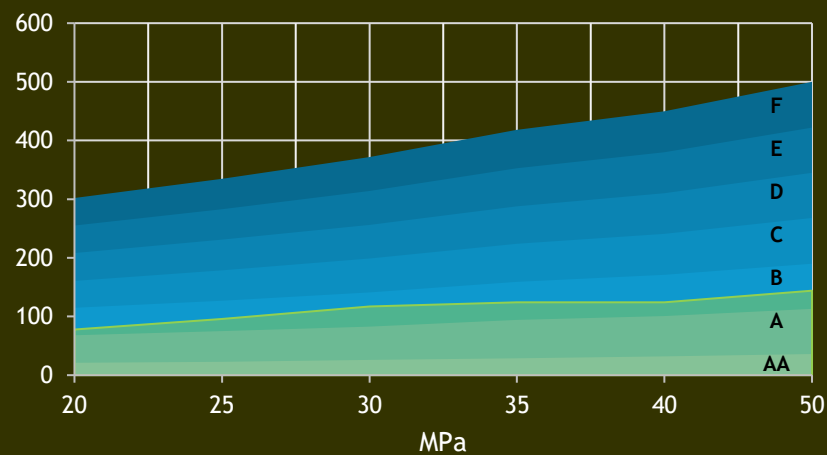


CSC (LB Bélgica)
30-40-50-60 %

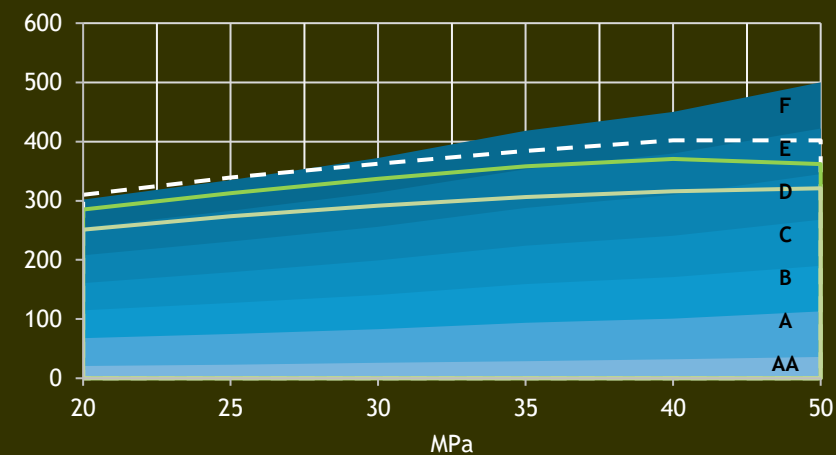


ACI 323

(Envoltorio Máx y Mín, 8 Regiones)

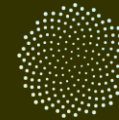


First Movers Coalition



IRA GSA FHWA EPA
Top 20-Top 40-Mean

- Green-Not Green vs Clasificación por Bandas
- Estático vs Dinámico
- Límites continuos o escalonados
- Comparación Línea Base vs “Proximidad” al Net Zero
- Emisiones Netas o Brutas
- Criterios de consideración funcional, durabilidad y resistencia a edad temprana
- Regionalización



First Movers
Coalition



Innovate
UK

ARUP



°CLIMATE GROUP
CONCRETE
ZERO

AMÉRICA LATINA Y EL CARIBE

1. 68% del despacho en sacos. Decisiones de compra final concentradas en el canal cemento.
2. Señal muy débil en incentivos y compras verdes públicas y privadas. Green Premium limitado a proyectos de alto estándar (Certificaciones LEED, EDGE, etc)
3. Brechas estructurales vs Norte Global:
 - Regulación, financiamiento, normas habilitantes
 - Déficit vivienda e infraestructura
 - Mayor impacto % en el costo final de construcción
4. Clientes (profesionales) valoran la descarbonización, pero su capacidad para asumir mayores costos es baja.
5. Producción RMX atomizada, capacidades técnicas (EPDs, reporting, actualización) limitadas en productores de media y baja escala.



CIERRE - VISIÓN



Capacidad para **CAPTURAR GREEN PREMIUM** y apoyar la descarbonización del producto



Trazable, verificable, transparente, armonizado, alineado con **ESTÁNDARES VALIDADOS**



Coherente con **HOJA DE RUTA FICEM ALYC** y estrategias de descarbonización nacionales en la región, incluyendo palancas regionales (Metano, SbN)



Fortalecer el **POSICIONAMIENTO DEL CEMENTO Y CONCRETO** como materiales sostenibles



COMPENSIVO PARA CLIENTES:

- Alineado con las condiciones de la demanda y mercado regional
- Valor (diferencial) percibido



Considere los **ATRIBUTOS Y USO FUNCIONAL** de los productos



CONGRESO Cemento & Concreto Verde 2050



11 AL **15** **2026**
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Santiago,
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