



FICEM

FEDERACIÓN INTERAMERICANA
DEL CEMENTO



Contexto **G**lobal

Carbono **N**eutralidad **FICEM**

Desafíos

Conclusiones



Contexto Global

7.900

Millones habitantes



4.170

Millones t Cemento

A white line-art outline of a world map is centered in the background. The map shows the continents of North America, South America, Europe, Africa, Asia, and Australia. The text is overlaid on the map.

4.170

Millones t Cemento



4.170
Millones t Cemento

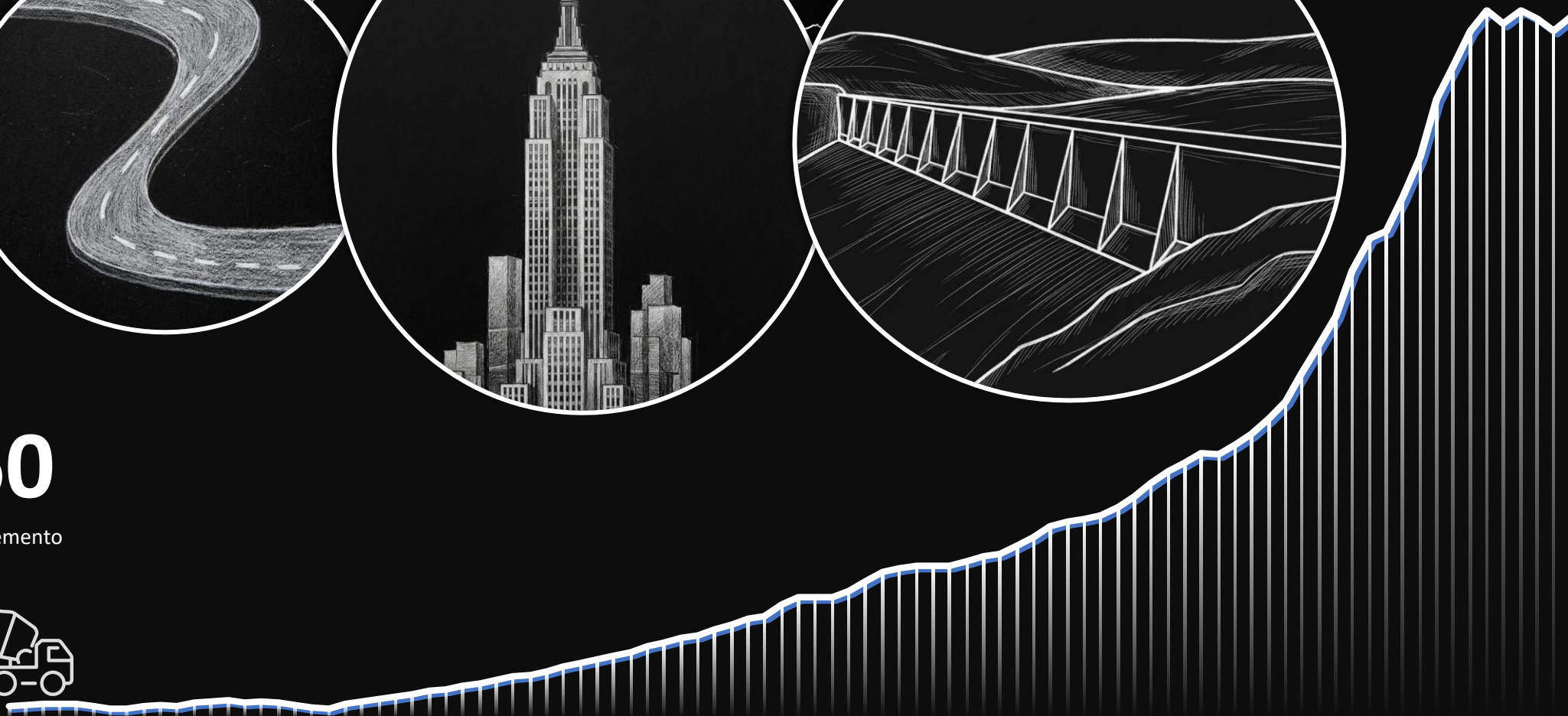
60

Mt Cemento



1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020

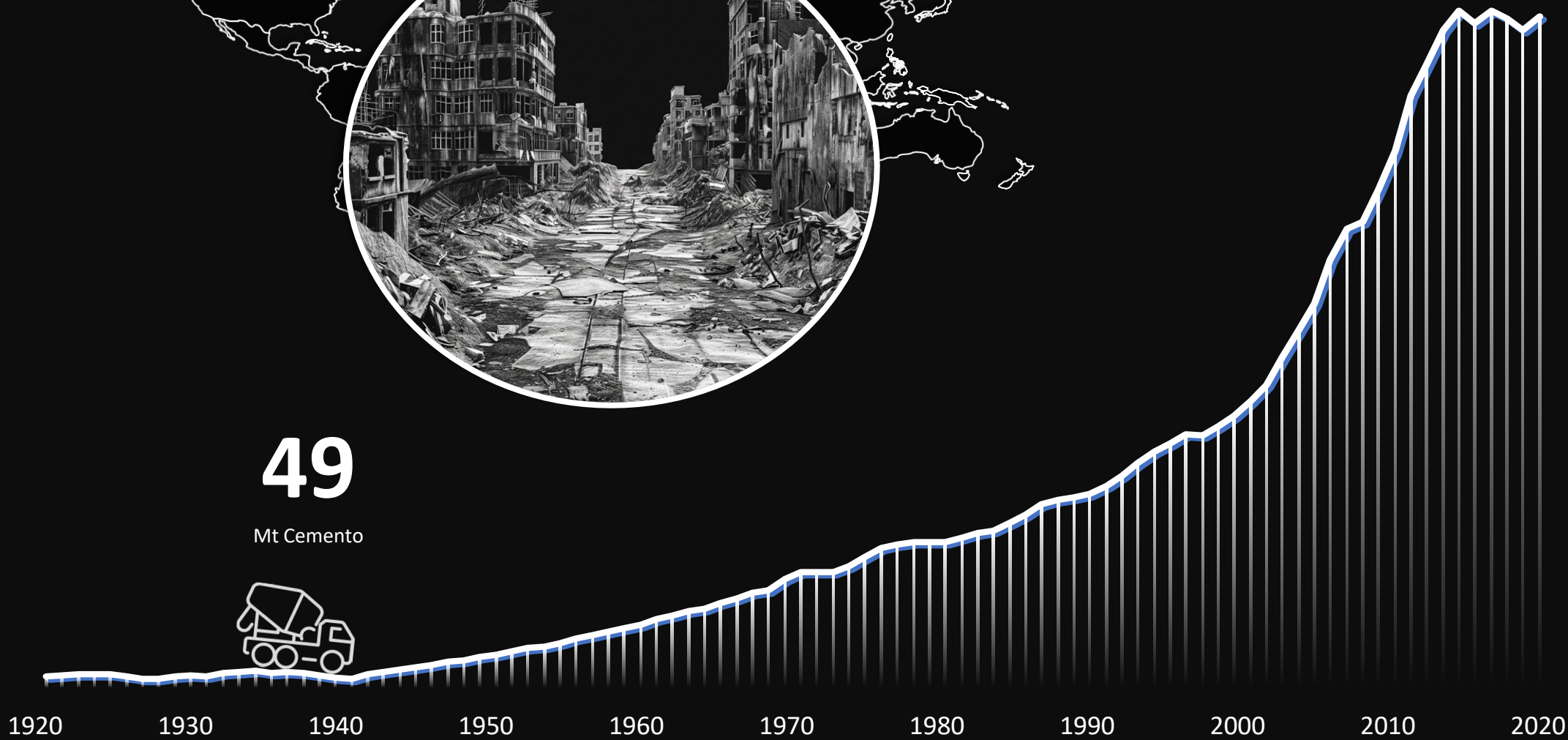
Urbanización USA





49

Mt Cemento

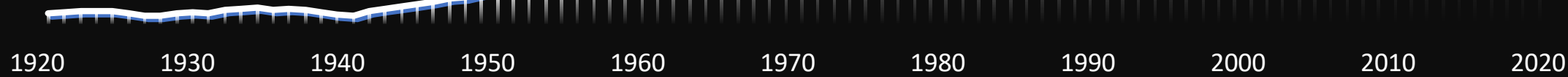


Segunda Guerra Mundial



133

Mt Cemento



> Boom Post Guerra



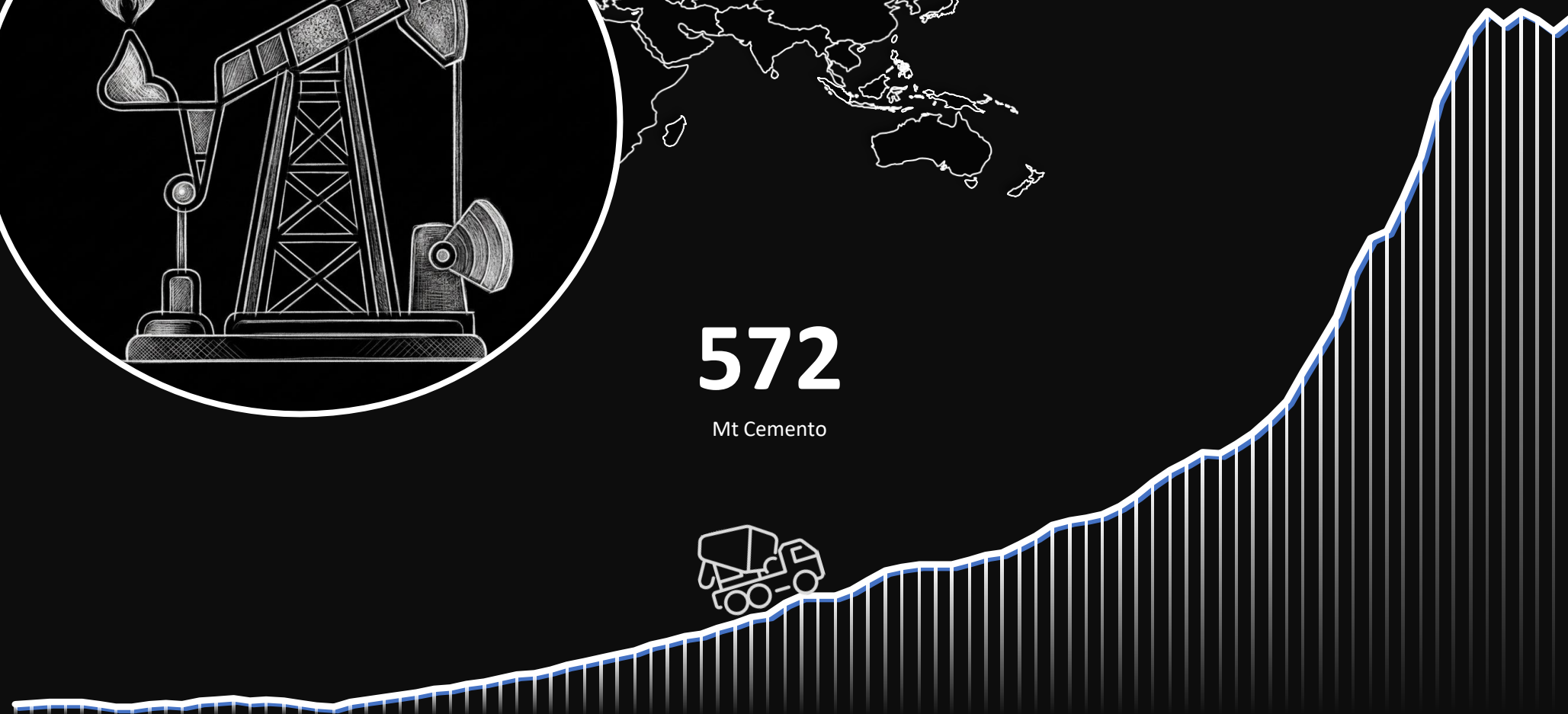
572

Mt Cemento



1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020

Crisis Energética





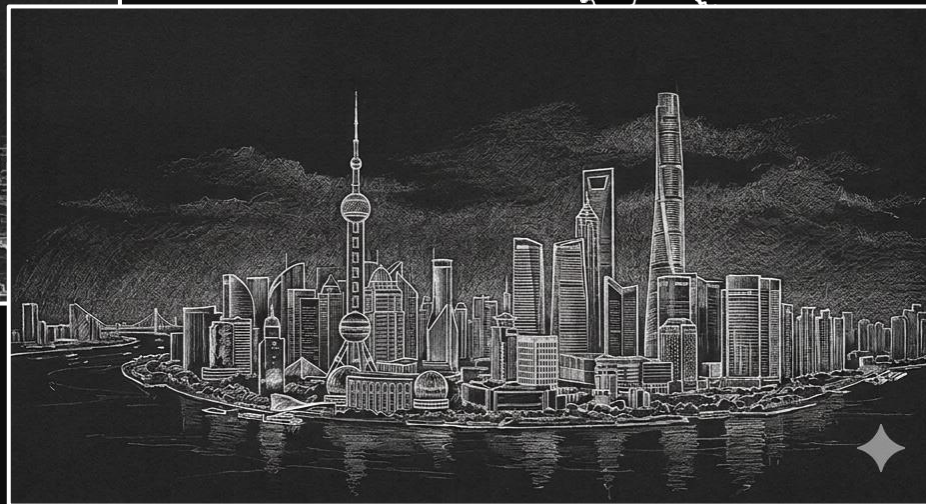
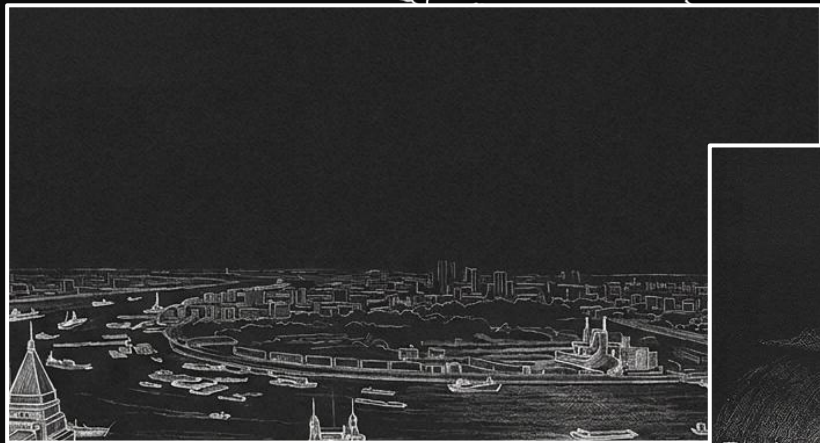
1.160

Mt Cemento



1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020

> Factor China



3.290

Mt Cemento

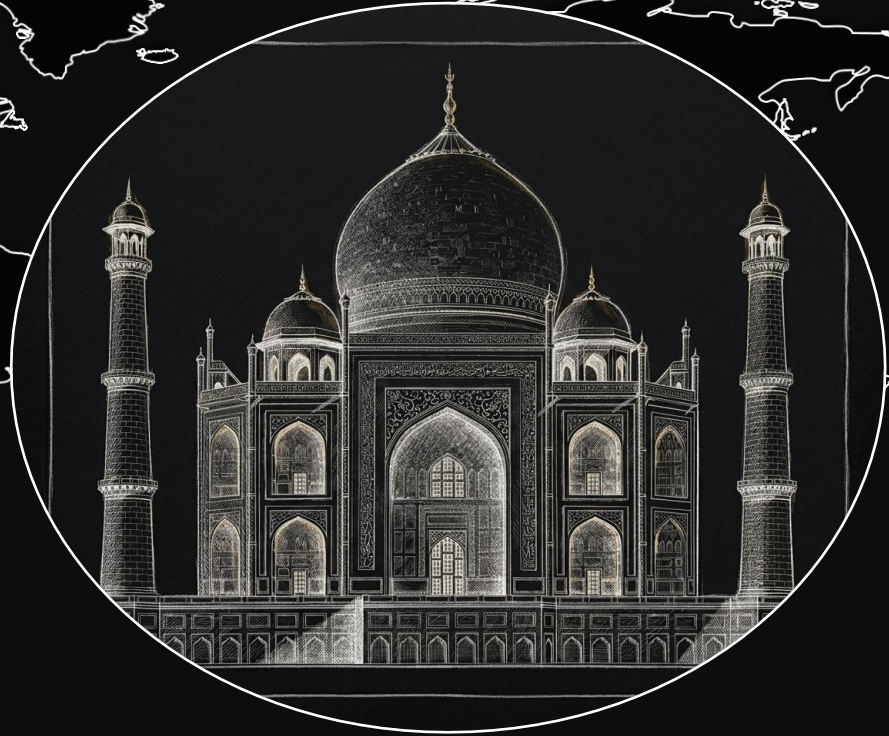


1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020

Record China

4.170

Mt Cemento



60

Mt Cemento

1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020

Meseta : - Norte + Sur

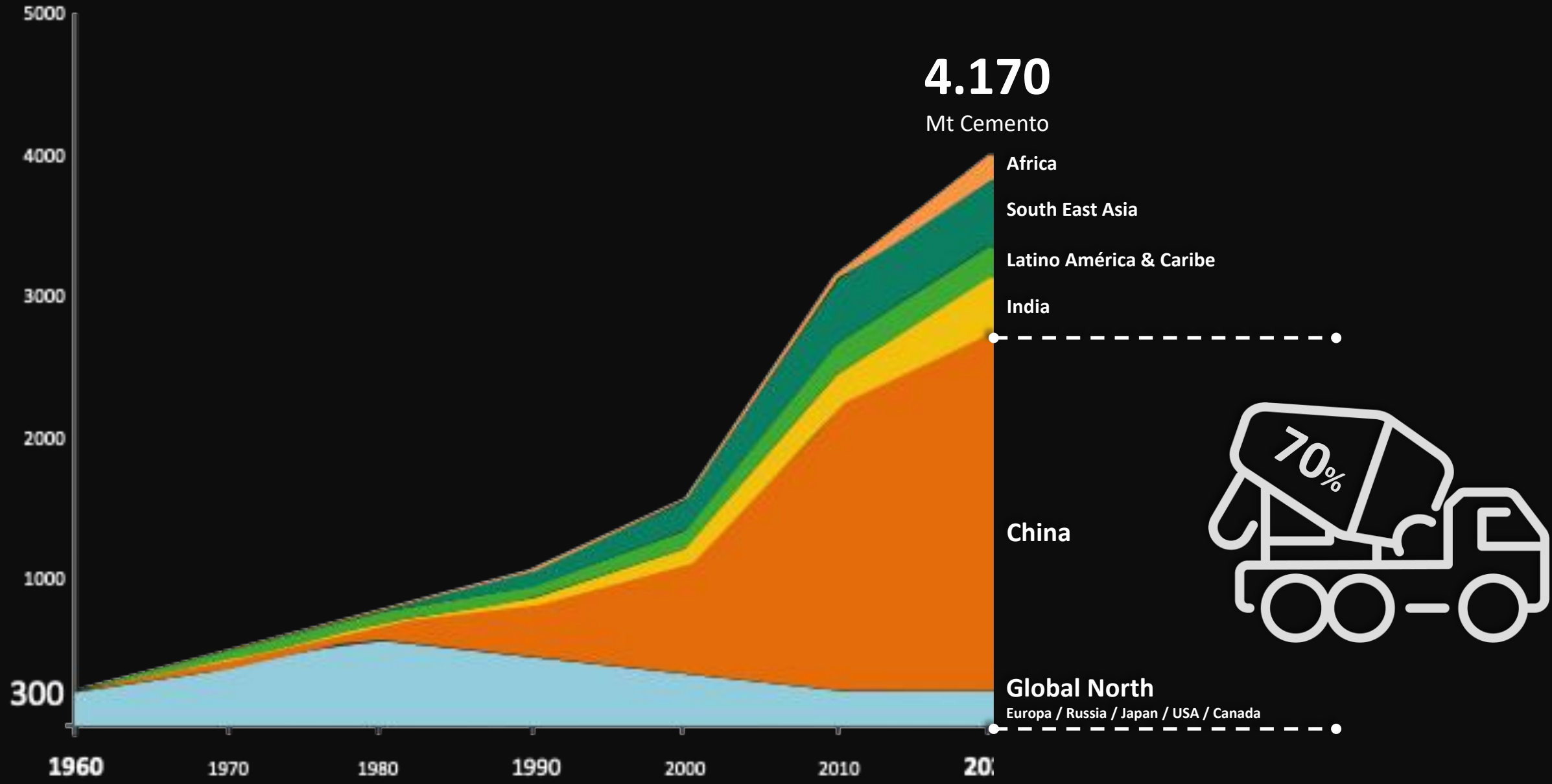




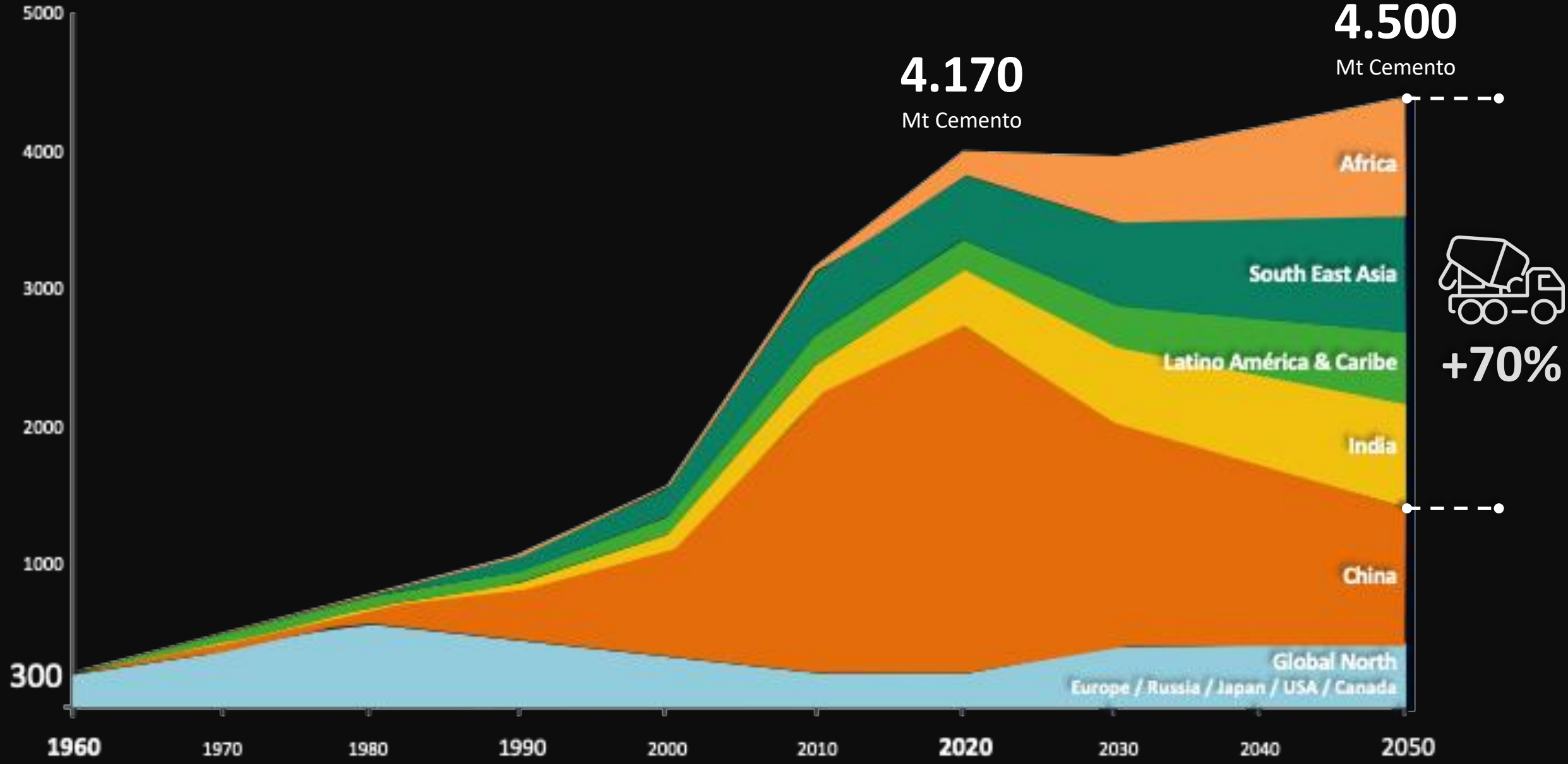
4.170

Mt Cemento

Mt Cemento

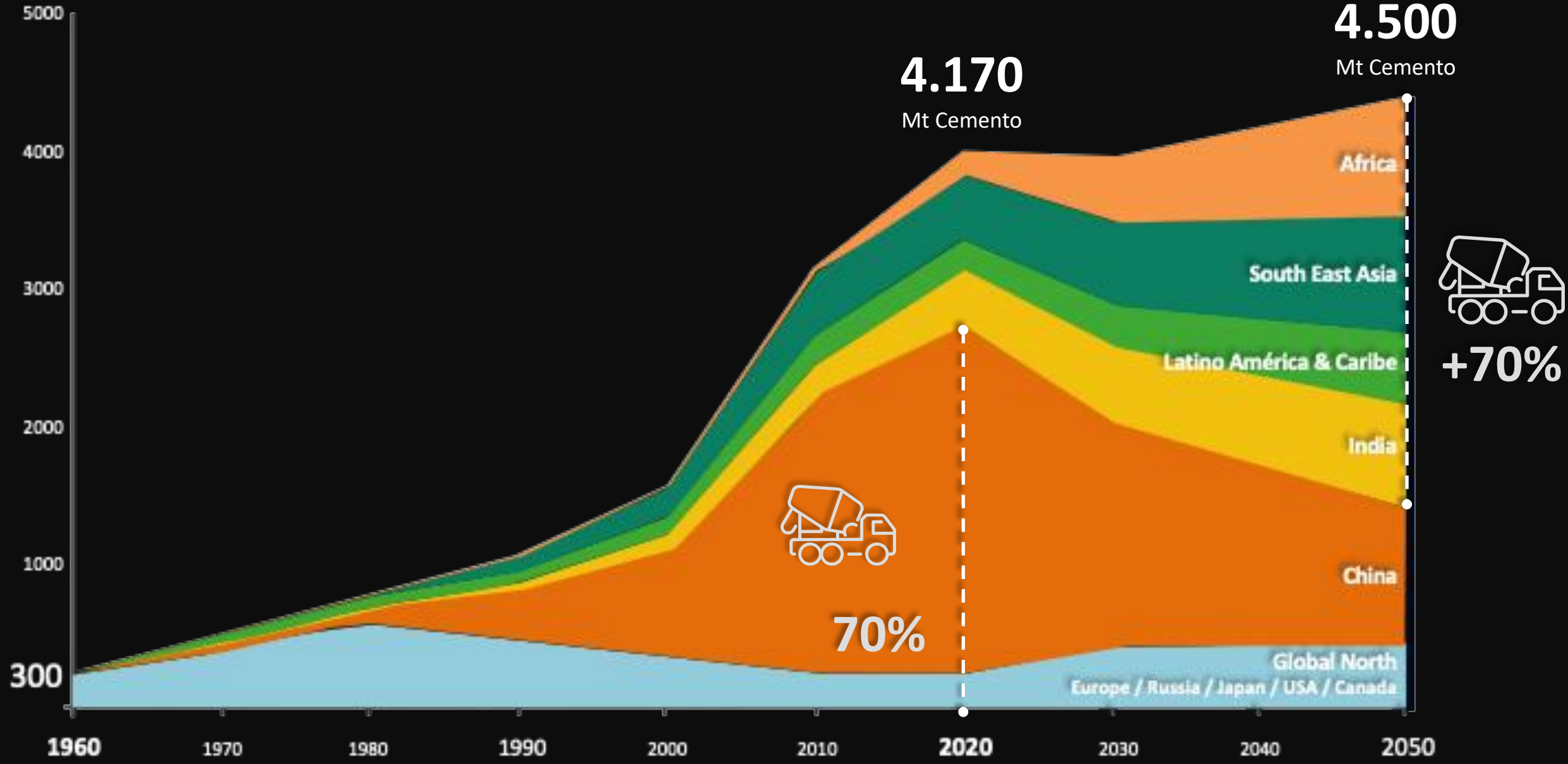


Mt Cemento



+70%

Mt Cemento



4.500
Mt Cemento

4.170
Mt Cemento

+70%

70%

Global North
Europe / Russia / Japan / USA / Canada

Africa

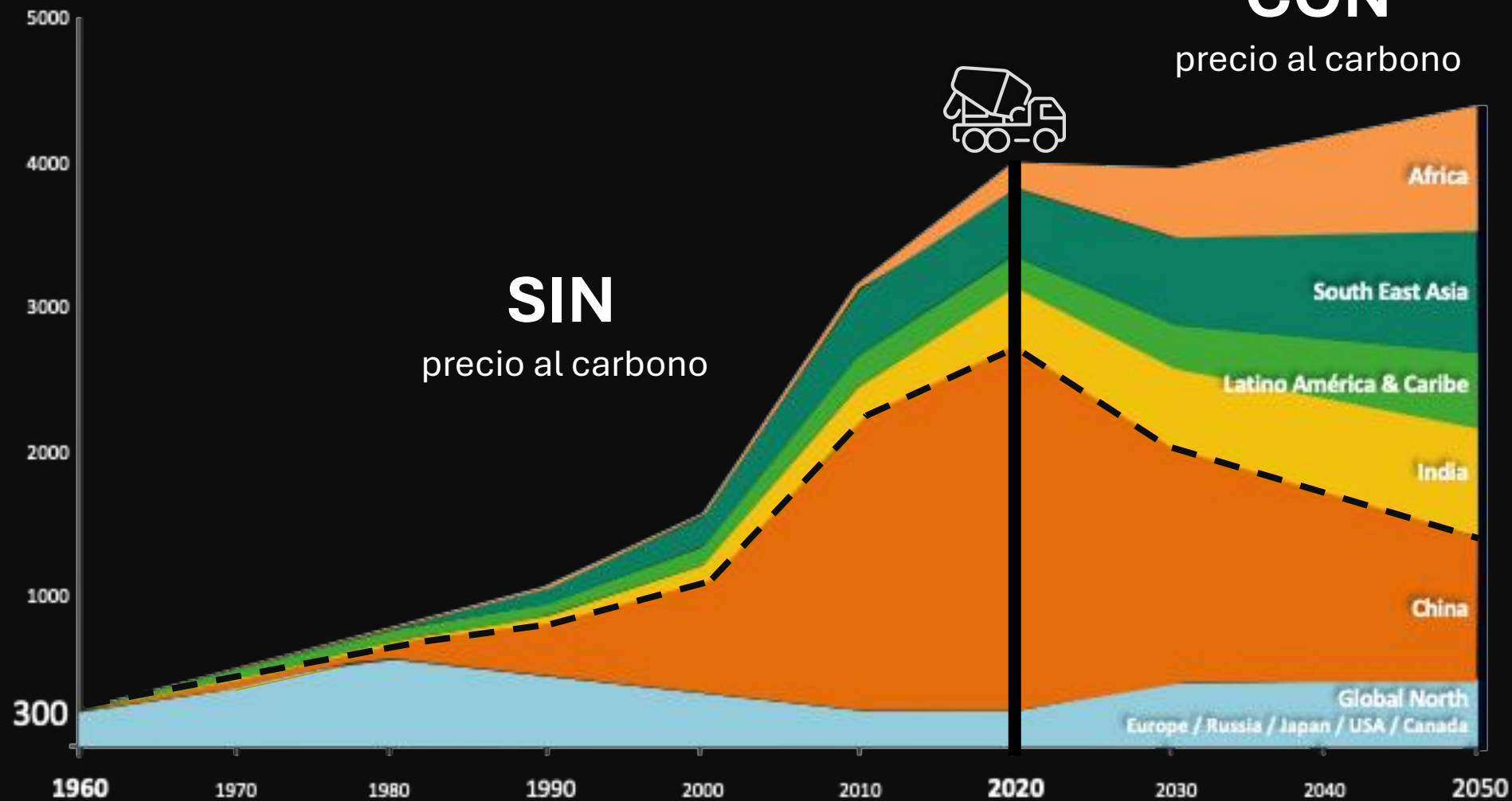
South East Asia

Latino América & Caribe

India

China

Mt Cemento



CON

precio al carbono



SIN

precio al carbono

SUR

GLOBAL



CEPAL

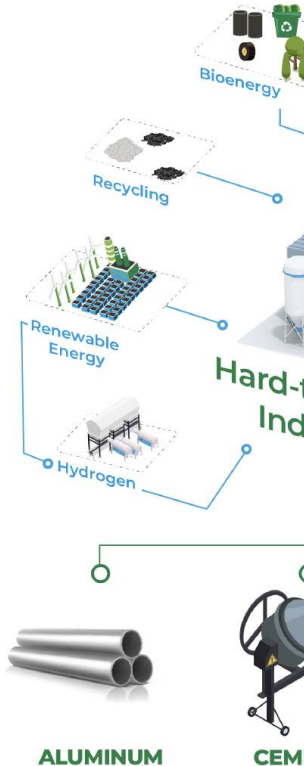


CEPAL

NET ZERO
PARTNERSHIPNDC 3.0 Global
Industrial
A Structured Approach
Prioritizing Policy

VOLUME 2

OCTOBER 2025

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATIONPathways to Accelerate
Transformation in Latin America
the Caribbean:
Focus on Aluminum, Cement,
Pulp & Paper, and Steel

nature communications

Article

Timely deployment
technologies to enable
decarbonise construction

Received: 11 June 2025

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Published online: 24 December 2025

Check for updates

Cyrille Dunar
Martin Röck

In the face of growing world population, historic cement-based mass. Historic as Gross Domestic Product use of downwards demand will adopting the emissions by middle-income the Sustainable reducing the

Climate change is among the most urgent challenges of the decades, with recent findings suggesting we are at critical level warming¹. To meet the Paris Agreement target of limiting the average temperature increase to $\leq 1.5^{\circ}\text{C}$, we need to surpass existing commitments and approximately halve CO_2 emissions by 2030 and achieve net zero CO_2 emissions by 2050². Decarbonisation of construction materials has received a notable amount of attention from both academic authors^{3,4} and industrial organisations^{5,6}, with a particular focus on cement & concrete and steel. Yet the specific question of degree of decarbonisation is achievable at the global level, via implementable strategies, is less well-addressed. Zhong et al.⁷ estimated material decarbonisation achievable in the buildings (residential and commercial) up to 2060 for seven construction materials, using a range of seven material efficiency strategies. A reduction of $\sim 62\%$ was deemed achievable by 2050 (from a baseline of 3.17 gigatonnes of CO_2 per year ($\text{GtCO}_2/\text{year}$) to 1.21 $\text{GtCO}_2/\text{year}$ in 2050). Pauliuk et al.⁸ focussed on residential

¹Engineering Department, University of Cambridge, Cambridge, UK. ²Materials, Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland. ³RISE Institute for Regenerative Spatial Systems Science, Vienna, Austria. ⁴Department of Civil and Environmental Engineering, University of California, Berkeley, CA, USA.



WORKING PAPER

Emerging green standards for cement
and steel decarbonization

Willy Carlsen, Neelam Singh, and Ankita Gangotra

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Working Papers contain preliminary research, analysis, findings, and recommendations. They are circulated to stimulate timely discussion and critical feedback, and to influence ongoing debate on emerging issues.

Suggested Citation: Carlsen, W., N. Singh, and A. Gangotra. 2026. "Emerging green standards for cement and steel decarbonization." Working Paper. Washington, DC: World Resources Institute. Available online at doi.org/10.46830/wriwp.25.00054.

Highlights

- Product-level emissions accounting and emissions intensity benchmarking are needed for effective industrial decarbonization and trade policy.
- Governments and organizations are establishing these emissions accounting standards and emissions intensity benchmarks.
- Promulgated standards and benchmarks vary greatly depending on various country- or sector-specific factors.
- A patchwork of accounting methodologies for calculating a product's emissions increases the costs of compliance for businesses, makes comparison challenging, and inhibits market growth for low-carbon products.
- The increased number of emissions accounting standards calls attention to the need for greater consistency in underlying rules and methods—or interoperability—across these standards.
- Improving the global standards landscape requires improving data quality, leveraging existing standards, harmonizing methodologies, coordinating across standards to ensure interoperability, and, when viable, converging on benchmarks and thresholds, as well as greater consideration of small-scale producers and nonclimate pollution impacts.



FICEM
FEDERACIÓN INTERAMERICANA
DEL CEMENTO

Contexto **G**lobal

Carbono **N**eutralidad **FICEM**

Desafíos

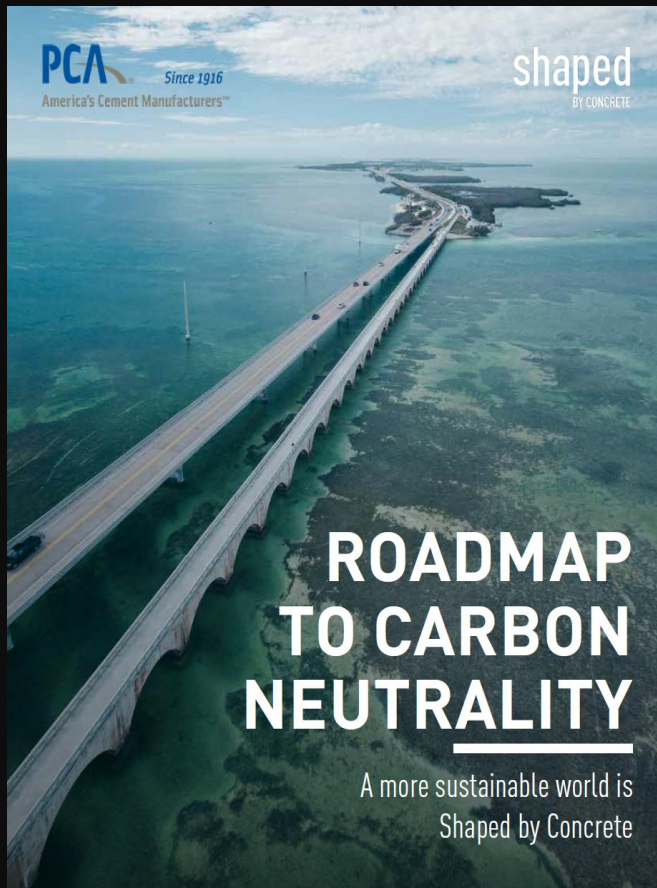
Conclusiones

Carbono Neutralidad FICEM



75%

Producción de Cemento
Roadmap

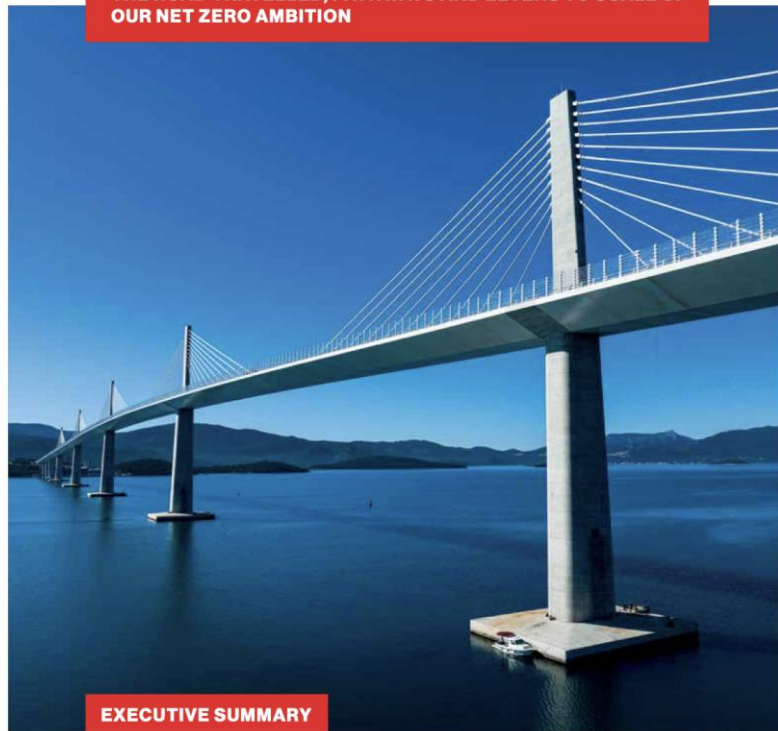


2% producción mundial
276 kgcem/hab
100 Mt Cemento +64%
95% Factor Clínker 75%
14% Coprocesamiento 50%



From Ambition to Deployment

THE ROAD TRAVELLED, PATHWAYS AND LEVERS TO SCALE UP
OUR NET ZERO AMBITION



EXECUTIVE SUMMARY

4% producción mundial
343 kgcem/hab
187 Mt Cemento +20%
77% Factor Clíner 65%
46% Coprocesamiento 90%



Toward Net Zero: Decarbonization Roadmap for China's Cement Industry



Report / December 2022

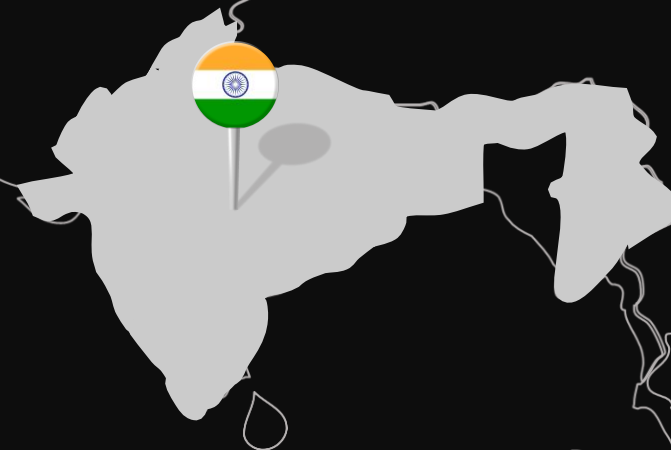
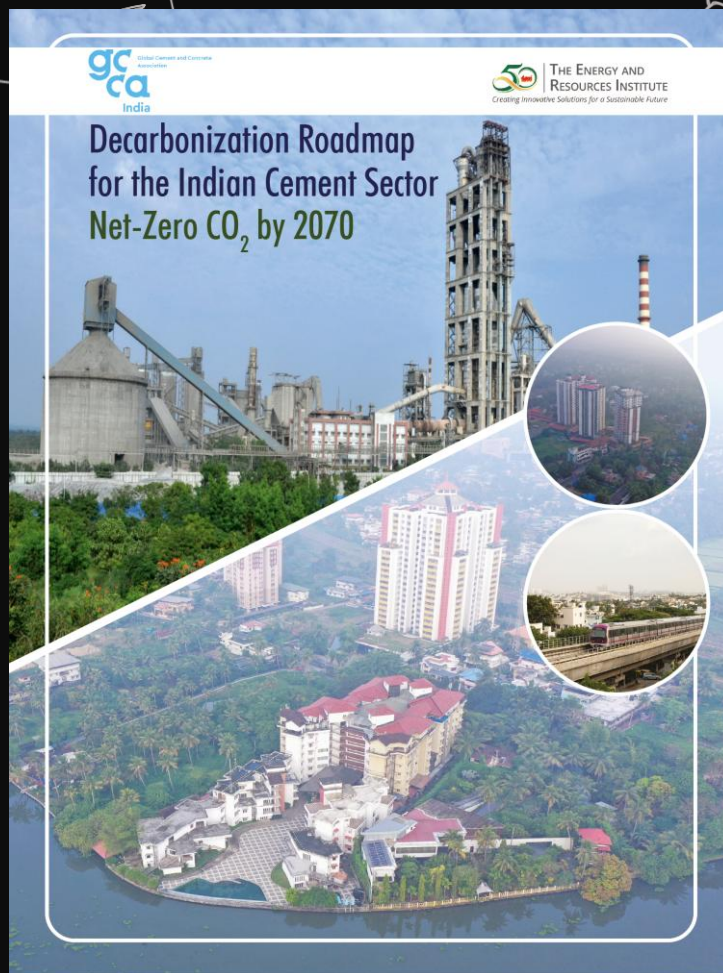
57% producción mundial

1,684 kgcem/hab

2.377 Mt Cemento **-28%**

70% Factor Clínter **65%**

2% Coprocesamiento **53%**



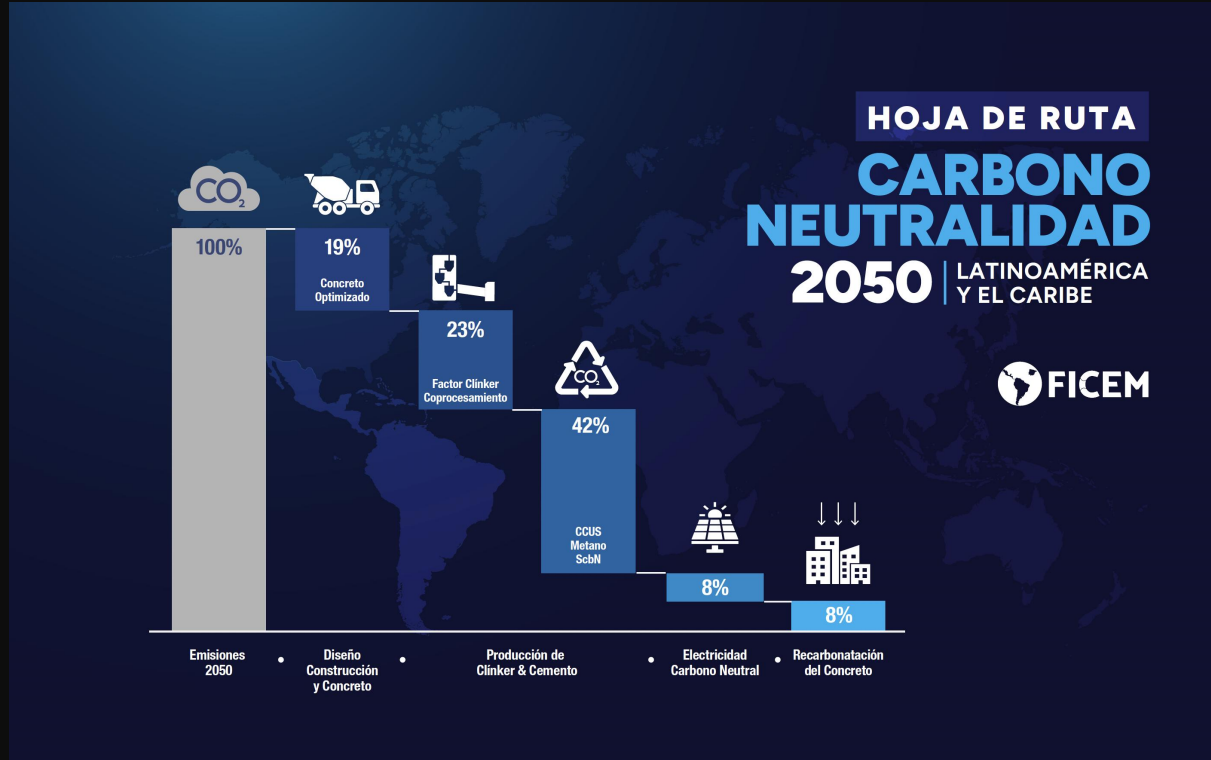
7% producción mundial

233 kgcem/hab

280 Mt Cemento **+400%**

75% Factor Clínter **56%**

5% Coprocesamiento **50%**



5% producción mundial

255 kgcem/hab

196 Mt Cemento +70%

67% Factor Clínter 60%

12% Coprocesamiento 53%



Producción Cemento
12,4 Mt – 24,9 Mt
Proyección Demanda
+ 101%
Factor Clínter
69% - 56%
Coprocesamiento
8% - 45%
Eficiencia Térmica
4052 – 3260

Producción Cemento
62 Mt – 111 Mt
Proyección Demanda
+ 80%
Factor Clínter
71% - 51%
Coprocesamiento
27% - 60%
Eficiencia Térmica
3461 – 3220

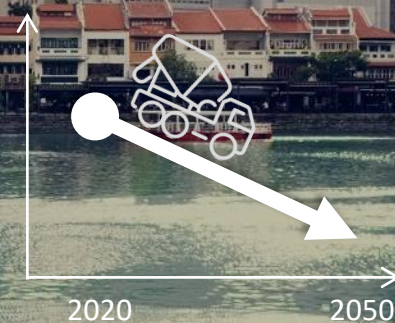
Producción Cemento
5,1 Mt – 6,9 Mt
Proyección Demanda
+ 35%
Factor Clínter
71% - 73%
Coprocesamiento
15% - 68%
Eficiencia Térmica
3887 - 3300

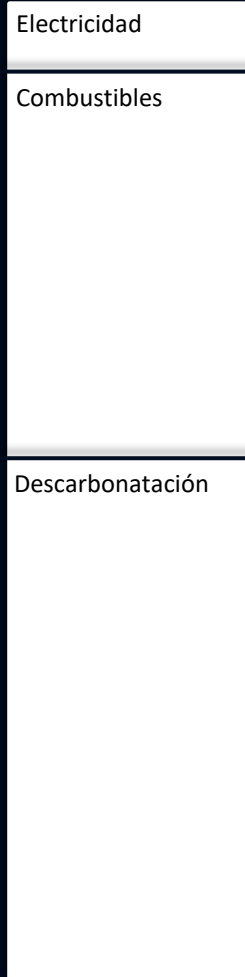
Producción Cemento
12,6 Mt – 19,5 Mt
Proyección Demanda
+ 55%
Factor Clínter
67% - 61%
Coprocesamiento
7% - 18%
Eficiencia Térmica
3425 – 3300



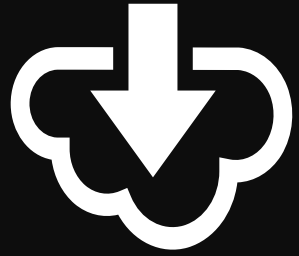
75% 

Producción de Cemento



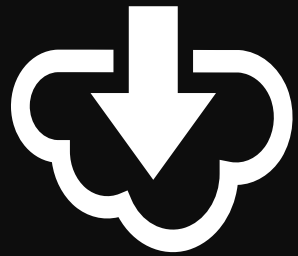


BAU 2050



50%

- 1** Reducir Contenido Clinker
- 2** Uso de Combustibles Alternativos
- 3** Uso eficiente Cemento & Concreto



50%

1

Reducir Contenido Clinker

2

Uso de Combustibles Alternativos

3

Uso eficiente Cemento & Concreto

50%

4

Remoción CO₂

5

Evitar CO₂e

4 Remoción CO₂



5 Evitar CO₂e





50%

1

Reducir Contenido Clinker

2

Uso de Combustibles Alternativos

3

Uso eficiente Cemento & Concreto

50%

4

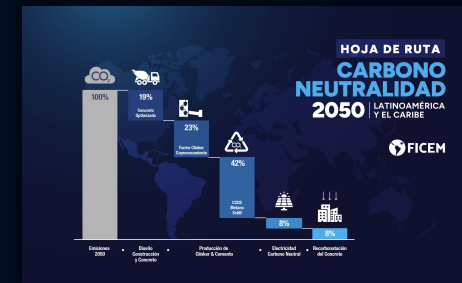
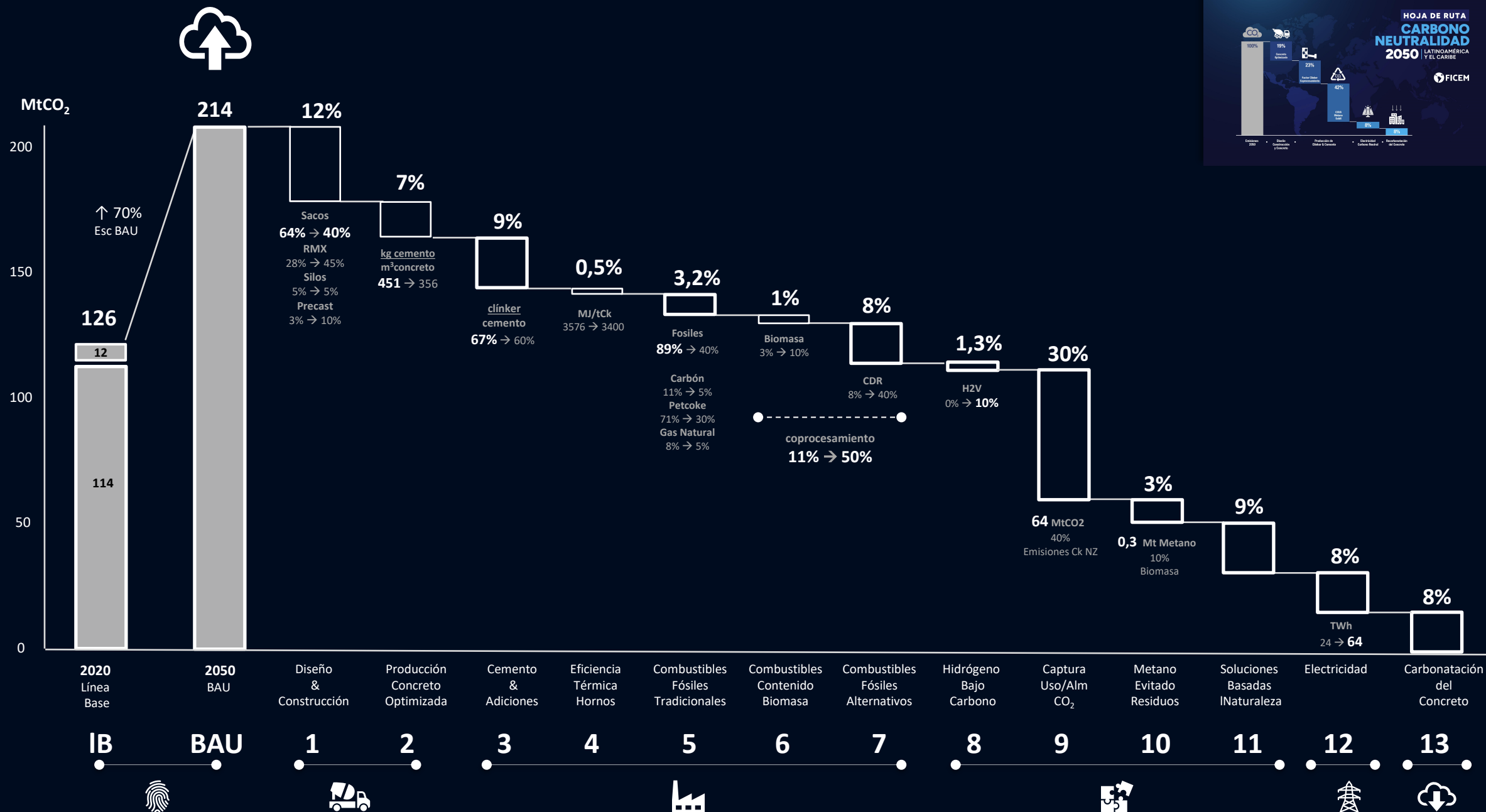
Remoción CO₂

5

Evitar CO₂e

6 Innovación

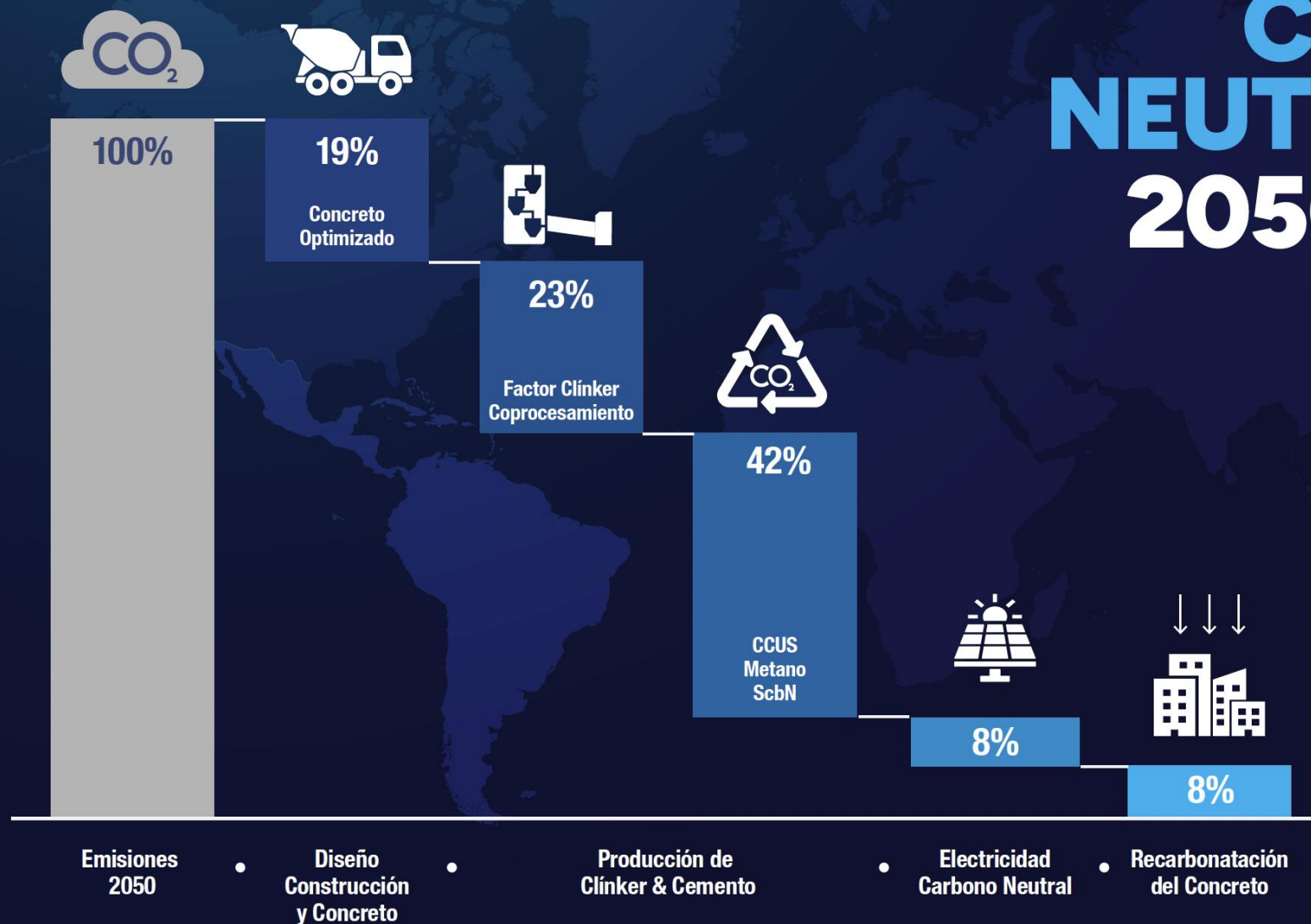
7 Certeza Jurídica & Financiamiento



HOJA DE RUTA

CARBONO NEUTRALIDAD

2050 | LATINOAMÉRICA Y EL CARIBE





Contexto **G**lobal

Carbono **N**eutralidad **FICEM**

Desafíos

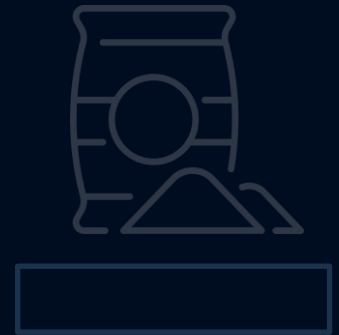
Conclusiones

Desafíos





MRV + NDC + IPC



MRV + NDC + IPC



Cemento + Taxonomías + Coprocesamiento + Capturas + Art 6

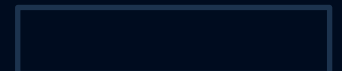


MRV + NDC + IPC



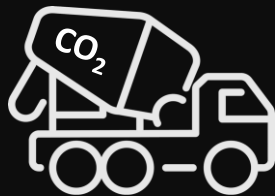


Huella de Carbono





Calculadora 3C FICEM: Modelo para una compañía



28 Plantas de Concreto

+ 200.000 remito año + 113 CO₂
+ 1,4 millones m³



3 Hornos de Clinker

- Clinker Planta Cem 1 939 kg CO₂/t
- Clinker Planta Cem 2 932 kg CO₂/t
- Clinker Planta Cem 3 941 kg CO₂/t



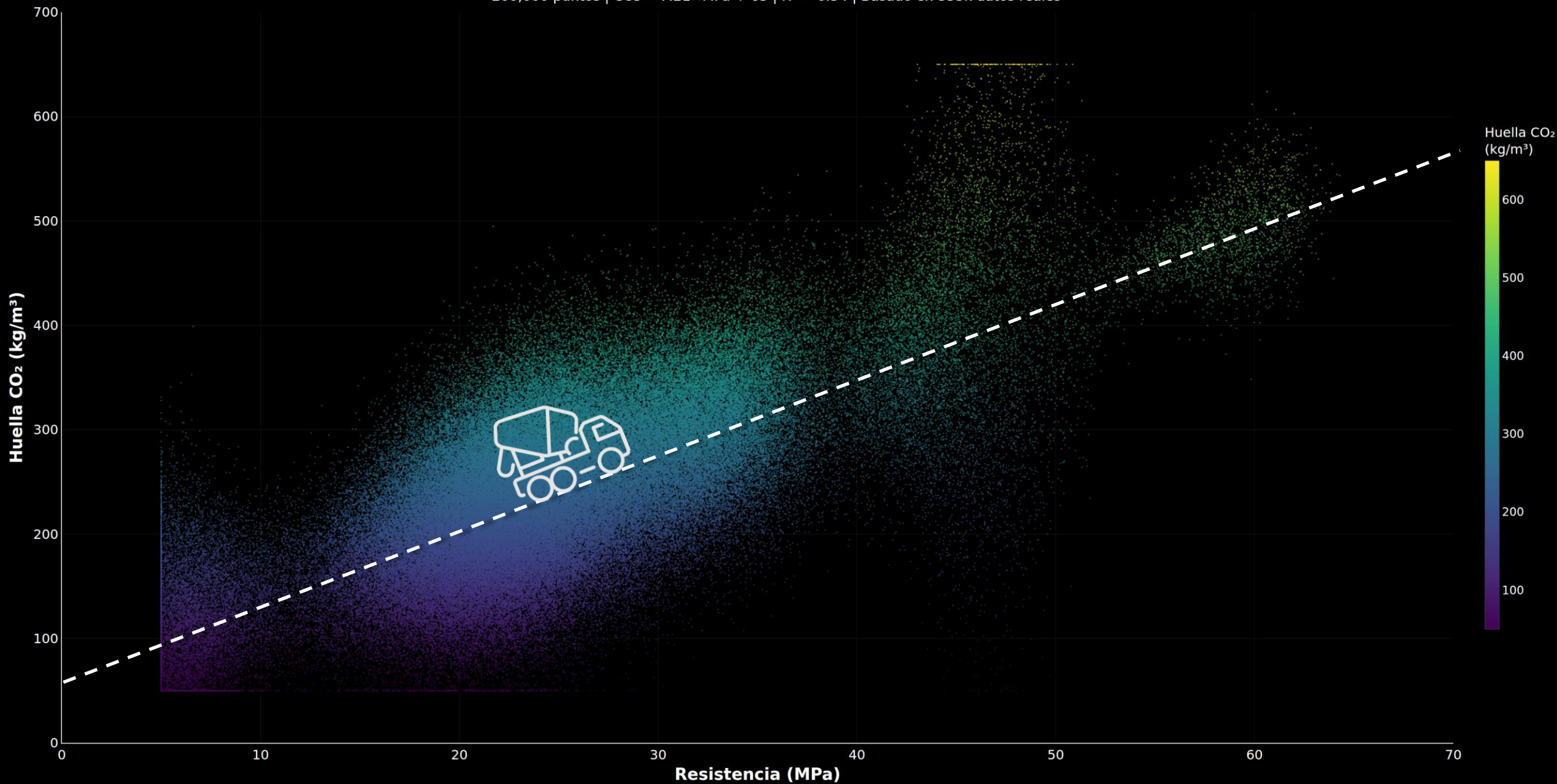
9 Tipos de Cemento

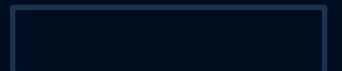
- CPC30R (Planta Cem 1) 654 kg/t
- Mortero (Planta Cem 1) 360 kg/t
- CPC40 (Planta Cem 1) 839 kg/t
- CPC40 (Planta Cem 2) 803 kg/t
- Mortero (Planta Cem 2) 347 kg/t
- CPC30R (Planta Cem 2) 616 kg/t
- CPC40 (Planta Cem 3) 820 kg/t
- CPC30R (Planta Cem 3) 608 kg/t

- Planta Concreto A 348 kg CO₂/m³
- Planta Concreto B 305 kg CO₂/m³
- Planta Concreto C 295 kg CO₂/m³
- Planta Concreto J 357 kg CO₂/m³
- Planta Concreto F 308 kg CO₂/m³
- Planta Concreto O 360 kg CO₂/m³
- Planta Concreto E 255 kg CO₂/m³
- Planta Concreto I 281 kg CO₂/m³
- Planta Concreto K 308 kg CO₂/m³
- Planta Concreto M 304 kg CO₂/m³
- Planta Concreto P 336 kg CO₂/m³
- Planta Concreto R 329 kg CO₂/m³
- Planta Concreto D 219 kg CO₂/m³
- Planta Concreto G 213 kg CO₂/m³
- Planta Concreto N 281 kg CO₂/m³
- Planta Concreto H 219 kg CO₂/m³
- Planta Concreto L 243 kg CO₂/m³
- Planta Concreto Q 282 kg CO₂/m³
- Planta Concreto S 300 kg CO₂/m³
- Planta Concreto X 342 kg CO₂/m³
- Planta Concreto V 361 kg CO₂/m³
- Planta Concreto T 283 kg CO₂/m³
- Planta Concreto V 286 kg CO₂/m³
- Planta Concreto U 270 kg CO₂/m³
- Planta Concreto W 291 kg CO₂/m³
- Planta Concreto I 338 kg CO₂/m³

Nube Masiva de Remitos (Teórica)

200,000 puntos | $\text{CO}_2 = 7.21 \times \text{MPa} + 65$ | $R^2 = 0.54$ | Basado en 353k datos reales







Reducción **C**linker en el **C**emento





Overview of cement and concrete production in Latin America and the Caribbean with a focus on the goals of reaching carbon neutrality

Yury Villagrán-Zaccardi^{1,2*}, Ricardo Pareja³, Lina Rojas³, Edgardo Irassar⁴, Andrés Torres-Acosta⁵, Jorge Tobón⁶, Vanderley M. John⁷

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³ Inter American Federation of Cement (FICEM), 110111 Bogotá, Colombia

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⁶ Cement and Building Materials Research Group, Departamento de Materiales y Minerales, Facultad de Minas, Universidad Nacional de Colombia, 050034 Medellín, Colombia

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Abstract

Carbon neutrality to limit global warming is an increasing challenge for all industries, particularly for the cement industry, due to the chemical emission process. For decades, reducing the clinker factor has been one of the main strategies to reduce the carbon footprint. Additional cuttings in the clinker content of cements seem possible with the upsurge of novel supplementary cementitious materials. This potential contribution represents only a fraction of the required carbon reductions for achieving the goal of carbon neutrality in the coming decades. This paper describes the current situation of the cement industry in Latin America and the Caribbean and the global opportunities and strategies to reduce the carbon footprint of cement and concrete and their adaptation to the regional conditions. Besides describing emerging supplementary cementitious materials, the potential contribution of industrialization and quality control are discussed. Moreover, limitations related to geography and standardization are analyzed. Regional considerations are made given the specific prospects of human development.

Keywords: Low carbon cement; Supplementary cementitious materials; Cement production; Global warming potential; Industrialization

1 Introduction

As a developing region with an increasing demand for large-scale infrastructure expansion, Latin America and the Caribbean (LAC) are likely to experience an increasing demand for cement and concrete. Moreover, suburban and rural housing construction development increases through programs and housing refurbished through informal sectors.

Global warming is an urgent worldwide problem requiring full attention from all sectors. Current scenarios preview impacts on wellbeing to different degrees depending on the actions taken in the present. Also, the effects of natural disasters will bring additional demand for cement and concrete. For a target scenario of a maximum of 1.5 °C (1.5 D) above pre-industrial levels, related global greenhouse emissions must be progressively reduced [1]. The global cement industry is thus on the path toward the challenge of achieving carbon-neutral concrete by 2050 [2]. Such a goal shifts the focus from cement (intermediate product) to concrete (final product). Therefore, policies and new strategies must cover both cement

production and use. Strategies for reducing the carbon footprint of the industry should account for human development needs and avoid the intensification of inequalities.

This paper revises the current situation in the LAC cement and concrete industries concerning carbon neutrality. The cement market and standardization in LAC are described, and a discussion is presented on the potential contribution of industrialization and emerging supplementary cementitious materials (SCMs) for achieving goals concerning human development and the limitation of global warming.

2 Latin American market

Approximately 272 cement plants are currently operating in LAC, including 191 integrated plants, 78 grinding mills, and 3 clinker plants. The installed capacity of the integrated plants is 261 Mt of cement and that of the grinding mills is 43 Mt (Figure 1).

*Corresponding authors: Yury Villagrán-Zaccardi, yury.villagranzaccardi@ugent.be

Reducción Clinker en el Cemento

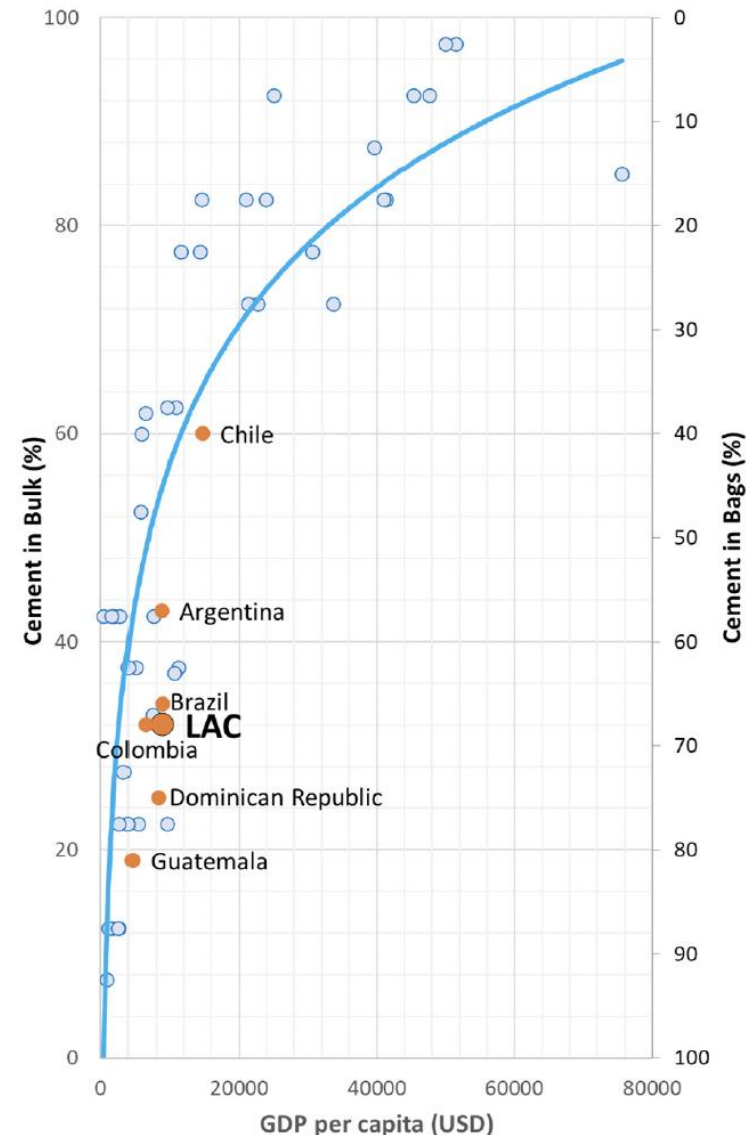
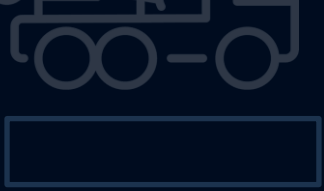
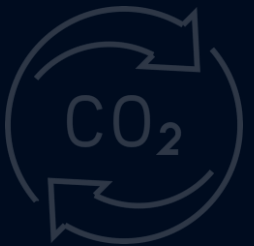


Figure 2. Market share of bagged cement in various regions and key countries with their GDP per capita (adapted from [12]).

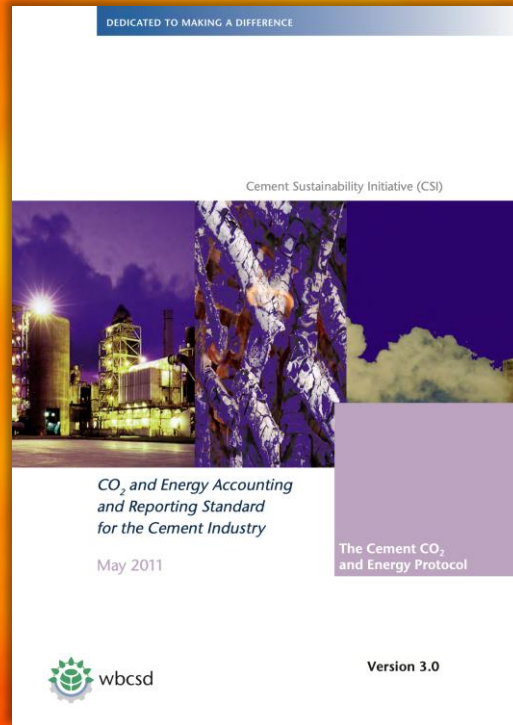


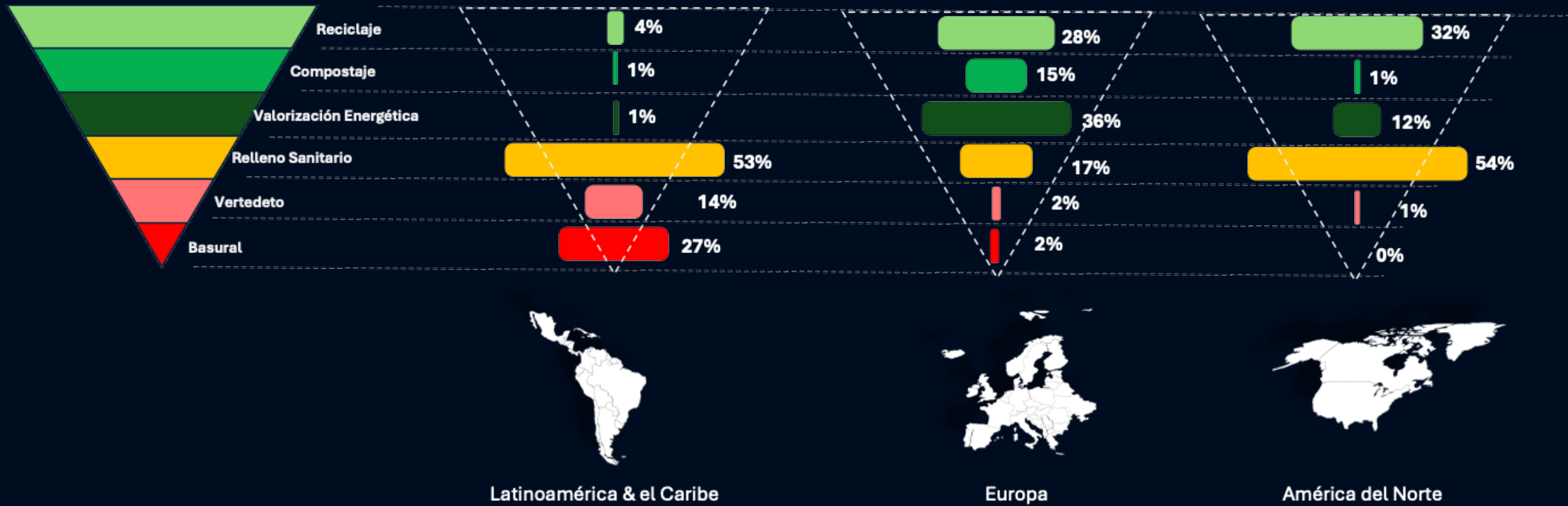


Coprocesamiento



Coprocesamiento







Latinoamérica & el Caribe

Resumen para
tomadores de
decisiones

PROGRAMA REGIONAL DE COOPERACIÓN

Reducción de
emisiones de metano
provenientes de
residuos orgánicos
y cierre de basurales
en América Latina y
el Caribe



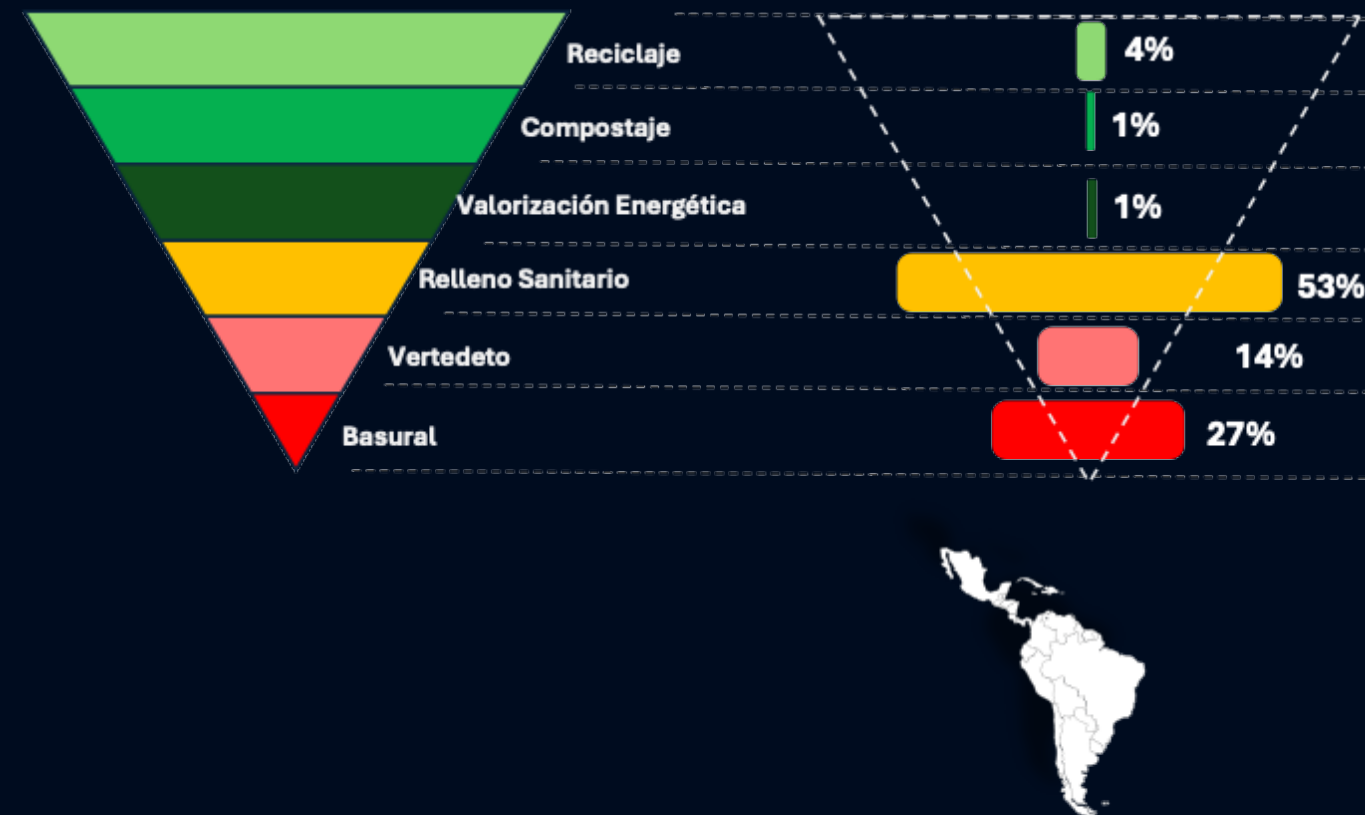
FORO DE MINISTROS
Y MINISTROS DE
MEDIO AMBIENTE
DE AMÉRICA LATINA Y EL CARIBE



XXIV
REUNIÓN PERU

ONU 
programa para el
medio ambiente

Latinoamérica & el Caribe



PROGRAMA REGIONAL DE COOPERACIÓN

Reducción de emisiones de metano provenientes de residuos orgánicos y cierre de basurales en América Latina y el Caribe

Resumen para
tomadores de
decisiones



FORO DE MINISTROS
Y MINISTROS DE
MEDIO AMBIENTE
DE AMÉRICA LATINA Y EL CARIBE



ONU
programa para el
medio ambiente



PROPOSED NEW BASELINE AND MONITORING METHODOLOGY OR METHODOLOGICAL TOOL FORM FOR EMISSION REDUCTIONS ACTIVITIES (Version 02.0)

INFORMATION TO BE COMPLETED BY THE SECRETARIAT AND METHODOLOGIES EXPERT PANEL

Type of standard	New baseline and monitoring methodology
Unique reference number and title of the proposed new methodology or new methodological tool	A6.4-PNM00xxxxx
Date when this form was received at UNFCCC secretariat:	22/09/2025
Date of posting in the UNFCCC A6.4 web site for global stakeholder consultation	30/09/2025

Coprocesamiento & Metano Evitado

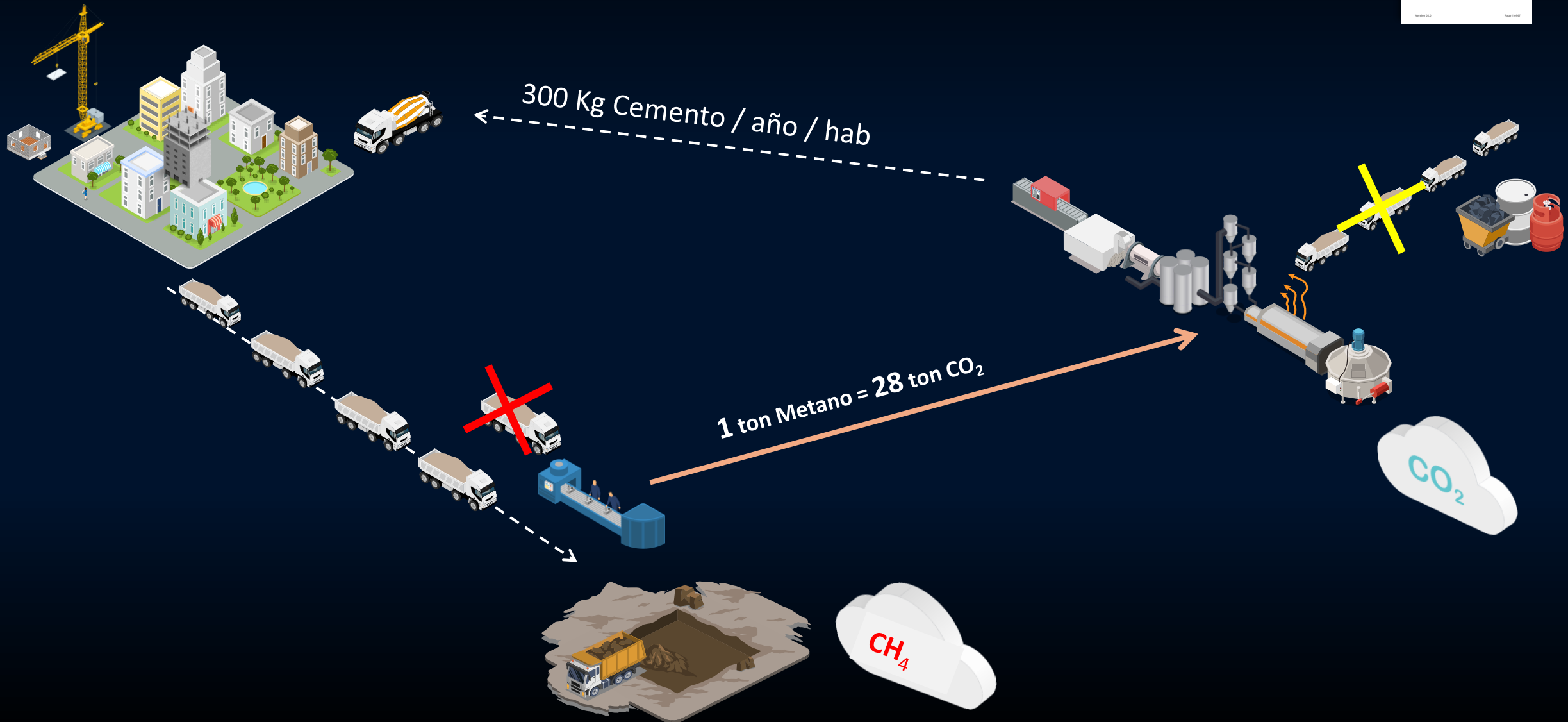
Coprocesamiento

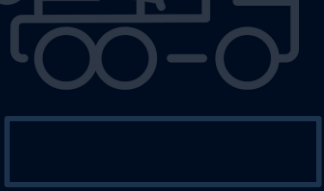
& Metano Evitado

11

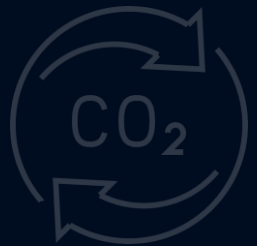
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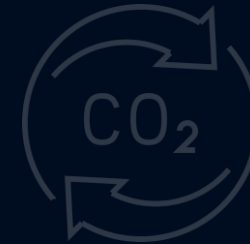


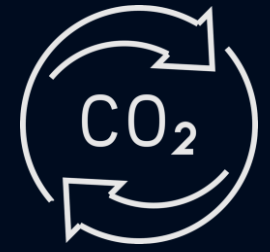
Coprocesamiento





Consumo Electrico Bajo
en Carbono





CCUS



SbN



CCUS



Remociones CO₂ Tecnológicas

SbN



Remociones CO₂ Biológicas

CCUS Captura Uso & Almacenamiento de CO₂



Mongstad



Northern Lights



Brevik



Mergelstetten



Leilac



Cartagena

CCUS



Remociones CO₂ Tecnológicas

SbN



Remociones CO₂ Biológicas

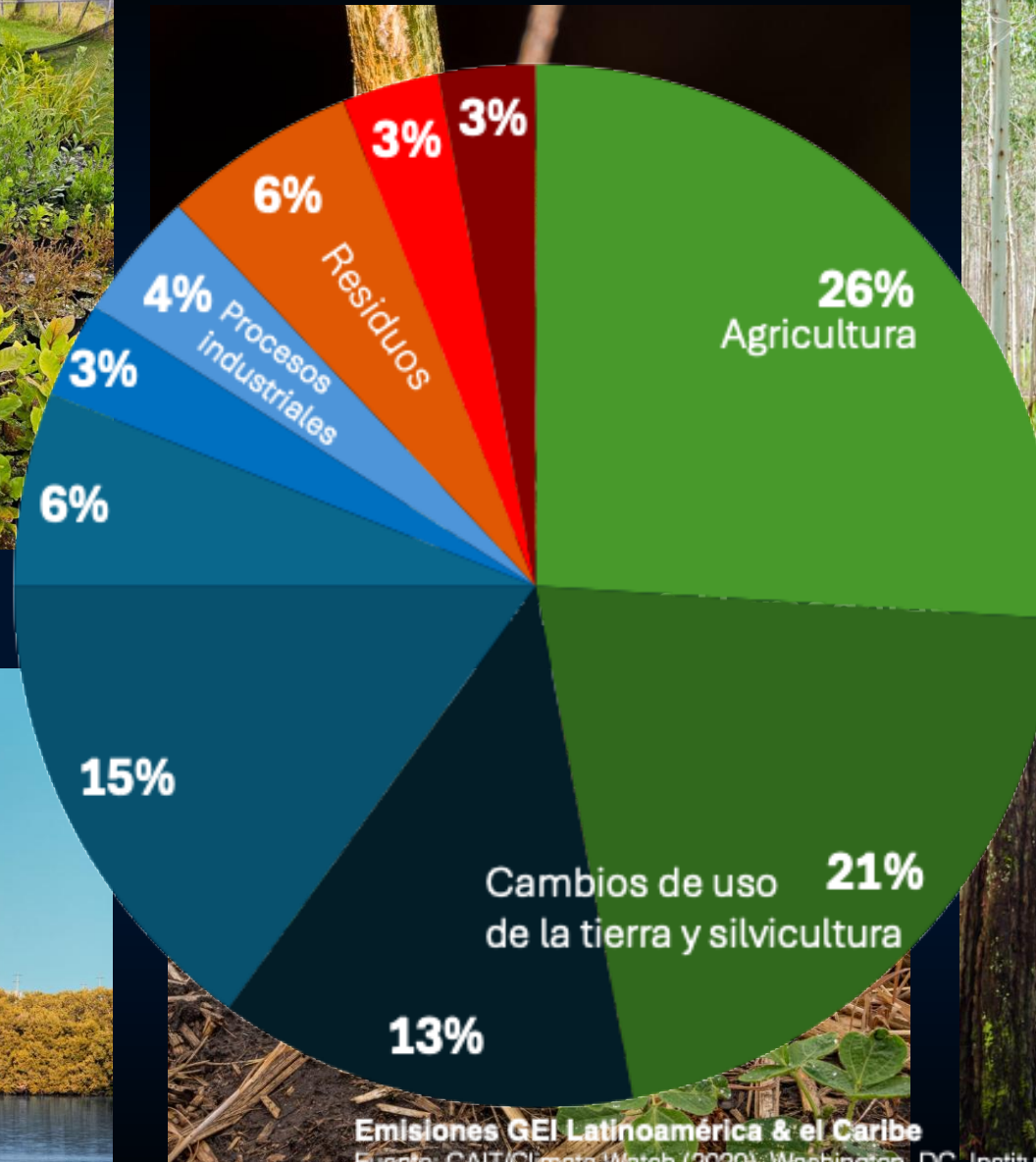
SbN Soluciones Basadas en la Naturaleza



Reforestación Nativa



Conservación Manglares



Agricultura Regenerativa



Reforestación Exótica



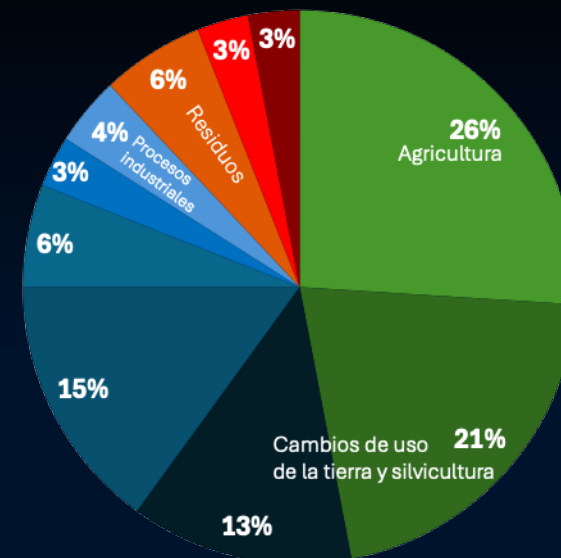
IFM: Manejo Forestal Mejorado

LIBRO DE REGLAS

IMPLEMENTACION DE PROYECTOS ELEGIBLES DE REDUCCION
DE EMISIONES DE GEI A PARTIR DE
SOLUCIONES BASADAS EN LA NATURALEZA

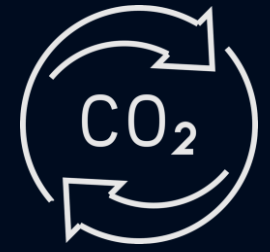
**FICEM | FEDERACION INTERAMERICANA DEL
CEMENTO Y EL CONCRETO**

Coordinación: Aldo Cerda y Ricardo Pareja
Revisión Club Climático SbN
Primera Versión: Diciembre 2025



Emisiones GEI Latinoamérica & el Caribe

Fuente: CATT/Climate Watch (2020), Washington, DC, Instituto de Recursos Mundiales

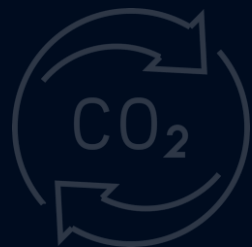


CCUS



SbN





Recarbonatación
Natural del Concreto

Our ref.: 5261-25/IPCC/TFI

To Members of the IPCC Bureau and
Task Force Bureau

Geneva, 10 November 2025

Subject: 2027 IPCC Methodology Report on Carbon Dioxide Removal Technologies, Carbon Capture, Utilization, and Storage for National Greenhouse Gas Inventories (Additional guidance)

Sir/Madam,

I have the honour of inviting you to submit nominations of experts for consideration as Coordinating Lead Authors, Lead Authors and Review Editors to contribute to the production of a Methodology Report titled "2027 IPCC Methodology Report on Carbon Dioxide Removal Technologies, Carbon Capture, Utilization, and Storage for National Greenhouse Gas Inventories (Additional guidance)".

The outline of the Methodology Report agreed by the Panel at its Sixty-third Session (Lima, Peru, 27 to 30 October 2025) is available at: [Decision IPCC-LXIII-6](https://www.ipcc.ch/site/assets/uploads/2018/09/ipcc-principles-appendix-a-final.pdf).

The terms of reference for the production of this Methodology Report are contained in Annex 1 to this decision, and the table of contents of this Methodology Report is contained in Annex 2 to this decision.

A detailed description of the IPCC writing and review process is contained in the "Procedures for the Preparation, Review, Acceptance, Adoption, Approval and Publication of IPCC Reports" which can be viewed on the IPCC website at: <https://www.ipcc.ch/site/assets/uploads/2018/09/ipcc-principles-appendix-a-final.pdf>. The tasks and responsibilities for Coordinating Lead Authors, Lead Authors, Contributing Authors, and Review Editors are specified in the Annex 1 to these procedures.

The task of Coordinating Lead Authors and Lead Authors is a demanding one. They are responsible, in particular, for drafting the different chapters of the Methodology Report and thereafter revising those taking into account comments submitted during the two IPCC-mandated reviews, namely the expert review and the second review by governments and experts.

The Coordinating Lead Authors and Lead Authors will be requested to attend four Lead Authors meetings between 2025 and 2027. The presence of Lead Authors may be requested at IPCC Plenary sessions where the Methodology Report will be adopted. The time of the Coordinating Lead Authors or Lead Authors, but not the Contributing Authors, is not included in 2026 and 2027. Contributing Authors are invited to attend the meetings.

The role of the IPCC is to assess in a comprehensive, scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation. Therefore, the IPCC requires that the nominee(s) have appropriate expertise. All nominations should indicate the chapter(s) and author role(s) for which the candidate is being nominated, a specification



Gisela Paola Córdoba

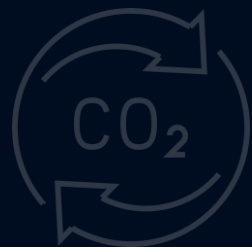
Docente en la Facultad de Ingeniería de la UNICEN
Investigadora CIC-CONICET-UNICEN
"Autora Hoja de Ruta FICEM ARGENTINA"
(Argentina)



Miguel Ángel Sanjuán

Jefe del Área de Cementos y Morteros
Instituto Español del Cemento y sus
Aplicaciones (IECA)
"Integrante Grupo Recarbonatación FICEM"
(España)

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Recarbonatación
Natural del Concreto

Desafíos

Conocimiento

Medición & Seguimiento

Marcos Regulatorios

Financiamientos





Contexto

Carbono **N**eutralidad **FICEM**

Desafíos

Conclusiones

Sector EITE

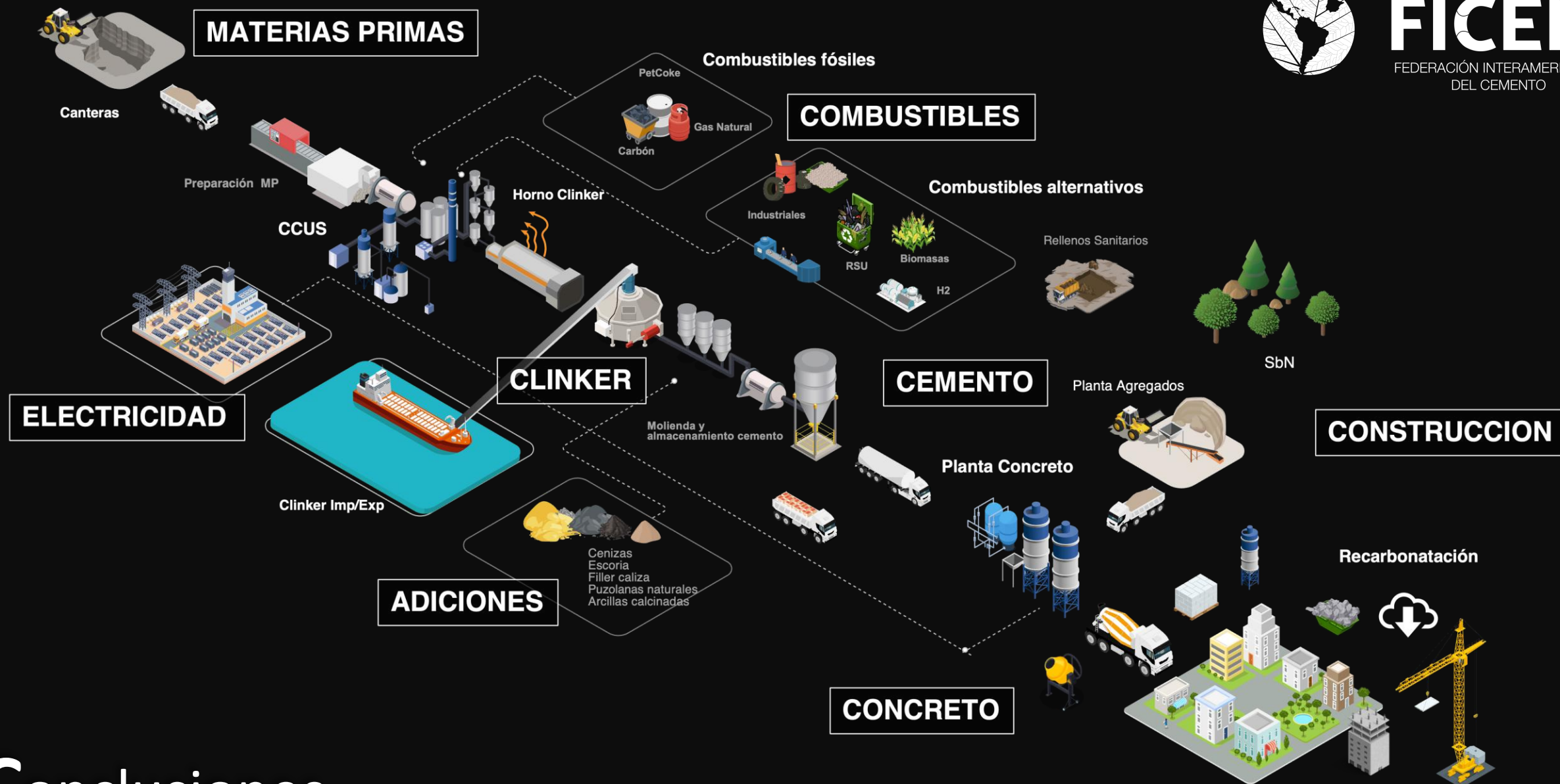
Intensivos en emisiones de CO₂
y expuestos al comercio internacional

An aerial photograph of a large red cargo ship sailing on a deep blue ocean. The ship is viewed from above, showing its long deck and multiple cargo holds. The water has a textured, wavy surface. The ship's bow is at the bottom of the frame, and its stern is at the top.

Fuga de Carbono



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DEL CEMENTO



Conclusiones
3 de 3



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