

CLIMATE GROUP
**CONCRETE
ZERO**

ConcreteZero's Global Policy Priorities

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**Policy
Report**

Heavy Industry

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What is ConcreteZero?

ConcreteZero is a global initiative led by the international non-profit Climate Group, which brings together pioneering organisations to create a market for net zero concrete. Businesses that join ConcreteZero commit to using 100% net zero concrete by 2050, with two ambitious 2025 and 2030 commitments that set a clear pathway to net zero.

By harnessing our members' collective purchasing power and influence, ConcreteZero sends a strong demand signal to shift global markets, investment and policies towards the sustainable production and sourcing of concrete.

To find out more about [ConcreteZero](https://www.climategroup.org/concretezero) and how to get involved go to www.climategroup.org/concretezero or email info@climategroup.org



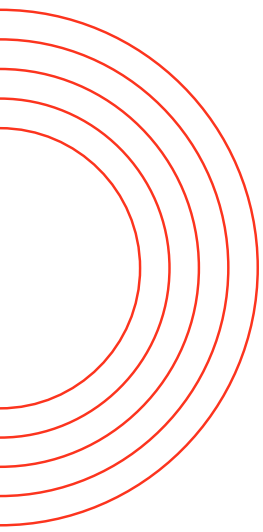


Executive Summary

Policy reform has a critical role to play in growing the market for lower-carbon and net zero concrete. The sector is characterised by large material volumes, risk-averse procurement practices, and standards and cost structures designed around incumbent materials. In many markets, current policy design and cost signals can weaken the commercial case for transition options, slowing investment and deployment.

This has resulted in a prolonged lack of progress. Since 2015, emissions from cement and concrete have not declined, and the emissions intensity of production has remained broadly unchanged. According to the International Energy Agency's Breakthrough Agenda Report 2025, total CO₂ emissions from cement and concrete are higher today than in 2015, while operational and planned near-zero cement production capacity falls short of the pace required to align with the Net Zero Emissions Scenario by 2030.¹

¹ International Energy Agency (IEA). (2025, November). **Breakthrough Agenda Report 2025: Cement and concrete**. IEA. www.iea.org/reports/breakthrough-agenda-report-2025/cement-and-concrete



Over the same period, total renewable electricity generation increased by around 60%, contributing to a measurable reduction in the power sector's emissions intensity. The contrast highlights the extent to which current market and policy frameworks are not yet delivering concrete sector decarbonisation. The world cannot afford another lost decade.

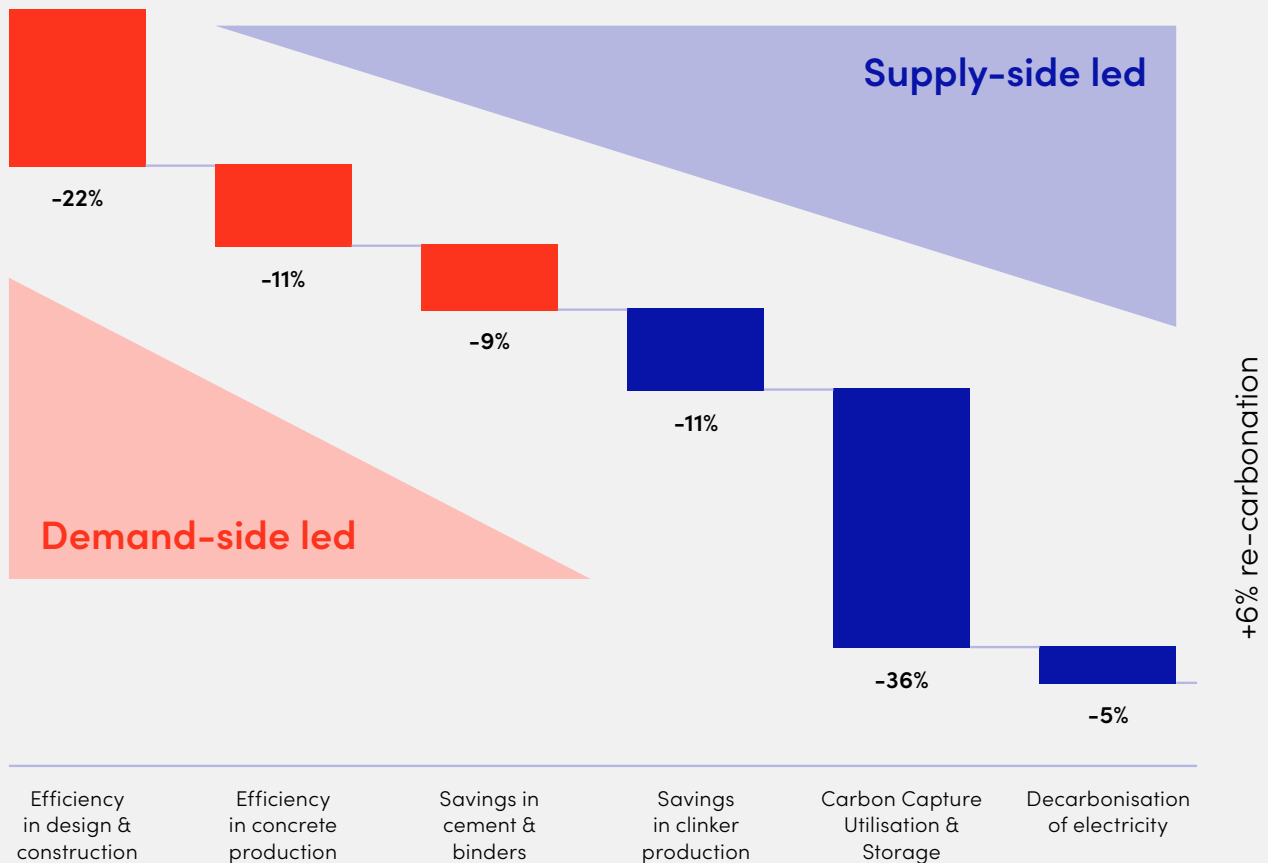
Concrete production accounts for an estimated 8% of global greenhouse gas emissions. Up to 90% of these emissions originate from the production of clinker, the main constituent of Ordinary Portland Cement (OPC). Clinker production requires high temperatures (above 1350°C), which are currently difficult to electrify at scale, and involves an inherent chemical process that directly releases CO₂.

As a result, achieving net zero concrete hinges on two complementary levers: decarbonising clinker production and maximising clinker displacement through material innovation, efficiency, and improved design and specification.

Both demand-side and supply-side actors have critical roles to play, see Figure 1. The demand side can support the transition to decarbonised clinker by growing markets for near-zero products, though higher costs remain a significant barrier. At the same time, many clinker-displacement interventions – particularly those related to material efficiency and design optimisation – can reduce costs for concrete users and their clients. Realising these opportunities requires collaboration across the value chain, supported by enabling policy frameworks.



Figure 1: Main concrete decarbonisation levers and their role in reducing emissions to net zero by 2050, reproduced from the Global Cement and Concrete Association 2050 roadmap.² Clinker-displacing levers are indicated in red and clinker-decarbonising levers in blue.



ConcreteZero launched in 2022 with a mandate from its demand-side members – contractors, engineers, architects, and clients – to address the systemic challenges to scaling net zero concrete that sit beyond the control of individual companies. Its members have committed to near-term targets to procure and specify lower-carbon concrete, leading the market ahead of wider adoption. The barriers they encounter today signal the changes required to unlock progress at scale across the sector.

² Global Cement and Concrete Association (GCCA). (2021, October). **Our Path to Net Zero**. GCCA. gccassociation.org/concretefuture/our-path-to-net-zero

To unlock market growth in lower-carbon and net zero concrete, ConcreteZero advocates for action across six Global Policy Priorities:



Support material innovation and scale-up

Create incentives, including carbon pricing, green public procurement, and advanced market commitments, to level the playing field for clinker-displacing materials, alongside public innovation funding that prioritises scalable and cost-effective technologies.



Accelerate adoption of performance-based standards

Fast-track the development, recognition, and referencing of performance-based technical standards to enable routes to market for lower-carbon concretes and reduce reliance on clinker-intensive recipes.



Improve the availability and comparability of embodied carbon data

Harmonise data standards and invest in centralised Environmental Product Declaration (EPD) infrastructure to improve transparency and comparability across markets.



Work towards embodied carbon reporting and regulation

Coordinate the phased introduction of embodied carbon disclosure requirements and limits for construction projects, with ambition strengthened over time.



Establish clear definitions and adopt existing rating systems

Promote global alignment on definitions for lower-carbon and net zero concrete and interoperable rating systems to avoid market fragmentation and greenwashing.



Invest in knowledge and skills development

Embed carbon literacy and sustainability competencies into professional qualifications and project workflows to enable effective specification and use of lower-carbon concrete.

Taken together, these actions reduce investment risk, open routes to market for innovation, and accelerate the transition to lower-carbon and net zero concrete at scale.

Methodology

This paper draws on desk-based research conducted by the ConcreteZero team, supplemented by input from members of the initiative and industry specialists. The review of market- and policy-related initiatives on the following pages aims to provide a representative overview rather than an exhaustive assessment. Readers seeking additional detail can consult the bibliography.

The Global Policy Priorities presented in this paper will guide ConcreteZero's future outreach and engagement activities. Although the analysis considers global developments, the authors acknowledge that their expertise more closely aligns with European markets. ConcreteZero therefore recognises the importance of further tailoring its engagement approach to reflect the distinct market conditions, regulatory environments, and decarbonisation pathways present in different regions.





Research Findings

1. Material innovation to reduce clinker dependence

A detailed understanding of lower-carbon concrete material innovations is required for assessing how different decarbonisation approaches influence overall costs and the pace of emissions reduction across the sector.

Ordinary Portland Cement (OPC) marked its 200th year in 2024.³ Over this period, the concrete supply chain has optimised for the efficient and competitive production of clinker-based OPC. New lower-carbon materials that reduce clinker content encounter structural challenges to scaling, as existing market and policy frameworks have been shaped around clinker-centric production.⁴

Material innovations represent a diverse, comparatively lower cost, but often more complex set of interventions compared to Carbon Capture Utilisation and Storage (CCUS), which is the main lever for decarbonising clinker. Examining the scalability of material innovations and quantifying their potential climate, economic, and social impacts supports a more complete understanding of the range of decarbonisation pathways available to the sector.

³ Chen, H., et al. (2024, October). **200 Years of Portland Cement: Technological Advancements and Sustainability Challenges**. Journal of Cleaner Production. www.sciencedirect.com/science/article/pii/S0959652624039490

⁴ Li, X., et al. (2024, June). **Decarbonising cement and concrete production: Strategies, challenges and pathways for sustainable development**. Journal of Building Engineering. www.sciencedirect.com/science/article/pii/S2352710224004297



The challenge for the demand side

Lower-carbon concrete material innovation plays a key role in enabling demand-side organisations to make progress toward material and organisational decarbonisation targets, particularly in the near term. This is relevant both to ConcreteZero members and to real estate, homebuilding, construction, and engineering companies with commitments validated by the Science Based Targets Initiative.⁵

Demand-side actors also require scalable alternatives to clinker that extend beyond currently constrained resources such as ground granulated blast furnace slag and fly ash.⁶ Broader availability of clinker-displacing materials helps ensure that carbon limits in specification and procurement processes translate into genuine emissions reductions rather than shifts in the use of limited resources between markets or applications.

Cost remains a significant consideration as reported in a joint 2024 report by Climate Group and Ramboll.⁷ A price premium for lower-carbon concrete is the most frequently cited barrier, while indirect costs – such as higher insurance premiums or the implications of longer curing times for project sequencing – also influence adoption.

Additional challenges arise in identifying suitable innovative materials, assessing their applicability, and securing supply within project timelines. These factors shape the ability of demand-side organisations to incorporate new material options at scale.

The long-term pathway to net zero concrete is uncertain, including the timing and extent of future CCUS deployment. Expanding the use of material innovations provides a means of reducing exposure to potential delays or cost pressures associated with clinker decarbonisation.⁸ Current market conditions, however, limit the extent to which these innovations can influence the clinker-centric structure of the sector.

- 5 Science Based Targets initiative (SBTi). **Target Dashboard** (accessed on 28 November 2025). SBTi. sciencebasedtargets.org/target-dashboard
- 6 Institution of Structural Engineers (IStructE). (2023, September). **Efficient Use of GGBS in Reducing Global Emissions: Guidance for Designers and Engineers**. IStructE. www.istructe.org/resources/guidance/efficient-use-of-ggbs-in-reducing-global-emissions
- 7 Climate Group. (2024, September). **The Steel and Concrete Transformation: 2024 Market Outlook on Lower Emission Steel and Concrete**. Climate Group. www.theclimategroup.org/sites/default/files/2024-11/The%20Steel%20and%20Concrete%20Transformation%20-%202024%20market%20outlook%20on%20lower%20emission%20steel%20and%20concrete%20report.pdf
- 8 World Cement Association (WCA). (2025, November). **WCA Warns European Policies Could Triple Cement Prices; Urges Balanced Approach to Decarbonisation at European Summit**. WCA. www.worldcementassociation.org/blog/member-news/wca-warns-european-policies-could-triple-cement-prices-urges-balanced-approach-to-decarbonisation-at-european-summit

Illustrative examples of market-led progress include:

- Major cement producers are integrating incubator programmes, venture partnerships, and joint pilot projects with emerging lower-carbon concrete innovators into their R&D strategies. At the same time, they are expanding the availability of clinker-displacing supplementary cementitious materials, including limestone fines and recycled cement fines.
- Demand-side organisations, particularly technology companies rapidly expanding data centre capacity, are directly supporting the growth of innovative lower-carbon concrete supply through targeted investments, and indirectly through offtake agreements that strengthen suppliers' ability to secure additional external financing.⁹
- Venture capital is increasingly active in backing pre-commercial lower-carbon concrete technologies, often in combination with public innovation funding to help bridge early-stage commercialisation gaps.
- Aggregated demand-side initiatives, such as ConcreteZero and the First Movers Coalition, are mapping and expanding routes to market for innovative lower-carbon concretes.¹⁰ While formally technology-agnostic, these initiatives can also help strengthen the investment case for specific solutions, such as calcined clays, through coordinated buying commitments, as recently demonstrated by the Task and Finish Working Group in the UK.¹¹



- 9 BusinessWire. (2025, September). **Fortera Secures Microsoft Funding for Low Carbon Cement Production**. BusinessWire. www.businesswire.com/news/home/20250923902212/en/Fortera-Secures-Microsoft-Funding-for-Low-Carbon-Cement-Production
- 10 World Economic Forum (WEF). (2025). **First Movers Coalition: Cement and Concrete Sector Overview**. WEF. initiatives.weforum.org/first-movers-coalition/cement-and-concrete
- 11 Concrete Society (UK). (2024, December). **Discussion Document: Calcined Clay**. Concrete Society. www.concrete.org.uk/discussion-document-calcinedclay

Illustrative examples of supportive policy interventions include:

- Carbon pricing, implemented through the phase-out of free allocation for clinker-based cement within Emissions Trading Schemes, and supported by carbon border adjustment mechanisms, helps level the playing field for clinker-displacing material innovation. Both the UK and EU are progressing towards full phase-out of free allocation by the mid-2030s.¹²
- Although not a material innovation, CCUS deployment on clinker production is receiving substantial public financial support to overcome high capital costs. The Global Cement and Concrete Association (GCCA) anticipates that ten industrial CCUS installations will be operational globally by 2030.¹³
- Lower-carbon concrete is becoming an increasing focus for green public procurement, from the Biden-era US (Federal Buy Clean Initiative),¹⁴ to Germany's Sustainability Criteria for Federal Procurement to Singapore's Green Mark Scheme.¹⁵ Introducing embodied carbon limits, mandatory measurement and reporting, and adjusting procurement weighting to balance cost with carbon performance can significantly expand markets for lower-carbon concrete.
- The UK's Advanced Market Commitment project, funded by Innovate UK, has established a mechanism through which demand-side actors commit to time-bound offtake agreements for innovative concretes that have not yet reached commercial scale. This approach helps suppliers attract the investment required to bring new materials to market.¹⁶
- Public innovation funding is supporting the progression of lower-carbon concrete technologies from R&D through pilot phases to commercial deployment. Programmes in the UK (Innovate UK), the US (Advanced Research Projects Agency), and China (Ministry of Industry & Information Technology) are among those providing critical early-stage support.

12 UK Government. (2025, November). **UK Emissions Trading Scheme: Free Allocation Review – Main Authority Response**. UK Government. www.gov.uk/government/consultations/uk-emissions-trading-scheme-free-allocation-review/outcome/uk-emissions-trading-scheme-free-allocation-review-main-authority-response-accessible-webpage

13 Global Cement and Concrete Association (GCCA). (2023, September). **CCUS Policy Document**. GCCA. gccassociation.org/wp-content/uploads/2023/09/GCCA_CCUS_Policy_Document_Digital.pdf

14 Columbia Law School, Sabin Center for Climate Change Law. (2025, March). **Cancelling the Buy Clean Program**. Columbia University. blogs.law.columbia.edu/climatechange/2025/03/26/cancelling-the-buy-clean-program

15 World Resources Institute (WRI). (2025, July). **Green Procurement Initiatives**. WRI. www.wri.org/insights/green-procurement-initiatives

16 Innovate UK. (2025, December). **Innovate UK and Partners Launch Advanced Market Commitment for Low Carbon Concrete**. Innovate UK. iuk-business-connect.org.uk/news/innovate-uk-and-partners-launch-amc-for-low-carbon-concrete



2. Enabling innovation through performance-based standards

The accelerated adoption of performance-based technical standards for concrete is important for creating viable routes to market for low- and no-clinker materials globally.

Technical standards play a critical role in safeguarding concrete performance, ensuring safety, durability, and consistency across applications. Compliance with these standards is a prerequisite for regulatory approval and market access. Only performance-based standards provide the flexibility required to accommodate both current and emerging innovative materials. In contrast, prescriptive, recipe-based standards typically centred on high-clinker formulations, constrain innovation and market uptake of innovative materials.

The challenge for the demand side

Concrete material innovators tend to avoid markets where technical standards or related regulatory frameworks create barriers to entry, limiting the range of decarbonisation solutions available to demand-side organisations.

To be legally deployed, concrete must meet the relevant technical standards in each jurisdiction. These standards are also referenced in quasi-regulatory instruments, including warranty requirements for new homes and insurance policies, further reinforcing their influence on market access.

Introducing performance-based standards can represent a significant shift in how concrete is specified and procured. Demonstrating compliance requires testing that must be built into project budgets, resource plans, and timelines. Growing knowledge and capability, particularly through the sharing of lessons across materials, applications, and markets, can support the effective uptake of performance-based standards and help accelerate their impact.

Efforts to streamline performance testing should also be prioritised, provided they remain aligned with established risk-based frameworks. Highly application-specific testing requirements limit opportunities to transfer learnings across contexts, while the absence of widely accepted reference values for performance benchmarks places innovative materials at a disadvantage relative to established concretes governed by prescriptive standards.

Illustrative examples of market-led progress include:

- The Alliance for Low Carbon Cement & Concrete is advocating for standards and regulatory regimes that create a level playing field for its members' products relative to incumbent clinker-based technologies.¹⁷
- National Standards Bodies, typically independent but aligned with government, continue to develop and update concrete standards, including performance-based approaches that enable innovation. Examples include Deutsches Institut für Normung in Germany, British Standards Institution (BSI) in the UK, and Standards Australia, alongside voluntary standard setting organisations such as the American Society for Testing and Materials (ASTM) in the United States.
- In the UK, BSI has introduced a code of practice for the use of alternative binder systems (non-clinker-based cements) in concrete. Implemented in 2023, this framework is expected to evolve further through stakeholder engagement, with the long-term aim of transitioning into a full British standard.
- ASTM standards, particularly C1157 and C1709, provide a route to market for any binder that meets defined strength, durability, and safety criteria. Their incorporation into American Concrete Institute (ACI) codes and International Code Council (ICC) building codes gives these standards a quasi-regulatory function in practice.¹⁸

Illustrative examples of supportive policy interventions include:

- Innovate UK, through its 2024 Decarbonising Concrete funding competition, is supporting lower-carbon concrete innovations by enabling design-assisted testing aligned with the BSI Flex 350 standard, including applications involving calcined clays and recycled concrete fines.¹⁹
- Singapore's Building and Construction Authority has developed guidance for the deployment of innovative concrete solutions, including a structured process for design assisted by testing, to facilitate safe and effective market entry.²⁰
- The EU's Cement Standards Committee (CEN/TC 51) is undertaking a comprehensive revision of European cement standards to incorporate alternative binder systems and to establish the associated test methods and conformity assessment frameworks. Outcomes are anticipated between 2026 and 2028.²¹

17 Alliance for Low-Carbon Cement & Concrete (ALCCC). (2025). **Alliance for Low-Carbon Cement & Concrete**. ALCCC. alliancelccc.com

18 International Code Council (ICC). (2024). **ASTM C1157 / C1157M 17 Standard Performance Specification for Hydraulic Cement**. ICC. codes.iccsafe.org/content/ASTM-C1157-C1157M-17

19 UK Research and Innovation (UKRI). (2024). **Innovate UK invests £3.2 million in concrete decarbonisation**. UKRI. www.ukri.org/news/innovate-uk-invests-3-2-million-in-concrete-decarbonisation

20 Building and Construction Authority (BCA). (2025, June). **Innovative Concrete Solutions: Design Assisted Testing Guidance**. BCA. www1.bca.gov.sg/docs/default-source/_wp-tmp/bca_innovative-concrete-solutions-fa-jun25v3.pdf

21 Environmental Coalition on Standards (ECOS). (2024, December). **European Cement Standards – All You Need to Know**. ECOS. ecostandard.org/publications/european-cement-standards-faq

3. Improving embodied carbon data quality and comparability

The demand side requires clear and comparable data on the embodied carbon of concrete products to inform effective carbon-reduction strategies.

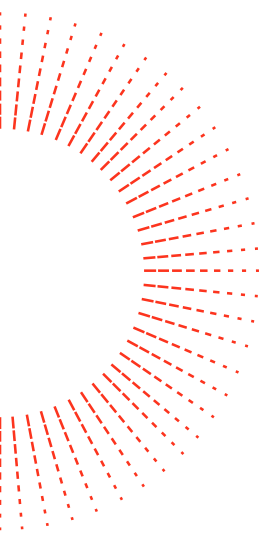
Upfront embodied carbon, also referred to as cradle-to-gate emissions or Life Cycle Assessment (LCA) stages A1–A3, captures the emissions associated with all upstream processes involved in producing a material. For concrete, these stages typically account for more than 80% of total lifecycle emissions, underscoring their vital importance in decarbonisation efforts.²²

The industry standard source of embodied carbon data is third party-verified Environmental Product Declarations (EPDs), which summarise LCA results in accordance with Product Category Rules (PCRs). Product Carbon Footprints, when produced using EPD-compliant data and methodologies, can also offer a streamlined means of obtaining batch-specific embodied carbon information.

However, the demand side faces significant challenges. Variations in LCA assumptions and inconsistencies between PCRs across EPD programmes mean that like-for-like comparisons of environmental performance are often unreliable or discouraged.



²² Arup. (2024). **Embodied Carbon Classification Scheme for Concrete**. Arup. www.arup.com/globalassets/downloads/insights/e/embodied-carbon-classification-scheme-for-concrete/embodied-carbon-classification-scheme-for-concrete-report.pdf



The challenge for the demand side

Robust, comparable embodied carbon data is necessary for enabling demand-side organisations to specify and use concrete efficiently, and to prioritise lower-carbon options through design and procurement decisions. When embodied carbon information is ambiguous or inconsistent, it becomes difficult to confidently direct procurement towards market leading materials and supply chains.

The current data landscape is fragmented and often poorly understood by those responsible for tracking progress against carbon targets or communicating performance. Differences in greenhouse gas accounting practices across markets, for example, whether clinker-production emissions are reported on a “gross” or “net” basis, depending on the treatment of fossil-derived waste fuels, further complicate comparability. Emerging alternative chain-of-custody approaches may introduce additional uncertainty if not aligned with established accounting frameworks.^{23, 24}

Illustrative examples of market-led progress include:

The availability of EPDs for concrete and its constituent materials is increasing, supported by industry associations that provide calculation tools and guidance to their members.^{25, 26}

- Technology providers are enabling ready-mix producers to generate mix-specific EPDs - an important development given that individual batching plants may produce tens of thousands of unique mixes each year.
- The ConcreteZero reporting framework facilitates embodied carbon calculations using the best available supply chain-specific data combined with carbon estimates based on specified mix designs and consistent default emission factors. This offers a pragmatic approach to improving comparability as the data landscape continues to evolve.
- Market-level benchmarking initiatives, which develop representative embodied carbon profiles for concrete across regions or product categories, are drawing greater attention to the availability, quality, and consistency of underlying product-level data.²⁷

23 Global Cement and Concrete Association (GCCA). (2025). **Cement and Concrete Industry Decarbonisation Progress Report 2025/26** [LinkedIn post]. GCCA. www.linkedin.com/posts/gcca-global-cement-concrete-association_netzero-decarbonisation-cement-activity-7409171124258762753-z6tf

24 Center for Green Market Activation (GMA). (2025). **Cement & Concrete: Introducing the Sustainable Concrete Buyers Alliance**. GMA. gmacenter.org/program/cement-concrete

25 Global Cement and Concrete Association (GCCA). (2025). **GCCA EPD Tool**. gccaepd.org/tool

26 National Ready Mixed Concrete Association (NRMCA). (n.d.). **Environmental Product Declarations**. NRMCA. www.nrmca.org/association-resources/sustainability/environmental-product-declarations

27 UK Low Carbon Concrete Group (LCCG). (2025). **LCCG Market Benchmark**. LCCG. www.lccg.uk/home/current-activities/lccg-market-benchmark

Illustrative examples of supportive policy interventions include:

Embodied carbon data and measurement focused interventions fall into two main categories:

- Policy measures that mandate embodied carbon disclosure, often via EPDs, thereby increasing data availability:
 - The Buy Clean California Act, which also sets maximum global warming potential thresholds for high-intensity construction materials, including concrete, used in publicly funded projects.²⁸
 - The London Plan, which requires whole-life carbon assessments for proposed developments and encourages the use of EPD-based data.²⁹
 - Statsbygg in Norway, which mandates the use of EPDs to demonstrate compliance with embodied carbon targets for public buildings.³⁰
 - The EU’s 2025 update to the Construction Products Regulation, which introduces Digital Product Passports requiring environmental sustainability information supported by EPDs.³¹
 - Initiatives in Asia, including Singapore’s Green Mark scheme and China’s National Green Product Certification programme, which promote the development and use of EPDs for concrete.^{32, 33}



- 28 California Department of General Services (DGS). (2023, February). **Buy Clean California Act: Environmental Product Declaration (EPD) Compliance Guide**. DGS. www.dgs.ca.gov/-/media/Divisions/PD/Engineering/EPP/Buy-Clean-California-Act/BCCA-EPD-compliance-guide-final-1-23-23.pdf
- 29 Greater London Authority (GLA). (2022, March). **Whole Life Cycle Carbon Assessments guidance**. GLA. www.london.gov.uk/programmes-strategies/planning/implementing-london-plan/london-plan-guidance/whole-life-cycle-carbon-assessments-guidance
- 30 Loli, A., et al. (2025, July). **Setting benchmark values for apartment blocks in Norway as the basis for GHG emission reduction along the building process**. Building and Environment. www.sciencedirect.com/science/article/pii/S0360132325006080
- 31 European Commission (EC), Directorate General for Internal Market, Industry, Entrepreneurship and SMEs. (2025, January). **New EU rules on the safety and sustainability of construction products mark a new step for the sector’s competitiveness**. EC. single-market-economy.ec.europa.eu/news/new-eu-rules-safety-and-sustainability-construction-products-mark-new-step-sectors-competitiveness-2025-01-07_en
- 32 Singapore Green Building Council (SGBC). (n.d.). **SGBC Green Certification Schemes**. SGBC. www.sgbc.sg/sgbc-certifications
- 33 State Council of the People’s Republic of China. (2026, January). **China updates green product rules to tighten oversight**. State Council of the People’s Republic of China. english.www.gov.cn/news/202601/04/content_WS695a31f6c6d00ca5f9a08649.html

- Policy interventions aimed at improving data consistency while managing industry costs:
 - The Netherlands’ Nationale Milieu Database, a government supported database of EPDs and LCAs for building products, which is maintained as a national reference source.³⁴
 - France’s Institut National de l’Énergie Solaire database, the official repository of construction-related EPDs used to demonstrate compliance with the national RE2020 building code, with government support provided for EPD creation and verification.³⁵
 - Ongoing EU consideration of a centralised or federated EPD database to support the rollout of Digital Product Passports, including for construction materials.



34 Stichting Nationale Milieudatabase. (n.d.). **Databases: Nationale Milieudatabase.** Nationale Milieudatabase. milieudatabase.nl/en/database

35 Institut National de l’Énergie Solaire (INIES). (n.d.). **INIES: Reference environmental and health data for buildings and RE2020.** INIES. www.inies.fr/en



4. Reporting and regulatory frameworks for embodied carbon

Including embodied carbon limits within voluntary and regulatory reporting frameworks creates a strong market pull for lower-carbon materials and for the actionable data required to inform carbon-reduction interventions across the value chain.

The challenge for the demand side

Consistent and detailed reporting on the embodied carbon of concrete enables project teams to integrate carbon considerations alongside cost and programme in design and construction decision making.

However, identifying and implementing marginal reductions in embodied carbon becomes significantly more difficult when data from as built projects are unavailable, inconsistent, or insufficiently granular to support meaningful analysis. Without reliable data, opportunities to optimise design choices, material selection, and construction methodologies are harder to capture.

For most demand-side organisations, the collection, management, and reporting of embodied carbon data across complex project structures is a new undertaking. Establishing effective reporting practices requires new processes and ways of working, supported by team upskilling, carbon management systems, and digital tools. In many cases, a clear business case must be developed to justify the investment of time and resources needed to embed these capabilities.



Illustrative examples of market-led progress include:

- Voluntary project-level reporting on whole-life carbon, including embodied carbon, has increased visibility of concrete's substantial contribution to overall emissions. Certification schemes such as LEED, RICS, BREEAM in the UK, DGNB in Germany, Green Star in Australia, and Canada's Zero Carbon Building Standard have played a significant role in elevating this focus.^{36, 37, 38}
- A consortium of UK construction industry leaders has called for the introduction of mandatory whole-life cycle emissions reporting and legally binding limits on upfront embodied carbon for buildings, signalling growing market appetite for regulatory clarity and ambition.³⁹
- PAS 2080, the standard for carbon management in infrastructure, places emphasis on early-stage carbon reduction and supply chain collaboration. It supports a shift from top-down reporting for certification purposes to a bottom-up approach that enables more effective decision making on material selection, design optimisation, and construction methodologies.⁴⁰
- Technology solutions that streamline the collection, management, and reporting of concrete-related data, including embodied carbon metrics, are improving the efficiency and consistency of reporting across complex projects. Building Information Management (BIM) models also continue to evolve to support project-level carbon assessments.⁴¹
- ConcreteZero has developed a reporting framework tailored to the information needs of demand-side organisations, fostering a positive feedback loop between those specifying concrete and those placing it.

36 JLL. (n.d.). **Green certifications up the ante on long-term building performance.** JLL.

www.jll.com/en-uk/insights/green-certifications-up-the-ante-on-long-term-building-performance

37 Green Building Council of Australia (GBCA). (n.d.). **Our Green Star strategy.** GBCA. new.gbca.org.au/green-star/green-star-strategy

38 Canada Green Building Council – Zero Carbon Building Standard
Canada Green Building Council (CaGBC). (n.d.). **Zero Carbon Building Standard.**
CaGBC: www.cagbc.org/our-work/certification/zero-carbon-building-standard

39 Part Z. (2022). **Part Z: Embodied carbon requirements.** Part Z. part-z.uk

40 British Standards Institution (BSI). (2023). **PAS 2080: Carbon management in infrastructure and the built environment.** BSI. www.bsigroup.com/en-GB/insights-and-media/insights/brochures/pas-2080-carbon-management-in-infrastructure-and-built-environment

41 World Business Council for Sustainable Development (WBCSD). (2025, September). **A guide to alignment in the built environment.** WBCSD. www.wbcd.org/resources/a-guide-to-alignment-in-the-built-environment

Illustrative examples of supportive policy interventions include:

Mandatory whole-life carbon reporting requirements, whether applied to all new developments or targeted at specific categories such as public buildings or large projects, create a strong market pull for embodied carbon reporting. When these measures also introduce embodied carbon limits that can only be met through design, construction, or material innovation, they further incentivise granular, bottom-up reporting on concrete.

- In the Nordic region, Denmark, Sweden, and Finland have introduced whole-life carbon reporting for buildings and have either implemented, piloted, or signalled forthcoming embodied carbon limits.⁴²
- Denmark, through BR18, reduced its whole-life carbon limit by 40% in 2024, while France's RE2020 framework is phasing in a similar scale of reduction between 2022 and 2031.⁴³



42 Nordic Council of Ministers – Nordic Innovation. (2024, March). **Harmonised carbon limit values for buildings in Nordic countries: Analysis of the different regulatory needs.** Nordic Council of Ministers. www.norden.org/en/publication/harmonised-carbon-limit-values-buildings-nordic-countries-analysis-different-regulatory

43 2050 Materials. (2024, August). **Mapping Europe's whole life carbon policy landscape (BPIE 2024).** 2050 Materials: 2050-materials.com/blog/mapping-europes-whole-life-carbon-policy-landscape-bpie-2024

5. Establishing clear definitions and globally aligned rating systems

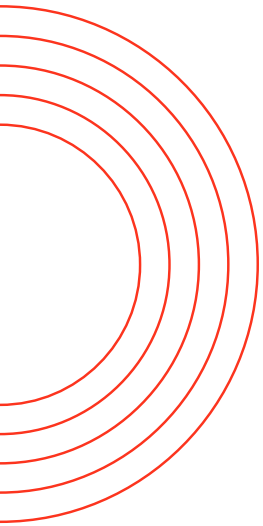
Using existing definitions and rating systems can streamline global collaboration and coordination in reducing the embodied carbon of concrete.

The challenge for the demand side

Clear, widely recognised definitions and rating systems enable demand-side organisations to direct specifications and procurement towards materials and production processes that genuinely displace high-emission alternatives. In the absence of such clarity, or where multiple, non-aligned systems coexist, it becomes significantly harder for demand-side actors to communicate expectations to suppliers, benchmark performance across projects and markets, or articulate requirements to other stakeholders.

Demand for lower-carbon materials can be weakened or misdirected when a shared, precise vocabulary has not yet emerged. Terms such as “green concrete” or “low-emission concrete” are interpreted inconsistently across supply chains and geographies, creating scope for confusion, reduced credibility, and inadvertent greenwashing. Rating or certification systems developed at national or regional levels are often not interoperable, while global systems remain in early stages of adoption, limiting opportunities for international alignment. Definitions and rating systems that are insufficiently differentiated from business-as-usual risk dampening ambition rather than accelerating progress.

Businesses are increasingly calling for clarity on the carbon impact of the concrete they procure, enabling them to communicate consistently and make informed decisions with project teams and external stakeholders.⁷





Illustrative examples of market-led progress include:

- A recent review of embodied carbon rating systems highlights the risk that, without attention to interoperability, divergence between systems could impede international cooperation.⁴⁴
- The GCCA has developed a globally applicable rating system that accommodates variations in concrete classification and greenhouse gas accounting across markets.⁴⁵
- ConcreteZero has established a Low Embodied Carbon Concrete Threshold that underpins members' near-term decarbonisation targets. By incorporating the concept of "equivalency," this definition can be mapped onto both global and market-specific rating systems.⁴⁶

Illustrative examples of supportive policy interventions include:

- The International Energy Agency's work on definitions for near-zero and low-emissions cement (and steel) reflects emerging international alignment among governments on these terms.⁴⁷
- The United Nations Industrial Development Organization's Industrial Deep Decarbonization Initiative (IDDI) collaborates with participating governments to expand public procurement of low- and near-zero-emission concrete (and steel). Harmonising global standards and establishing consistent approaches to embodied carbon data collection and reporting are central to this effort.⁴⁸
- In the UK, a signatory to the IDDI Green Public Procurement Pledge, the government is consulting on product classifications for concrete (and steel) as a precursor to integrating these classifications into procurement frameworks for publicly funded projects.
- Cement and concrete are also a focus of the ongoing update to the EU Public Procurement Criteria Directive, where the introduction of mandatory carbon limits, referencing rating systems, is under consideration.⁴⁹

44 Munro, M., et al. (2024, December). A critical review of embodied carbon classification schemes for concrete. Case Studies in Construction Materials. www.sciencedirect.com/science/article/pii/S2214509524011732

45 Global Cement and Concrete Association (GCCA). (2025, April). **Global Low Carbon Ratings (LCR) for cement and concrete (concrete ratings page)**. GCCA. gccassociation.org/lcr-concrete

46 Climate Group. (2024, December). **ConcreteZero Commitment Framework and Campaign Overview**. Climate Group. www.theclimategroup.org/media/29636/download

47 International Energy Agency (IEA). (2024, November). **Definitions for near-zero and low-emissions steel and cement, and underlying emissions measurement methodologies**. IEA. www.iea.org/reports/definitions-for-near-zero-and-low-emissions-steel-and-cement-and-underlying-emissions-measurement-methodologies

48 United Nations Industrial Development Organization (UNIDO). (2024, October). **An overview of the Industrial Deep Decarbonisation Initiative (IDDI)**. UNIDO. www.unido.org/sites/default/files/unido-publications/2024-10/FINAL-IDDI-factsheet_updated-2024.pdf

49 Bellona Europa. (2024, October). **Green Public Procurement of cement and steel in the EU: An overview of the state of play**. Bellona Europe. eu.bellona.org/publication/gpp-of-cement-and-steel-in-the-eu

6. Building capability for lower-carbon concrete specification

Construction project teams need to be equipped with the skills and knowledge required to contribute effectively to the specification and use of lower-carbon concrete.

The challenge for the demand side

Transitioning from a traditional, linear specification process to a more iterative and collaborative approach that enables the exploration and adoption of lower-carbon concrete, can be constrained by existing contractual structures and the roles and responsibilities they define.

A collaborative, iterative process allows project teams to identify carbon-reduction opportunities by collectively examining and challenging concrete performance requirements. A deeper understanding of these requirements also strengthens the ability to manage risks related to cost, programme, and carbon budgets particularly when unplanned changes to concrete specifications arise.

Developing skills and knowledge across project teams, especially among those responsible for approving the use of lower-carbon concrete, is central to embedding carbon considerations into material, design, and construction decisions.





Illustrative examples of market-led progress include:

- Professional bodies across the construction sector are integrating sustainability and climate literacy into professional standards and qualification pathways. This includes updates to professional review processes to reflect the need for ongoing continuous professional development in these areas. Examples include the Institution of Civil Engineers and the Royal Institute of British Architects.^{50, 51}
- Industry groups are producing guidance on best practice for specifying and using lower-carbon concrete. Examples include concrete specific resources such as the North America focused Lower Carbon Concrete Guide and the ConcreteZero Specification Guidance.^{52, 53} There is also guidance from the UK and Hong Kong that includes concrete alongside other construction products.^{54, 55}

Illustrative examples of supportive policy interventions include:

- New Zealand's Ministry of Business, Innovation and Employment is supporting carbon-literacy training for architects, engineers, and contractors to underpin the whole-life-carbon assessments that became mandatory for new building projects in 2025.⁵⁶
- Governments can embed carbon literacy within construction sector education by updating National Qualification Frameworks. France's Répertoire National des Certifications Professionnelles provides an example of this approach.⁵⁷

50 Royal Institute of British Architects (RIBA). (n.d.). **Sustainable architecture: RIBA core curriculum CPD materials**. RIBA. www.ribacpd.com/browse-riba-core-curriculum/sustainable-architecture/hV1bKJ5mSzoqWzwGBAoaqX

51 Institution of Civil Engineers (ICE). (n.d.). **Sustainable development: CPD resources and learning materials**. ICE. knowledgehub.ice.org.uk/cpd/sustainable-dev

52 Lower Carbon Concrete Task Force. (2025). **Lower-Carbon Concrete Guide**. Lower Carbon Concrete Task Force. lowercarbonconcrete.org/guide

53 Climate Group. (2025, April). **ConcreteZero Specification Guidance**. Climate Group. www.theclimategroup.org/sites/default/files/2025-05/Climate%20Group%2025476%20-%20ConcreteZero%20-%20Specifications%20Report.pdf

54 London Energy Transformation Initiative (LETI). (2023, March). **Low Embodied Carbon Specification and Procurement Guide**. LETI. www.leti.uk/specification

55 RESET Carbon. (2024, September). **Transforming the built environment: Technical procurement guideline on low embodied carbon construction**. RESET Carbon. resetcarbon.com/en/transforming-the-built-environment-our-technical-procurement-guideline-on-low-embodied-carbon-construction

56 ArchiPro. (2024, June). **How will 2025 mandatory carbon counting impact architecture?** ArchiPro. archipro.co.nz/article/how-will-2025-mandatory-carbon-counting-impact-architecture-tm-consultants-ltd

57 France Compétences. (n.d.). **Glossaire: RNCP**. France Compétences. www.francecompetences.fr/glossary/rncp

Conclusion

Concrete decarbonisation remains one of the most significant and urgent challenges in meeting global climate objectives.

Despite increased awareness and a growing number of commitments, progress on emissions reduction since 2015 has been minimal. Emissions from cement and concrete continue to rise, and the emissions intensity of production has remained effectively static. This stagnation highlights the limitations of current market structures and policy frameworks in enabling a credible transition to net zero concrete. Decisive action is especially urgent in rapidly developing economies, where concrete demand is both high and accelerating.

Demand-side actors, such as contractors, engineers, architects, and clients, have shown leadership through initiatives such as ConcreteZero. However, despite the market and policy-led interventions highlighted in this paper, systemic barriers persist across technical standards, material innovation, data quality, reporting practices, and the absence of clear, interoperable definitions. Without targeted intervention, the sector risks repeating the past decade's lack of progress, placing the 2050 net zero goal at serious risk.





The transition to net zero concrete depends on two core levers: decarbonising clinker production and maximising clinker displacement. While CCUS may play a role in addressing process emissions, its long-term scalability and cost trajectory remain uncertain. By contrast, material innovations that reduce clinker content offer more immediate, cost-effective mitigation potential, yet these solutions continue to face barriers in market access, technical acceptance, and investment readiness. Fragmented data systems and inconsistent rating frameworks further impede informed decision-making and international coordination.

ConcreteZero calls for the prioritisation of immediate, high impact interventions.

Evidence from this policy and market review indicates that measures which accelerate clinker displacement can deliver near-term, cost-effective emissions reductions; accordingly, we prioritise policy options that accelerate clinker displacement and support material innovation.

Achieving net zero concrete will require coordinated action that aligns market driven innovation with coherent, enabling policy frameworks. By addressing systemic barriers and strengthening collaboration across the value chain, the sector can unlock the full potential of lower-carbon materials and avoid another decade of missed opportunity.



Bibliography

Agora Industry. (2024, July). **Creating markets for climate-friendly basic materials**. Agora Industry. www.agora-industry.org/publications/creating-markets-for-climate-friendly-basic-materials

Bellona Europa. (2024). **Green Public Procurement of Cement and Steel in the EU: An overview of the state of play**. Bellona Europa. network.bellona.org/content/uploads/sites/6/2024/10/Report-GPP.pdf

Breakthrough Agenda / IEA. (2025). **The Breakthrough Agenda Report 2025**. IEA. iea.blob.core.windows.net/assets/6f3b4ad7-b1aa-4791-b363-e4efe58cbb83/BreakthroughAgendaReport2025.pdf

Carbon Leadership Forum (CLF). (2024, May). **CLF Embodied Carbon Policy Toolkit**. CLF. carbonleadershipforum.org/clf-policy-toolkit/

Cembureau (Cement Europe). (2024, November). **Creating Lead Markets for Low-Carbon Cements: The policies needed from now until 2030**. Cement Europe. www.cembureau.eu/media/uspdkbic/241114-cembureau-position-paper-creating-lead-markets-for-low-carbon-cements-final.pdf

ClearPath. (2024, February). **Paving the Way to Innovation: Moving from Prescriptive to Performance Specifications to Unlock Low-Carbon Cement, Concrete and Asphalt Innovations**. ClearPath. clearpath.org/wp-content/uploads/sites/44/2024/02/202402_PBS-Research-Report_Final.pdf

Climate Neutral Cities Alliance (CNCA). (2021). **City Policy Framework for Dramatically Reducing Embodied Carbon**. CNCA. carbonneutralcities.org/wp-content/uploads/2021/02/City-Policy-Framework-for-Dramatically-Reducing-Embodied-Carbon.pdf

European Environmental Citizens' Organisation for Standardisation (ECOS). (2024, December). **European cement standards – all you need to know**. ECOS. ecostandard.org/publications/european-cement-standards-faq/

ECOS. (2024, November). **Buy better to build better: Driving public purchase towards green construction products**. ECOS. ecostandard.org/publications/report-buy-better-to-build-better-driving-public-purchase-towards-green-construction-products/

Future Cleantech Architects (FCA). (2024, December). **Decarbonizing the Cement and Concrete Industry: Cement EU Policy Brief**. FCA. fcarchitects.org/wp-content/uploads/2024/12/Policy-Brief-Decarbonizing-Cement-and-Concrete.pdf

Global Cement and Concrete Association (GCCA). (2021, October). **Concrete Future: The GCCA 2050 Cement and Concrete Industry Roadmap for Net Zero Concrete**. GCCA. globalabc.org/sites/default/files/2023-09/GCCA-Concrete-Future-Roadmap-Document.pdf

National Institute of Urban Affairs, Rocky Mountain Institute (RMI). (2025, May). **Build Right First Time: Scaling Adoption of Net-Zero Carbon Buildings in India**. RMI. rmi.org/wp-content/uploads/dlm_uploads/2025/05/build_right_the_first_time-2.pdf

China Building Materials Federation; RMI. (2024). **Opening Early Market for Low-Carbon Building Materials in China: Executive Summary**. RMI. rmi.org/insight/opening-early-market-for-low-carbon-building-materials-by-public-procurement-in-china/?submitted=1#thank-you



Appendix

Matrix mapping ConcreteZero's Global Policy Priorities to the key policymaking bodies responsible for implementation across national, subnational, standards, and quasi-regulatory domains.

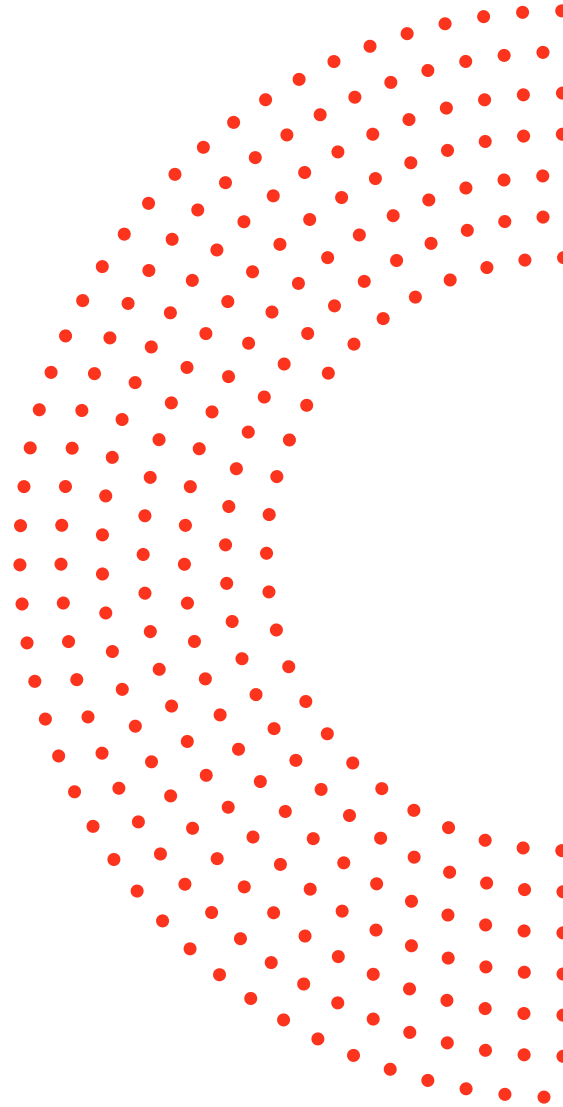
	Central Government	Subnational governments	Standards bodies	Warranty providers (as an example of a quasi-regulatory body)
1. Support material innovation and scale-up	Incentivise interventions in clinker-displacing materials, including innovation funding and green public procurement			
2. Accelerate adoption of performance-based standards			Fast-track development of performance-based standards	Fast-track recognition of performance-based standards
3. Improve the availability and comparability of embodied carbon data	Invest in centralised EPD databases		Harmonise embodied carbon data standards	
4. Work towards embodied carbon reporting and regulation	Set limits on and require disclosure of embodied carbon on construction projects			
5. Establish clear definitions and adopt existing rating systems	Promote alignment on definitions for lower-carbon and net zero concrete			
6. Invest in knowledge and skills development	Embed carbon literacy in professional qualifications and project workflows			



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Policy reform has a critical role to play in growing the market for lower-emission and net zero concrete.

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