Global Cement and Concrete Association

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GCCA Policy Document on CCUS

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Global Cement and Concrete Association (GCCA) is registered in England & Wales, Company No 11191992

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Position Statement

Carbon capture utilisation and storage (CCUS) is a critical lever in the GCCA 2050 cement and concrete industry roadmap to net zero concrete. This is the case even with all other CO_2 emission reduction technologies and new cement solutions being utilised.

The cement industry is committed to developing the capture technologies. It is investing in research, developing pilot plants, and is embarking on industrial scale facilities. The industry has committed to applying carbon capture technology at industrial scale in ten plants by 2030.

Governments have a fundamental role to facilitate development of carbon capture in the cement sector in this decade and scaling it up from 2030. Supportive policy frameworks are required in the areas of financing, carbon accounting, carbon pricing and demand for low carbon products. Government needs to help industry build the business case for carbon capture through appropriate financial mechanisms (private financing and public financing mechanisms). Finally, there is a need for governments to provide financing and supportive frameworks that address public acceptance and allocation of liability, to ensure the transport infrastructure and storage sites are in place.

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Introduction

In 2021, GCCA published an ambitious Roadmap for carbon neutral concrete by 2050. It outlines multiple levers and milestones that need to be taken on the path to zero emissions.

The process emissions of the cement production mean that, whilst GCCA members will make use of all technological solutions to reduce them, carbon dioxide will need to be captured, re-used if possible, or stored. Carbon Capture Utilisation and Storage (CCUS) technology is therefore an essential component of the Roadmap towards net zero. A full-scale deployment of CCUS could fully eliminate the process emissions and potentially even result in carbon negative concrete with broad benefits for industry and society.

CCUS pilot projects are evidence that there is substantial momentum in development of the technology and further new pilots are being announced in North America, India and Europe. In order to realise its full emission reduction potential, however, it is critical to create the right framework conditions and infrastructure within this decade to ensure its full deployment beyond 2030.

While the industry is already engaged in numerous CCUS projects, the sector cannot achieve this on its own. Deploying CCUS and related infrastructure requires a broad stakeholder dialogue as well as long-term commitments by governments and society alike. A set of targeted policy actions at local, national and international levels is needed to:

- Ensure investments for CCUS project construction and operation;
- Allow for the accounting of captured and stored or utilised CO_2 emissions;
- Create the infrastructure needed for CO_2 transportation and storage;
- Ensure concurrency in development of infrastructure and investment in capture;
- Ensure access to sufficient affordable decarbonised energy.

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About CCUS

Carbon capture, utilisation and storage (CCUS) describes processes that capture CO_2 emissions from industrial sources and either reuses them in other industrial processes or stores them so that they will not enter the atmosphere. CCUS is a crucial solution for the cement sector where a large share of emissions are not energy related but due to the specific chemistry of cement making.

Carbon capture:

Carbon Capture is not economically viable today, but technology is improving and the significant number of demonstration facilities, currently being deployed in cement production, demonstrates the potential for significant cost reduction in the years ahead. A variety of different capture technologies are currently being tested in pilot projects across the globe. These include post combustion (e.g., chemical absorption by amines), direct separation, oxyfuel and calcium looping. Typically additional energy is needed for these technologies to operate the CO_2 separation and handling processes.

Utilisation (or Valorisation):

Captured CO_2 can be used in the production of e-fuels and as a feedstock for the chemical industry. More specific uses are to promote crop growth in greenhouses and in the food and drinks industries. The aggregates and concrete industry is beginning to play its part in developing an economy for CO_2 through using CO_2 in production thereby achieving permanent storage in aggregates and hardened concrete. In addition, concrete in use and at end of life can permanently store CO_2 through the process of carbonation. This has been long understood by engineers with respect to reinforced concrete and is rightly limited during operation for the sake of durability. Recent developments have focused on maximising CO_2 uptake in crushed concrete as a method of sequestering CO_2.

Storage:

CO_2 can be stored or sequestrated in geological formations which would avoid it being released into the atmosphere.

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Policy Context

CCUS requires clear policies that will speed-up its development and affirm its long-term future.

Financing:

The 2020s will be crucial to bring down costs across the entire value chain and allow for the development of a business case. Until this, an appropriate carbon price, as well as long-term predictability, is needed to enable companies to make further investments into CCUS projects.

Given the significant development and scaling costs of this technology, however, additional and targeted public funding is necessary to lower the financial risks associated with innovative, pioneer projects. This must include R&D as well as the development, industrial deployment and early operational period.

In order to attract further private investments, CCUS must also be incorporated and classified as a green economic activity in dedicated sustainable financing schemes, such as the EU taxonomy.

CO_2 transport and storage:

Widespread deployment of CCUS will mean every cement plant needs transport and storage capacity to convey large volumes of CO_2 to distant sites where it can be stored or used in other industrial processes. The transport solutions will vary from site-to-site but, due to the volumes and distance involved, will likely need a pipeline, rail-enabled link, shipping facility or a combination of the three to take the CO_2 to a suitable storage site or for use in another industrial process. Given the local, dispersed, often rural nature of cement plants this requires significant infrastructure support to enable a plant to achieve its carbon reduction potential.

That being said, the benefits will not only serve the cement industry but society more generally. The supportive infrastructure will be shared across industrial sectors. A common understanding and mapping of the CO_2 infrastructure as well as on- and offshore storage capacity needs across sectors and regions is thus needed to allow its benefits to take full effect. Further synergies could be achieved when aligning these plans with related infrastructure developments, in particular, for the hydrogen sector.

Use of carbon and carbon accounting:

Whilst storage presents its own challenges, there also needs to be a significant investment in use options for captured CO_2. The opportunity exists to create new industrial symbiosis relationships, with other sectors taking CO_2 supplied from the cement sector to produce products substituting more carbon intensive ones (e.g., e-fuels).

The business case for deploying these technologies rests heavily on the ability for installations that capture CO_2 to discount it from their emissions, whether used for permanent geological storage, for mineralisation or for the production of products substituting more carbon intensive ones. Where biogenic material is used in the energy fuel mix and its emission captured and permanently stored (i.e., BECCS), it should be possible to acknowledge the negative emissions in the accounting.

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Public acceptance:

CCUS, like many new technologies, can face opposition by the public due to an understandable lack of knowledge about its technical maturity, its benefits and proven safety. In particular, if these are land-based then there will need to be a public acceptance of the solution; this will need politicians and communities alike to be supportive, backed by appropriate legal mechanisms.

Liability:

To facilitate long-term storage other issues such as liability for the CO_2 need to be resolved. It is preferable if these types of liabilities are public [or shared, as with interesting planned models in the UK]; otherwise it will place an unaffordable burden on the sector.

Demand for low carbon products:

The long-term success of CCUS is highly dependent on the procurement, regulatory and standardisation frameworks that will lead to a market transformation and establishes market demand for the very low carbon products which CCUS will enable.

Policy Recommendations

1. Use appropriate **carbon pricing** mechanisms to create a level playing field on carbon costs and avoid carbon leakage through adequate carbon pricing mechanisms.
2. Integrate CCUS in **public financing** mechanisms that covers in particular the initial investments and early operational abatement costs to allow for an investable business case.
3. Provide **fair recognition of all carbon removal** measures, both where the CO_2 is ultimately stored or used in products, either by acknowledging them as part of regional/national emission trading systems or by developing tailored accounting rules. Include negative emission savings through the use of CCUS combined with biomass fuels in the accounting rules.
4. **Provide transport infrastructure and storage infrastructure** to move captured carbon to places where it can be used or stored. In particular, speed up the permitting processes to allow for the construction of carbon storage facilities. In addition, the infrastructure needs to regulated in such a way that also dispersed sites are not disadvantaged when it comes to access and costs.
5. Provide reliable access to sufficient and competitively priced decarbonised energy.
6. Establish **public-private partnerships** to speed-up CCUS developments, including shared investment in CO_2 transport and storage networks.
7. **Support R&D** including for new uses in other sectors of CO_2 captured by the cement & concrete industry.
8. Enable the integration of CO_2 performance in public procurement, building standards and construction codes alongside traditional criteria (e.g. technical performance) to **create the demand for carbon-neutral products**.

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Our Commitments

1. Continue to invest in R&D through the GCCA Innovandi platform – both research (Innovandi GCRN) and start up accelerator initiative (Innovandi Open Challenge).
2. Continue and scale up investment in sole-company and multi-company CCUS projects, building on the 29 reported in the "GCCA 2050 Cement and Concrete Industry Roadmap to Net Zero Concrete".
3. Apply carbon capture technology at industrial scale at ten plants thereby contributing to delivering net zero concrete, by 2030.

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