ICBC Country Action on Blended Lower Carbon Cements and SCMs to reduce Clinker Content and GHG emissions

A quick-win initiative for GHG reductions supporting ICBC countries in meeting the Chaillot Declaration's ambitions for carbon reduction and resilience.

Implementation of art. 5.2.4 of Chaillot Declaration on low carbon material

Introduction

Cement production is responsible for around 7% of man-made greenhouse gas emissions globally, yet cement and concrete are essential to deliver homes, infrastructure and the built environment. One of the most effective near-term decarbonisation levers—identified across GCCA roadmaps and policy frameworks—is reducing the clinker content of cement by scaling up the use of supplementary cementitious materials (SCMs) and promoting blended cements. Because clinker is the most carbon-intensive component of cement, partially substituting it with SCMs can reduce the CO_2 footprint of cement and concrete by as much as 50% compared with ordinary Portland cement. This shift not only delivers immediate emissions savings but also strengthens circularity by making productive use of industrial by-products and locally available materials.

Several countries have already acted: government ministries and/or agencies in India, Indonesia, Turkey, and Japan have included SCMs in their national Cement & Concrete sector decarbonization roadmaps, with Thailand standing out for proactive government actions to promote SCMs.

About SCMS, blended cements and clinker ratios

- Diversity of solutions; Supplementary cementitious materials include pozzolans, limestone, slag, fly ash, and even the newer technology of calcined clays; can be incorporated in blended cement manufactured at the cement plant or added to mixtures at the concrete plant.
- Significant CO_2 reduction potential – By lowering clinker content by up to 50%, SCMs can cut the carbon footprint of cement and concrete by almost half, especially important where carbon capture is not yet deployed.
- Globally recognised in standards – Most SCM-based solutions are already permitted and normalised in standards around the world, supporting rapid deployment.
- Proven at scale – Many SCMs have been used globally for decades, with around 1.5 billion tonnes estimated to have been used in 2023. Case studies available here in annual GCCA Action and Progress Report.
- Innovation – Even as availability of some traditional SCMs declines in certain regions, other SCMs are increasingly available, for example through activation technologies.

Note: more details on SCMs in annexe.

Who is Proposing?

Cement Breakthrough, with 14 country members, will launch their Blended cement and SCM White Paper at COP30. Their white paper includes government actions and

commitments that accord with the document attached, and their membership has overlap with ICBC membership.

The cement breakthrough whitepaper was prepared for Cement Breakthrough by the Global Cement and Concrete Association (GCCA), which represents the majority of cement producers outside China and has key members in China. GCCA also has 29 country partner members: National cement and concrete associations across the world. This paper has been prepared for ICBC by GCCA.

How it Works?

ROLES:

ICBC countries will enable increased use of blended low carbon cements and SCMs. (See proposed ICBC decision)

Construction Industry and Stakeholders will respond to country enabling actions through action on standards and delivery of use of lower carbon cement and concrete products on gov't funded major projects

Cement and Concrete Industry will supply lower carbon products through blended lower carbon cements and use of SCMs

MEASUREMENT OF SUCCESS FOR EACH COMMITMENT

Cement and Concrete Industry will report

1. annual quantification of the use of blended cements and/or SCMs in concrete via the GCCA GNR database or national industry data.
2. annual audit of country standards, regulations and codes.
3. annual audit of blended cement/SCMs supply to government funded major projects by government.
4. annual survey of supply industry identifying barriers to sourcing SCMs.

TIMELINE

ICBC enabling actions can be reasonably delivered by end of 2026,
Construction Industry and Stakeholders can review standards by end of 2026
Cement and Concrete Industry can supply Construction industry and government projects from end 2026, or sooner if enabling actions completed.

FINANCING

Typically, the technology of blended lower carbon cements and SCMs represents a very cost-effective decarbonisation strategy compared with technologies available to decarbonise other sectors. Review and update of standards, regulations and codes may have cost implications to be met according to local practice: emerging economies may seek international donors to support this activity (via CTCN, GEF and Bilateral Assistance such through GMP).

GOVERNANCE

ICBC countries have decision making in their jurisdiction.
GCCA offer to provide oversight structure for initiative.

Supporting References & Resources

Global Cement and Concrete Association. (2024) GCCA Policy Document on Blended Cements and Supplementary Cementitious Materials. https://gccassociation.org/wp-content/uploads/2025/07/GCCA_Blended_Cements_and_SCM_Policy_Document_Digital.pdf

ICBC decisions

ICBC members recognize blended cements/SCMs as quick win solutions to reduce GHG emissions and emphasize that these materials can significantly lower the embodied emissions that occur upfront in new buildings.
Countries are invited to join in committing to:

1. support review of standards, regulations and codes, and an update if necessary, to ensure the latest international standards and state-of-the-art technologies are reflected, or directly used, to facilitate best practice in use of blended cements/SCMs.
2. where possible, procure low-carbon cements and concretes, including those containing blended cement/SCMs, in all major government funded projects.
3. work with industry to enable access and remove barriers to sourcing and use of SCMs thereby promoting decarbonisation and circularity.

Annexe: Supplementary Cementitious Materials (SCMs)

Supplementary cementitious materials are a wide range of both naturally occurring and industrial byproduct materials that are added in making a blended cement or added as constituents of concrete to reduce the CO_2 footprint and modify performance of cement and concrete. Some supplementary cementitious materials, like fly ash and ground granulated blast furnace slag (ggbs), are by-products and wastes of other industries, and their use in cement and concrete contributes to the circular economy. Other commonly used SCMs are ground limestone, natural pozzolans, calcined clay and other artificial pozzolans obtained by calcining natural materials. Recycled concrete fines can also be used as an SCM. Innovative processes and materials may result in new SCMs. For further information: visit https://gccassociation.org/cement-and-concreteinnovation/ clinker-substitutes/

Fly ash and ggbs, are from coal fired power stations and iron blast furnaces respectively. In many locations, currently, the available supply of fly ash and ggbs exceeds the demand from cement and concrete producers. Both the energy and steel industries are globally undergoing changes leading to fly ash and ggbs becoming less available in many places in coming years, but in some major economies the absolute scale of fly ash and ggbs production is not decreasing (and in some regions is increasing) even in the medium term. For example, in India the research institute TERI forecast that fly ash production of 281 and 256 million tonnes in 2030 and 2050 respectively. This is compared with 271 million tonnes production in 2020.

With regards ggbs, TERI forecasts this to increase from a 2020 value of 34 million tonnes to 67 and 116 million tonnes in 2030 and 2050 respectively. These values compare with a current use in India of fly ash and ggbs together of 93 Mt (Industry Data Analysis, TERI). Phasing out of coal fired power stations and blast furnaces will be quicker, even far quicker, in some developed economies, and these are often countries where available materials are being well utilised. It is of note that in these countries harvesting of stored/ landfilled fly ash is increasing, to provide supplies that might no longer be available due to coal-fired power plants closing. In some cases, beneficiation or other technology is being implemented to make previously unsuitable materials suitable for construction applications. With respect to slags, future low carbon metal processes may produce new slags that are suitable for use as appropriate SCMs.

Limestone is increasingly used as an SCM in blended cement or added at the concrete plant. As an example, in the USA it can be used as an ingredient in a blended cement at a maximum percentage of 15% and uptake has increased rapidly in recent years. In contrast, it has been

used extensively for decades in Europe and Latin America. Furthermore, limestone cements are used at higher limestone levels for certain applications, and cutting-edge concrete technology is enabling the use of ever higher limestone percentages. Limestone is both widely available and at scale. In addition, given that it is the main input into cement kilns, it is also available as an SCM in convenient locations.

Natural pozzolans are not as widely available as limestone, but where they are available it is often at a scale that means they can play a significant contribution to decarbonizing cement and concrete. For example, natural pozzolans are the most consumed SCM in Guatemala, Chile, Ecuador, the Dominican Republic and Peru, with above 20% in the first two cases.

Calcined clay is an SCM that is based on clays with specific chemistry. These are available at scale and whilst not everywhere they are widely distributed, particularly in tropical regions. Whereas calcination of limestone to make Portland cement clinker produces CO_2, the calcination of clay does not produce CO_2 unless the raw clay contains calcium carbonate. The calcination process of clay is at a lower temperature than that used for production of Portland cement clinker, therefore the CO_2 emissions from generating the heat in the kiln are less than for clinker. Therefore, whilst calcined clay has a higher CO_2 footprint than other SCMs, it can be used to make a cement/binder with lower

CO_2 footprint than a Portland cement (which has no SCM). Recent developments have optimised combinations of calcined clays and ground limestone as SCMs, allowing a clinker reduction of up to 50% and maintaining a similar performance to existing cements.