Paving the way for a better future

Decarbonization of cement is crucial to address climate change and reach global net-zero GHG emissions.

After water, concrete is the most consumed material on the planet. Cement, the key ingredient in concrete, is responsible for 7% of global carbon emissions. Emerging markets consume up to 30%-40% of cement today and their use of cement is projected to grow rapidly as they increasingly invest in buildings and infrastructure (excluding China).

Bridging the gap and setting the foundation

To successfully decarbonize the cement and concrete industry in emerging markets, it is helpful to understand...

01 How cement is used and by whom
02 How cement is distributed and mixed
03 How demand will evolve as a market develops

Context: When cement leaves the plant, there are two ways it can be packaged and distributed:

- **Bagged cement**: Dry bags typically distributed through retail.
  - **Cement plant**
  - **Distributor**: While dry cement can travel long distances, wet concrete will set quickly, so ready-mix plants can only serve nearby customers.
  - **Construction site**: Bagged cement is generally mixed into concrete on-site, but it is difficult to track how/where it is used when it leaves the distributor.

- **Bulk cement**: Truckloads of dry cement sent to ready-mix plants.
  - **Cement plant**
  - **Ready-mix plant or pre-cast factory**: Local transport of wet concrete or pre-cast components.
  - **Construction site**: Delivered to construction sites as concrete or pre-cast structures.

Scroll to view insights on cement and concrete decarbonization in emerging markets, based on analysis of four significant cement-producing emerging markets globally.
The majority of cement is consumed in small-scale projects, run by individuals with limited materials and engineering expertise, which creates a need for education.

Small residential buildings make up a large share of cement applications in emerging markets, where material specifiers are typically local masons and contractors who may not be formally trained to optimize the strengths and volumes of concrete used in projects.

Emerging markets should support the transition to bulk cement and ready-mix concrete and, in parallel, expand use of quality control mechanisms (e.g., mixing equipment, standardized measurement) for bagged cement.

Cement is primarily bagged and often hand-mixed on-site, which increases the risk of inefficient use of cement.

Emerging markets primarily consume bagged cement because:

- Projects tend to be small and may not have access to bulk cement (ready-mix plants)
- Some government policies, particularly in Brazil, do not encourage cement industrialization

Cement is frequently mixed by hand without formal recipes or quality control measures in place, creating a high potential for its overuse.

Emerging markets should support the transition to bulk cement and ready-mix concrete and, in parallel, expand use of quality control mechanisms (e.g., mixing equipment, standardized measurement) for bagged cement.
The transition to bulk cement and large capital projects will create new decarbonization challenges and opportunities

Emerging markets are shifting to larger projects as they urbanize and invest in more infrastructure:

**Challenges**
- Larger projects typically require higher strength (more carbon-intensive) concrete

**Opportunities**
- Bulk cement has the potential for more SCMs and greater quality control (standardized mixing)

**Increasingly, share is shifting from bagged to bulk cement**

<table>
<thead>
<tr>
<th>Country</th>
<th>Historical bulk cement consumption vs. today as a % of total consumption</th>
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</thead>
<tbody>
<tr>
<td>India</td>
<td>20 years ago: 0% → 20%–25% Today</td>
</tr>
<tr>
<td>Brazil</td>
<td>20 years ago: 20% → 30% Today</td>
</tr>
<tr>
<td>Indonesia</td>
<td>10 years ago: 20% → 25%–30% Today</td>
</tr>
<tr>
<td>Egypt</td>
<td>10 years ago: 10% → 40% Today</td>
</tr>
</tbody>
</table>

Governments, the industry, and standards organizations should seek to identify and reform restrictive construction codes that hinder decarbonization in large capital projects.

Emerging markets should ensure that, as they transition to bulk cement, they are utilizing SCMs to reduce the carbon intensity of cement.

Emerging markets must ensure their cement and concrete decarbonization plans reflect the way their countries use cement today and will use it in the future.

The GCCA 2050 Net-Zero Roadmap Accelerator Program is using these insights to help national cement industries accelerate local implementation of the GCCA 2050 Cement and Concrete Industry Roadmap for Net Zero Concrete.

**Worth noting:** Many other critical levers exist for delivering net-zero cement which don’t directly relate to the products and applications for which cement is used. Examples include use of renewable energy, alternatives fuels, and carbon capture technology in the production process. The cement industry and governments must also prioritize and support these levers to achieve net-zero.