



Dalmia Bharat Ltd.

Dr. Arvind Bodhankar
Executive Director, ESG & CRO

“Regulatory support and incentives can encourage cement companies to adopt waste-to-resource approaches and achieve more sustainable and low-carbon operations.”

To achieve India's ambitious Net-Zero 2070 targets, it is imperative to seize all possible low-carbon pathways across sectors. The cement industry alone is responsible for about 8% of the total national carbon emission in India. It is considered one of the hard-to-decarbonize industries due to its peculiar energy needs and processes. Some of the key obstacles and complexities involved in decarbonizing the cement industry include the following:

- Emissions associated with calcination of raw materials (limestone) account for almost 60% of the CO₂ emissions in the Cement sector. This is the most challenging part, and it differentiates the cement sector from the others, as far as decarbonization is concerned. In other sectors, fossil fuel is a major contribution of CO₂ emissions, which is relatively easier to reduce by replacing the fuel with green fuels, but in the cement industry, currently there is no replacement available for limestone.
- The cement sector requires supportive regulatory frameworks and policies that incentivize and facilitate the adoption of low-carbon technologies. Establishing effective policies and regulations that encourage decarbonization while ensuring competitiveness and addressing potential trade-offs is a challenge for policymakers.

- Cement production requires high temperatures, typically achieved through the combustion of fossil fuels such as coal, oil, and natural gas. The energy-intensive nature of the process makes it challenging to replace traditional fuels with low-carbon alternatives.
- Many decarbonization technologies such as carbon capture and storage (CCS) are capital-intensive and require significant investments. The high costs associated with implementing these technologies can pose financial barriers, especially for smaller cement manufacturers. Limited financial incentives and regulatory frameworks for promoting low-carbon cement can hinder the adoption of sustainable practices.

Addressing these challenges will require a multi-faceted approach involving technological innovation, supportive policies, financial incentives, and collaboration between state governments, industry stakeholders, and research institutions. It will also require continuous research and development to identify and scale up promising decarbonization technologies specific to the cement sector.

Carbon mitigation initiatives

Dalmia Bharat Limited, one of India's leading cement manufacturers, has been actively driving initiatives towards

carbon negative cement production and contributing to India's climate action strategy. The company has outlined a roadmap to achieve carbon neutrality and has undertaken several measures to support the sustainable and low-carbon transition of the cement sector. Here are some of their key initiatives and carbon mitigation levers:

Energy efficiency measures: Dalmia Bharat has implemented energy efficiency measures across its operations, such as optimizing process parameters and equipment. We have also invested in renewable energy sources, including solar and wind power, to reduce reliance on fossil fuels and lower carbon emissions. We have signed for the RE 100 initiative of climate Group.

Alternative fuels and raw materials: We are actively promoting use of alternative fuels such as biomass, agricultural waste, and refuse-derived fuels in cement kilns. These fuels can replace traditional fossil fuels, thereby reducing carbon emissions. Additionally, the company has explored alternative raw materials and industrial byproducts to decrease the clinker content in cement production, which helps lower emissions.

Waste Heat Recovery and Co-Processing: We have adopted waste heat recovery systems to capture and utilize



the excess heat generated during cement production. This recovered heat can be utilized for various purposes, such as power generation, heating, or even for other industrial processes. By effectively utilizing waste heat, cement manufacturers can improve energy efficiency and reduce the need for additional fossil fuel consumption. Co-processing not only reduces waste generation but also conserves natural resources and lowers the carbon footprint of cement production.

Recycling and Reuse: We explore opportunities to recycle or reuse waste materials generated within our processes. For instance, concrete waste can be crushed and recycled as aggregates for new concrete production. Similarly, water used in the manufacturing process can be treated and recycled, reducing water consumption, and minimizing environmental impact.

Carbon capture, utilization, and storage: We are actively involved in research and development projects related to carbon capture, utilization, and storage technologies. We are collaborating with

research institutions and industry partners to explore the feasibility of deploying CCU/ CCS at cement plants, which can capture and utilize or store CO₂ emissions.

Green building solutions: We have developed and promoted green building solutions such as sustainable concrete mixes and eco-friendly construction practices, to encourage the use of low-carbon cement in the construction sector. We have also invested in product innovation to develop cement with lower clinker content and reduced carbon footprint.

Collaborations and partnerships: We collaborate with government bodies, research institutions, and industry associations, to drive sustainable practices and advocate for policy support. For example, waste materials generated by one industry, such as steel slag or fly ash, can be used as raw materials in cement production. This industrial symbiosis reduces waste disposal and the need for virgin raw materials while promoting resource efficiency and circular economy principles.

Cement kilns can use a wide range of waste materials as alternative fuels which can include biomass, agricultural residues, municipal solid waste (MSW), tire-derived fuels, and industrial by-products. By substituting fossil fuels with waste-derived fuels, cement manufacturers can reduce both carbon emissions and the reliance on non-renewable resources. By leveraging these carbon mitigation measures and implementing sustainable practices, Dalmia Bharat aims to achieve carbon negativity in its cement production by 2040, thus demonstrating sustainability leadership.

It is important for cement manufacturers to assess the specific waste streams available in their regions and collaborate with waste management experts, research institutions, and other stakeholders to identify and implement the most suitable practices and technologies. Additionally, regulatory support and incentives can play a crucial role in encouraging cement companies to adopt waste-to-resource approaches and achieve more sustainable and low-carbon operations.