

“Achieving Net Zero goals is a complex and long-term process.”

Dr Arvind Bodhankar, Executive Director, ESG and CRO, Dalmia Bharat, brings to light the various measures undertaken for the production of green cement and the importance of incorporating sustainability in the manufacturing process.

Tell us about the importance of going green for the Indian cement industry?

The cement industry is one of the largest and most energy-intensive industries in India, accounting for a significant share of the country's industrial emissions. Therefore, the importance of going green in the cement industry in India cannot be overstated. Here are some reasons why:

- **Environmental protection:** Cement production is a major source of greenhouse gas emissions, including carbon dioxide, which contribute to global warming and climate change. By adopting green technologies and practices, the cement industry can reduce its carbon footprint and help protect the environment while doing cost optimisation.
- **Energy efficiency:** The cement industry is highly energy-intensive, with most of the energy used in the manufacturing process coming from fossil fuels. By improving energy efficiency and using renewable energy sources, the industry can reduce its dependence on fossil fuels and lower its operating costs.
- **Compliance with regulations:** Governments around the world are tightening regulations on industrial emissions, and India is no exception. By going green, cement companies can comply with environmental regulations and avoid fines and other penalties of regulations to be introduced in India in the future.
- **Consumer demand:** Consumers are increasingly concerned about the environmental impact of the products they use and are demanding more sustainable and eco-friendly products. By going green, cement companies can meet this demand and differentiate themselves in the marketplace.

Hence, going green in the cement industry in India is essential for environmental protection, energy



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efficiency, regulatory compliance and meeting consumer demand for eco-friendly products.

Tell us about the cement blends or products from your organisation that are lower in their carbon content.

Blended cements are a type of cement that is composed of a blend of two or more materials, with at least one of them being a cementitious material such as Portland cement, fly ash, ground granulated blast furnace slag (GGBS), silica fume, or limestone. In India, the following types of blended cements are commonly used and also manufactured by Dalmia Bharat:

- **Portland Pozzolana Cement (PPC):** PPC is a blend of clinker and pozzolanic materials such



For the progress of the cement industry worldwide, integrated sustainable practices have become mandatory.

as fly ash. It is known for its high strength and durability, and is commonly used in construction projects such as dams, bridges, and high-rise buildings.

- **Portland Slag Cement (PSC):** PSC is a blend of Clinker and GGBS, which is a by-product of the iron and steel industry. PSC is known for its high strength, low heat of hydration, and resistance to sulfate and chloride attacks, making it suitable for use in marine and coastal structures. Dalmia Bharat is the largest manufacturer of PSC in India. This cement has the lowest carbon footprint.
- **Composite Cement:** Composite cement is a blend of OPC/clinker and other cementitious materials such as fly ash or GGBS as well as other materials such as limestone or silica fume. Composite cement is commonly used in construction projects where high durability and strength are required.

We provide the blended cements with brand name of Dalmia INFRAPRO and Dalmia INFRAGREEN in various blended cement categories mentioned above. Other brands include Dalmia DSP and Konark Cement.

Tell us about your Net Zero Goals. How much have you achieved so far?

Net Zero goals refer to the target of achieving Net Zero carbon emissions, where the amount of carbon emissions produced is offset by the amount of carbon removed from the atmosphere. This can be achieved through a combination of reducing carbon emissions through efficient and sustainable manufacturing practices, as well as implementing carbon capture and storage technologies and investing in reforestation or other carbon removal projects.

Achieving Net Zero goals requires significant investments in research and development, process improvements, and alternative energy sources. Many cement manufacturers are exploring the use of alternative fuels and raw materials, as well as adopting technologies such as carbon capture and storage, to help reduce their carbon footprint. It is important to note that achieving Net Zero goals is a complex and long-term process that requires collaboration across the entire industry as well as support from governments, investors and consumers.

At the same time, Dalmia Cement has been doing its part and is the pioneer in setting up the target in the industry. We announced that we will become carbon negative by 2040. We are the first cement company globally to have such an ambitious target. And, we have been working in all spheres of its subject to meet our five-year interim targets. So far, we have been progressing well and ahead of our carbon negative roadmap targets. As compared to the target of 485 NetKgCO₂/tonne of cementitious, we have already achieved 463 kgCO₂/tonne of cementitious in FY23, which is more than 4.5 per cent reduction below the carbon negative target. All this has been taking place voluntarily without any regulatory push.

How do you incorporate sustainability in your cement manufacturing process?

Here is how sustainability is incorporated in our cement manufacturing process:

Sustainability is an important consideration for cement manufacturing. One way to promote sustainability is by using alternative raw materials and fuels in the manufacturing process. Some key alternative raw materials include fly ash and slag. The use of alternative fuels such as biomass and industrial byproducts can also help to reduce emissions and lower the carbon footprint of cement manufacturing. Dalmia Bharat has been enhancing their use to reduce natural minerals consumption. In addition, sustainable mining practices are being implemented to reduce the environmental impact of mining activities. This includes minimising water usage, using eco-friendly mining techniques, restoring mined land and protecting biodiversity in the surrounding areas.

Water conservation is another important aspect of our sustainability. We are implementing measures such as recycling and reusing water, optimising processes to reduce water usage, and using rainwater harvesting to reduce dependence on freshwater sources. We are more than 14 times water positive organisation on account of water harvesting and

saving activities.

Air emissions are another significant concern in cement manufacturing. Technology upgrades, alternative fuels and regular monitoring and reporting of emissions is helping us to reduce emissions and improve air quality within our plants and surrounding areas. To address fugitive emissions, we have implemented several measures, such as using enclosed conveyors, installing dust collection systems, and regularly maintaining equipment to prevent leaks. Additionally, proper training and awareness programs are helping employees to identify and report any fugitive emissions.

Finally, health and safety, people management and community engagement are another set of important considerations for promoting sustainability in our group and manufacturing process. Ensure the safety and well-being of the employees and engagement with local communities helps maintain the smooth relationships with key stakeholders.

By incorporating these measures, we have been progressing on the sustainability journey and reducing our environmental impacts while demonstrating a commitment to responsible business practices.

What is the role of automation and technology in making cement an eco-friendly product?

Automation and technology play a crucial role in making cement manufacturing a more eco-friendly and sustainable process. The use of advanced technologies and automation systems can help cement manufacturers to reduce energy consumption, increase efficiency and minimise waste generation.

One of the significant advantages of automation and technology is that they can help in optimising the cement manufacturing process, thus reducing energy consumption and greenhouse gas emissions. For example, automated kiln control systems can help to maintain precise temperature and pressure conditions in the kiln, leading to more efficient and cleaner burning of fuels. Moreover, the use of advanced technologies, such as artificial intelligence and machine learning, can help in real-time monitoring of the manufacturing process and identification of any inefficiencies or areas of improvement. This can help manufacturers to optimise their operations and reduce waste and emissions.

Predictive maintenance is another key aspect of automation and technology in the cement industry. It involves the use of sensors and data analytics to predict when maintenance will be required on equipment and machinery, allowing for timely repairs

and replacements to be made. By implementing a predictive maintenance system, cement plants can reduce the likelihood of equipment breakdowns and minimise the need for reactive maintenance, which can be time-consuming and expensive. This can lead to increased efficiency, reduced downtime, and improved overall productivity, while also reducing the environmental impact of the manufacturing process.

Another important aspect of technology in cement manufacturing is the use of digital solutions for tracking and reporting sustainability metrics. This can help manufacturers to monitor their environmental performance and identify areas of improvement to achieve their sustainability goals.

How do you measure the impact of your green cement on the environment and society, and what steps do you take to continuously improve its sustainability?

Measuring the impact of green cement on the environment and society requires a comprehensive approach that considers the entire life cycle of the product. We have been taking several steps to measure the impact of our cement on the environment and society:

Predictive maintenance is another key aspect of automation and technology in the cement industry.

- **Environmental Impact Assessment (EIA):** We conduct an Environmental Impact Assessment to evaluate the environmental impacts of our Cement production. This includes assessing the impact of raw material extraction, transportation, and manufacturing processes, as well as the energy and water usage and the carbon footprint of the product.
- **Social Impact Assessment (SIA):** We also evaluate the social impact of Cement production on local communities, including employment opportunities, labour practices and community development. This is done through stakeholder engagement and local knowledge.
- **Life Cycle Assessment (LCA):** We have also started conducting Life Cycle Assessment to measure the overall environmental impact of



Carbon emissions, water usage and waste generation are some of the crucial indicators of sustainability that need to be monitored with precision.

Cement from raw material extraction to disposal. This can help identify areas where improvements can be made to reduce environmental impact. The LCA has potential to identify hotspots or stages in the life cycle where the most environmental impact occurs.

- **Environmental Reporting:** We regularly report on environmental performance and progress towards sustainability goals. This includes reporting on carbon emissions, water usage, waste generation, and other key sustainability indicators. Environmental reporting can be done through sustainability reports, annual reports, and other public disclosures. This helps our stakeholders informed and our performance as well as targets checked from independent assurance providers.
- **Stakeholder Engagement:** We engage with stakeholders, including local communities, NGOs and regulators, to understand their concerns and perspectives on the impact of cement production. This can help identify opportunities for improvement and build support for sustainability initiatives. Stakeholder engagement also helps in development of sustainability strategies that are aligned with stakeholder expectations. To continuously improve sustainability, cement, we are taking the following steps:
- **Research and Development:** We invest in research and development to develop new low-carbon technologies and processes that reduce environmental impact. This involves developing

new materials, improving manufacturing processes, and exploring alternative fuels and energy sources.

- **Efficiency Improvements:** We are continuously improving the efficiency of manufacturing processes to reduce energy and water usage and improve environmental performance. This is done through process optimisation, equipment upgrades and energy management systems.
- **Green Procurement:** We source raw materials from sustainable and responsible sources, including recycled materials and renewable resources. This helps reduce the environmental impact of raw material extraction and supports sustainable development.
- **Certification:** We have third-party certifications to demonstrate the sustainability performance of green cement products under various categories. We also have third party certified plants for management systems. Certification helps us build credibility with customers and investors and it can differentiate green cement products in the market.
- **Collaboration:** We collaborate with other companies and stakeholders to share best practices and develop sustainability initiatives that benefit the entire industry including us. This has evolved as associations, collaborating with suppliers and customers, and partnering with NGOs and other stakeholders.



- Kanika Mathur