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NET ZERO AMBITIONS!

Is the cement industry ready to meet the country's 2070 Net Zero goal?

Over 20 industry leaders share their plans for Net Zero.



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Strategise and Decarbonise

Raman Bhatia, Founder and Managing Director, Servotech Power Systems, discusses embracing decarbonisation strategies, including carbon capture, alternative fuels, and solar integration, as the cement industry's move towards Net Zero.



When we talk about global infrastructure development, the cement industry definitely acts as a crucial player. However, the downside of this industry lies in the fact that the cement industry is an energy-intensive industry, contributing significantly towards greenhouse gas emissions that nearly account for 7 to 8 per cent of global carbon emissions. As we are looking, the world is collectively moving toward a sustainable future by focusing on creating sustainable and green solutions with a motive to mitigate climate change. It has become essential to decarbonise this sector to achieve Net Zero emissions in this domain. Now the question arises on how we can do it. Well, it involves a multifaceted approach involving the adoption of advanced technologies, automation, green practices and strategic initiatives having their core focus on establishing a green network within the cement industry.

Understanding the Challenge

Cement production is a highly energy-intensive process that generates large amounts of carbon dioxide (CO₂) emissions. About one-third of these emissions stem from the energy used in production. One of the major sources of emission is the calcination of limestone (the primary ingredient). Calcination is a process in which limestone (calcium carbonate) is heated, causing it to release CO₂ and produce lime (calcium oxide). Additionally, cement kilns require large amounts of thermal energy that is usually generated by burning fossil fuels such as coal, petroleum coke, and natural gas. The process also demands substantial electricity for grinding raw materials and powering plant operations.

Efforts Towards Decarbonisation

Decarbonising cement production can occur through reducing energy intensity, switching to lower-

emission fuels, and electrifying processes using clean electricity. One of the most promising solutions is Carbon Capture, Utilisation, and Storage (CCUS), which captures up to 90 per cent of CO₂ emissions from cement plants. This involves post-combustion carbon capture using solvents to extract CO₂ from flue gases for compression and storage or utilisation. Captured CO₂ can be repurposed in industrial applications, such as creating carbon-negative concrete or storing it underground in geological formations, preventing its release into the atmosphere. Lately, there has been a rise in alternative cement types and binders which are providing further opportunities to cut emissions. Clinker substitutes, such as fly ash, slag, and limestone, can significantly reduce the carbon footprint of cement. Geopolymer cement, made from industrial waste, can lower emissions by up to 80 per cent.

Integration of Solar Energy in Cement Production


Integration of solar energy into cement production acts as a massive tool that aids in acting as a rather promising sustainable solution. Cement production requires significant energy, particularly for operations like grinding, milling, and material handling, which rely on electricity from fossil fuels. By integrating solar power, cement plants can reduce their carbon emissions, lower energy costs, and enhance their sustainability. One of the main applications of solar energy in cement production is through solar photovoltaic (PV) systems. These systems convert sunlight into electricity, which can be used to power equipment in cement plants, such as crushers, conveyors, and grinding mills. In addition to generating electricity, solar thermal technology can also contribute to cement production. Solar thermal systems use lenses to concentrate sunlight and generate high temperatures, which can be used in pre-heating raw materials or even providing part of the thermal energy required for the calcination process, reducing the need for fossil fuels in kilns.

Practices that the Cement Industry can Adopt

Adopting reliable and sustainable practices like optimising kiln operations, such as improving insulation, utilising heat recovery systems, and adopting advanced control technologies, can significantly enhance energy efficiency and reduce emissions. Waste heat recovery (WHR) systems capture excess heat to generate electricity, reducing

reliance on external power sources, while variable frequency drives (VFDs) help save energy by controlling motor speeds in areas like grinding and material handling. Sustainable water management is also essential, with practices like water recycling and rainwater harvesting helping to minimise freshwater use and wastewater generation. Automation is playing a transformative role in the cement industry, with digitalisation and IoT technologies enabling the monitoring of equipment performance, energy consumption, and emissions. This data allows companies to optimise processes, reduce waste, and implement predictive maintenance to avoid inefficiencies. Artificial intelligence (AI) and machine learning are enhancing decision-making, enabling process optimisation and energy management by predicting demand and adjusting energy inputs. Industry collaboration, such as through the Global Cement and Concrete Association (GCCA) has taken collective action towards sustainability goals. Apart from this Implementing carbon taxes or cap-and-trade systems can incentivise cement companies to reduce their emissions by attaching a financial cost to carbon output and setting stringent emissions standards for the cement industry can encourage companies to adopt more sustainable practices.

Looking Forward

Achieving Net Zero in the cement industry is a difficult challenge but can be achieved through the right measures which will help the industry significantly reduce its carbon footprint and contribute to global sustainability goals. The road to Net Zero will require continuous innovation, investment, and commitment from all stakeholders. Cement companies that take proactive steps towards decarbonisation will not only enhance their environmental credentials but also position themselves as leaders in the sustainable economy of the future. The time to act is now – the cement industry must seize the opportunity to drive meaningful change and help build a more sustainable, resilient world. 



ABOUT THE AUTHOR:

Raman Bhatia brings over 25 years of experience in the renewable energy sector, driving growth in electric vehicle chargers and solar products. A passionate advocate for sustainable solutions, he has led his company's listing on NSE and earned recognition for his contributions to clean energy.