

# FROM GREY TO GREEN

## HOW ADANI CEMENT IS SHAPING TOMORROW

*Concrete may be the backbone of modern civilisation, but in today's climate-conscious world it must also become smarter and greener. In this edition of Concrete Talks, we speak with **VINOD BAHETY**, CEO – Cement Business, Adani Group, on how Adani Cement is redefining concrete through sustainability, digital innovation, and future-ready solutions. His vision sets out not just how we will build faster, but how we will build responsibly—aligning India's infrastructure growth with its climate goals.*

**Q** Concrete is often described as the backbone of civilisation. In an era defined by rapid urbanisation and climate challenges, how is Adani Cement reimagining this material as a force for sustainability as well as growth?

Concrete is the second most consumed material on the planet after water, and its importance to human civilisation cannot be overstated. It is versatile in its mouldability, aesthetics, durability, and strength, which makes it indispensable to infrastructure and urbanisation. Yet, in a climate-sensitive world, the challenge is no longer just to build with concrete but to build responsibly with it. At Adani Cement, we

believe concrete can become one of the most sustainable materials if used wisely. This begins with developing ultra-high strength concretes that allow us to use less material while achieving more, thereby conserving natural resources such as aggregates and water. It extends to incorporating mineral and chemical admixtures that optimise performance and reduce cement consumption, and finally to producing blended cements that cut clinker use.

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**VINOD BAHETY**  
CEO – Cement Business,  
Adani Group

age and conserve limestone, one of our most critical natural resources.

Our brand itself has recently undergone a transition to underline this commitment. Under the tagline "Strong Foundation, Lasting Impression", Adani Concrete has reaffirmed its role as a leader in Ready-Mix Concrete while simultaneously becoming a catalyst for sustainable practices. We have launched the ECOMaxX range of green concrete solutions, integrated renewable power into our plants, and deployed cleaner fleets such as CNG-powered and electric transit mixers to lower our carbon footprint. At the same time, our R&D teams are pioneering advanced technologies like self-healing concrete, ultra-high-performance concrete, and fibre-reinforced composites, while also embedding circular economy practices such as recycling concrete and using industrial by-products. We are even creating region-specific concrete formulations tailored to India's diverse climates—from coastal belts to seismic zones—ensuring our solutions are not only innovative but contextually relevant.

Equally important is the dissemination of knowledge. Through the Adani Knowledge Initiative, we run awareness workshops and training programmes to skill the ecosystem in sustainable concrete futures. We also publish the Indian Concrete Journal, India's oldest technical publication since 1927, which continues to shape thought leadership in this sector. In short, we are not just producing concrete; we are reimagining its role in building stronger, greener cities.

**Q** The cement sector is often criticised for its high carbon intensity. What concrete steps is Adani Cement taking to embed low-carbon innovation into its products, particularly with supplementary materials such as fly ash and GGBS?

Sustainability has to move from being a slogan to a measurable commitment, and at Adani Cement we have taken this seriously. Our focus is on developing low-carbon and, eventually, carbon-neutral formulations. One way we do this

is by maximising the use of supplementary cementitious materials such as fly ash, ground granulated blast furnace slag (GGBS), and even rice husk ash. These materials not only replace clinker, thereby lowering emissions, but also improve durability when used judiciously. Our research teams continually refine mix designs to use the least amount of cementitious material required while maintaining structural performance. This also means optimising water content and employing admixtures that enable higher levels of cement replacement without sacrificing strength or long-term durability.

At our R&D centre in Kalamboli, Navi Mumbai—which is the largest cement and concrete laboratory in India—we are pushing these innovations forward at scale. Thanks to advanced technology and stringent quality controls, blended cements such as PPC, PSC, and composite cement today account for more than 80 per cent of our production. Through our value-added products such as ECOMaxX, SustainoCrete, and PermeCrete, we have demonstrated that it is possible to reduce the carbon footprint of concrete by as much as 70 per cent.

This commitment has also been recognised globally. We are the fourth-largest cement company in the world to have our Net-Zero 2050 and near-term 2030 targets validated by the Science Based Targets initiative (SBTi). Beyond carbon, we have become leaders in water stewardship, achieving a status of being twelve times water positive, and are pioneering innovations such as waterless curing sheets that can save up to 12,000 litres of water per 100 square metres of slab. This is how we see sustainability—not as an add-on, but as an integral part of our business model and our responsibility to future generations.

**Q The global conversation around concrete is shifting from strength to intelligence—3D printing, self-healing, fibre reinforcement. How is Adani Cement engaging with these frontier technologies, and what breakthroughs have you already achieved?**

We see next-generation concrete not as a distant ambition but as an immediate necessity. At Adani Cement and Adani Concrete, we are actively devel-



oping and deploying advanced solutions that will redefine how the material behaves and how it can be used. For instance, we are working on bacterial formulations for self-healing concrete that can automatically seal non-structural cracks below 0.8 mm, extending the life of structures without the need for repairs. We have also successfully developed M150 grade ultra-high-performance concrete, a material that sets new benchmarks for strength and resilience.

Our FibreCrete range, which integrates a variety of micro and macro fibres including polypropylene, steel, and glass, is already being supplied in significant volumes and is proving to be transformative for projects that require enhanced toughness and crack resistance. At the same time, our R&D teams are exploring 3D-printable mortars and concrete, experimenting with polymers and additives that will allow us to move towards large-scale 3D-printed structures.

We are also innovating within precast applications, where we have developed high early strength concretes capable of reaching 30 MPa in just 12 hours and self-compacting concretes

with extended slump retention. For mass concrete applications, we are now using low-carbon thermally controlled mixes with high GGBS content to manage heat gradients effectively. Together, these advances are not only reshaping construction practices but also directly supporting green building certifications such as LEED, where our Environmental Product Declaration (EPD) for PPC provides lifecycle data that helps developers secure sustainability credits.

For us, this is the future of concrete—intelligent, adaptive, and aligned with the global demand for low-carbon construction. It is where performance meets sustainability, and where innovation becomes the foundation of progress.

**Q Cement manufacturing is often energy and water intensive. How are you addressing these challenges, particularly with waste heat recovery, water recycling, and energy efficiency across your plants?**

At Adani Cement, we view energy and water stewardship as central pillars of sustainable manufacturing. Our ambition is not only to reduce intensity but to align fully with global climate goals. Both Ambuja and ACC, part of our group, are among the very few companies worldwide whose Net-Zero 2050 and near-term 2030 targets have been validated by the Science Based Targets initiative (SBTi). This validation, aligned with the Paris Agreement, sets us apart as leaders committed to direct decarbonisation rather than relying on offsets. By 2030, our Scope 1 and 2 emissions will reduce significantly, driven





## CEMENT TALK

by greater use of blended cements, alternative fuels, and advanced technologies.

On the energy side, our intensity today stands at 2.6 GJ per tonne of cementitious material, with specific thermal energy at 757 kCal per kilogram of clinker and electrical energy at 76 kWh per tonne of cement. These are already industry benchmarks, but we are determined to go further. Our target is to bring thermal energy down to 710 kCal and electrical consumption to 63 kWh per tonne by 2030. Much of this will come through efficiency improvements, but also through scaling up our Waste Heat Recovery Systems (WHRS), which are central to lowering grid dependency. By FY'28, we plan to expand WHRS capacity to 376 MW, a step that will significantly cut emissions.

Equally important is our transition to renewable power. Already, 28 per cent of our energy portfolio is green, and by FY'27–28 we aim to take that number to 60 per cent. Water management complements this energy journey. We are proud to be twelve times water positive—replenishing far more than we withdraw. Over half of our operational needs are met through harvested rainwater, while 14 per cent of the water we use is recycled. Every one of our plants operates on a Zero Liquid Discharge model, ensuring no wastewater ever leaves our sites. Through such initiatives, we have improved water intensity from 206 litres per tonne last year to 172 litres per tonne this year. For us, efficiency is not simply operational discipline; it is a responsibility we owe to society and the planet.

**Q Sustainability is also about re-thinking resources. How does Adani Cement embed circular economy principles—through recycling, alternative fuels, or innovative waste management?**

Circularity has become the defining test of a modern manufacturer, and at Adani Cement we are embedding it deeply across our value chain. By 2030, Ambuja and ACC together aim to utilise nearly 50 million tonnes of waste annually. This includes municipal, industrial, and agricultural waste, which serve as alternative fuels in place of fossil

sources. It also includes fly ash, slag, and waste gypsum, which are now integral to our blended cements—helping us reduce the clinker factor while conserving mined resources.

Our waste management arm, Geoclean, has become a national benchmark. In FY'25 alone, it co-processed over 0.57 million tonnes of waste in partnership with more than 50 municipalities, remediating over 20 legacy landfill sites. This not only reduces environmental load but also supports circular flows of material back into the economy. We have already achieved a thermal substitution rate of about 10 per cent, meaning one-tenth of our thermal energy now comes from such alternative fuels. Our target is to take this to 23 per cent by 2030.

Plastic is another area where we are pushing the envelope. By FY'25, we reached 11 times plastic negativity, meaning we co-process eleven times more plastic than what we consume in packaging. At the same time, our

commitment to zero waste to landfill ensures that all hazardous by-products are either reused or responsibly processed. With over 78 per cent of our production already being blended cement and extensive integration of construction debris into our processes, we are proving that waste does not need to be discarded—it can be transformed into value. This, I believe, is the essence of circular economy in action.

**Q India's geography is as diverse as its people—extreme heat, monsoons, corrosive coastlines, and seismic zones. How is Adani Cement responding with region-specific concrete formulations that are climate-responsive?**

India's vastness presents unique challenges for concrete, and our philosophy has always been to design solutions that respect local environments. For instance, in the intense summers of northern India, we have introduced value-added products such as Coolcrete



and ECOMaxX, which are designed to lower the heat generated during hydration and control temperature differentials in mass pours. This not only reduces thermal stress but also prevents cracking, ensuring longer durability of structures under extreme heat conditions.

In coastal regions, durability is threatened by salinity, sulphates, and moisture. Here we adopt a different approach, increasing the use of supplementary materials such as GGBS and fly ash, while adding corrosion-inhibiting admixtures that extend the life of structures exposed to aggressive sea water and saline soils. For seismic zones, where resilience is paramount, we provide high-grade concretes with superior compressive and flexural strength, customised to meet the demands of earthquake-resistant design.

What ties all this together is our emphasis on tailoring, not templating. Every climatic region has its own set of stresses, and we believe concrete should respond intelligently to them. That is why our teams work closely with clients to provide customised mix designs that surpass performance benchmarks while addressing local realities. Beyond structural applications, we have also developed curing-free dry mix mortars for masonry and plastering—innovations that save water and improve workability. This is how we see our role: not just supplying concrete, but engineering it for India's unique geographies and the climate challenges they bring.

**Q While the benefits of green and advanced concrete are evident, adoption in India still faces hurdles.**



**From your perspective, what are the biggest roadblocks, and what role should policymakers play in accelerating change?**

The adoption of green or advanced concrete in India is not a question of technology—it is a question of economics, awareness, and regulation. One of the most significant roadblocks is cost. Sustainable concretes, whether low-carbon or advanced formulations, often have higher upfront production costs, which makes them appear less competitive in a market that remains highly price-sensitive. Many customers, including contractors and even institutional buyers, still see concrete as a commodity rather than a performance material. This is compounded by limited awareness. Engineers, contractors, and end-users are sometimes sceptical about the performance of green concrete, simply because they are less familiar with it. Education and demonstration are critical to changing this perception.

Another challenge lies in regulation and standards. While India has made impressive strides in sustainability, our codes and standards for new concrete technologies are still evolving. There is often a lag between innovation and

regulatory acceptance. For example, public procurement rules still favour ordinary Portland cement in many cases, which can discourage the use of blended or alternative formulations. Without clear performance-based standards that recognise low-carbon mixes, adoption remains slower than it could be.

On the production side, scaling up new cement chemistries demands steady supply chains for industrial by-products like fly ash or slag, which are not always consistent. Technologies like LC3 or geopolymers require significant R&D and capital investment, which not all producers are in a position to make. This makes collaboration between industry, government, and academia even more essential.

Policymakers, in my view, have a pivotal role. Incentives such as tax breaks, subsidies, or green financing schemes would make early adoption more viable. Mandating a minimum share of blended or low-CO<sub>2</sub> cements in public projects would create guaranteed demand and build confidence. Regulators must also fast-track the development of performance-based standards so that engineers and builders know they can rely on these new materials for durability and safety. Public-private partnerships, particularly with institutions like the IITs, can accelerate innovation, while the rollout of carbon markets will provide economic motivation for decarbonisation.

Ultimately, what India needs is a performance-driven mindset. Instead of prescribing what materials must be used, our codes and procurement practices should define the outcomes—strength, durability, service life, and carbon footprint—and allow industry to innovate to meet them. That, I believe, will be the real catalyst for mainstreaming green concrete in India.