

Commercialising sustainability in cement: Why most solutions fail

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1 About Beaumont Bailey

“Beaumont Bailey is a leading executive search and leadership advisory firm, operating from offices in London and New York, with a client network spanning six continents. Our work is focused on shaping the leadership teams of the future, underpinned by deep sector specialisation that allows our consultants to partner with clients as trusted strategic advisors.

Nowhere is this more evident than in the building materials sector, and particularly within cement. We bring a long-established track record in this industry, with our global industrial practice having successfully completed more than 300 executive and C-suite search assignments. This includes mandates for six of the world’s ten largest building materials producers, alongside tier one and tier two cement manufacturers and traders, as well as organisations at the forefront of cement decarbonisation, alternative materials, and clean energy innovation.

The perspectives shared in the following article draw directly from our ongoing dialogue with senior leaders across the sector, including plant and operations executives, regional presidents, and founders of high-growth start-ups.”

2 State of play of The Grey Silicon Valley

Few sectors sit so comfortably at the crossroads of human necessity and environmental pressure as cement. Concrete, as a building material, is foundational to the development of modern society, whilst being responsible for close to eight percent of global CO₂ emissions when considering the full value chain (mainly from cement production).

Contrary to external perceptions, the sector has not been passive in addressing this issue. Over the past decade in particular, cement has become a focal point for innovation, developing its grey spin on Silicon Valley in the pursuit of Net-Zero. A huge number of start-ups, spin-outs, and technology-led initiatives have emerged in response, seeking to reduce the environmental impact of one of the world’s most critical materials.

Many of these initiatives are driven by exceptional individuals, combining deep technical expertise with a noble goal to improve the construction sector’s impact on the planet. When done right, these organisations can meaningfully support manufacturers in their decarbonisation efforts and make the prospect of a net-zero industry by 2050 far more achievable.



Estimates from the World Economic Forum, 2024, suggest that this transition requires an estimated \$1.4 trillion in cumulative investment through 2050, to meet the sector’s decarbonisation targets. Despite this, cement and concrete have attracted less than one percent of global climate tech venture capital over the past five years, with (Just \$1.4 billion out of \$205 billion invested) [1]. For a sector with close to eight percent of global CO₂ emissions, and major organisations committing hundreds of millions to decarbonisation plans, this feels strangely low.

This is due to a hard truth which remains: most new technologies and start-ups targeting cement decarbonisation struggle to move beyond the pilot stage. Even fewer make the leap from concept to a commercially deployed solution. This persistent failure to scale not only undermines investor confidence but also signals to industry stakeholders that such innovations may be fleeting or overhyped. For many of these ventures, the core issue lies not in the ingenuity of the solution itself, but in the inability to adapt it to the market and commercialise it effectively.

3 The Scale and Complexity of Making a Green Building Material

Creating a genuinely sustainable material, whether through the production of net-zero cement or other emerging alternatives, requires a perspective that extends well beyond the plant itself. It demands a holistic view of the entire construction value chain and the impact on its key stakeholders.

This is happening already across the ecosystem. Every possible touchpoint is being analysed through the lens of sustainability. At one end, there are efforts to reduce cement usage through increased adoption of supplementary cementitious materials. Elsewhere, alternative fuels and energy sources are being deployed to reduce the carbon and energy cost of production processes.

Many pursue breakthroughs in the currently highly expensive method of CCUS, which offers incredible payback periods.

Further along the value chain, some start-ups look at how concrete is designed and how it is used more effectively on site, with greater scrutiny and improvement enabled through data collection, digital optimisation, and artificial intelligence. A growing suite of sensors, cameras, data collectors, and mix design systems is flooding the market, promising to transform outdated methods and revolutionise construction.

There is even a growing focus on the long-term carbon profile of construction materials. This includes ambitions to develop products with regenerative properties, or those capable of continued carbon sequestration throughout their operational lifetime. There are even some niche applications where alternative materials, albeit expensive, claim to be negative zero.

The ambition, passion and ingenuity are admirable, but the market reality is that concrete is durable, reliable, widely available, and well understood. Construction companies, architects, and other stakeholders are understandably cautious when asked to adopt new materials or unfamiliar methods, particularly if performance is at risk or the ‘green premium’ eats into already tight profit margins.

These conditions create significant barriers to entry for even the most impressive or revolutionary solutions. The result is that after a decade of “green concrete” hype, near-zero cement still accounts for close to 0% of global cement production [2]. It is telling that the world’s first near net-zero cement released for sale (*Heidelberg’s EvoZero*) was just a few months ago, and this is enabled only by the state-of-the-art carbon capture facility in Brevik, Norway.

This failure rate of concept to commercialisation presents a problem for the decarbonisation roadmap. For many such solutions, it seems the same fundamental challenges emerge.

3.1 They fail to integrate

Many underestimate how difficult it is to integrate a new solution into the cement and broader construction materials ecosystem. The sector is defined by conservative operating environments, long-established standards, and an inherent intolerance for risk.

Solutions that require significant process change, bespoke operating models, or parallel systems often introduce too many barriers to adoption. Even where the technology itself is credible, any friction present at the point of integration can be enough to deter even the most open-minded potential customer. This sector is a busy one; any solution needs to help alleviate their schedules from the get-go to ensure adoption.

Successful solutions tend to be those that are designed to be minimally invasive. They work within existing specifications, integrate seamlessly into plant operations or customer workflows,

and reduce complexity rather than introduce it. Start-ups that expect customers, standards, or operating models to adapt around their solution, frequently struggle to progress beyond early engagement.

This difficulty has been consistently observed across past attempts to disrupt the space. Start-ups such as Novacem and Calera, both of which developed promising alternatives to Portland cement, ultimately failed to attract lasting cooperation from major players or significant VC investment—constrained by barriers on both the supply and demand sides of the value chain [3]. This embeddedness is crucial to a highly regulated sector like construction, and is viewed by many as the key barrier to entry [4].

On the other hand, when you integrate effectively and help to service outdated methods, and ultimately, alleviate the burden placed on many decision makers across construction, you can find they become your most vocal champions. Successful solutions that pass this point find themselves with a huge opportunity to scale across vast client projects and portfolios. A new challenge therefore emerges.

3.2 They fail to scale

The path from early-stage concept to full commercial deployment is where most solutions fail. Initial trials, pilots, and case studies are an important first step, but they do not unearth the realities of developing a solution that can make a significant impact on the sector. Major cement producers operate across multiple plants, geographies, and raw material profiles, with little tolerance for performance variability. Any solution adopted must scale across this environment without compromising quality or reliability. Most must actively improve performance to be even considered.

Some start-ups fail because they cannot demonstrate that their solution works economically or operationally at scale. Others scale too quickly, before their technology is fully proven. In these cases, inconsistency in performance or quality rapidly erodes trust, and once confidence is lost in a production environment, it is rarely recovered.

Solutions must demonstrate that they can scale repeatedly, predictably, and without exception. The Industrial Advisory Panel suggests, one of the defining challenges in cement decarbonisation is the ability to scale while maintaining strength, setting time, and throughput, without compromising product quality or operational reliability [5]. This is compounded by the need for significant upfront capital investment and a business model capable of meeting global production demand at an industrial scale. Relying on sustainability without factoring in feasibility is a common downfall, which leads me to my final point.

3.3 They overestimate the green premium

A common assumption is that an ingenious solution promoting sustainability alone will justify higher cost.

While demand for greener cement and concrete products is growing, the market remains highly price sensitive. Customers continue to prioritise performance, reliability, and cost. Solutions that are materially more expensive must deliver clear and tangible value beyond their environmental credentials.

Emerging low-carbon cement products currently face a significant cost gap, with prices ranging from \$65 to \$130 per ton compared to around \$50 per ton for traditional Portland cement—an average green premium of roughly 75% [6]. In an industry defined by thin margins, such premiums remain a major deterrent. A 2025 embodied carbon industry report revealed that 40% of concrete professionals cited cost as the primary barrier to reducing embodied carbon, well ahead of any concerns about technical readiness or risk aversion [7].

Subsidies and institutional support can help bring solutions to market, but they do not create sustainable demand. Long-term commercial adoption requires a product that is competitive on quality and economics first, with sustainability acting as the added benefit and difference-maker rather than the sole selling point.

Green products are often premium products, and products enabling greener production or efficiency are themselves an extra cost to the customer. However, for a product to scale, at all points, the performance improvement or potential for gains must always outweigh the cost and outperform the alternatives in the market. A clear example is **CarbonCure Technologies**, where a CO₂ mineralisation technology is retrofitted into existing concrete plants, allowing producers to inject captured CO₂ during mixing and optimise cement content at the truckload level. This firstly delivers cost savings and economic benefits to the producers, whilst also helping the climate through CO₂ utilisation.

The solutions that succeed are those that recognise early that this is a market like any other. Being greener is an important difference maker, but the product must still win on its basic merits and qualities.

4 Conclusion

The cement sector does not lack innovation, ambition, or technical capability to decarbonise and reach net-zero. What it lacks, at times, is a realistic pathway from promising concept to scalable commercial solution. For start-ups and technology developers, success is rarely determined by how novel an idea is, but by how well it fits into

the operational, economic, and cultural realities of the industry it seeks to serve.

So, how can we address this?

- **Integration failure**—Solutions are often too complex or misaligned with existing workflows, failing to account for entrenched standards, stakeholder risk-aversion, and regulatory inertia.
→ *Design solutions around current industry norms and limitations, not against them. Prioritise minimal disruption and frictionless integration.*
- **Scaling failure**—Promising ideas falter when they either scale too quickly, or are not commercially viable at scale. Technical inconsistency and underinvestment frequently erode trust before a product reaches commercial maturity.
→ *Validate at scale through phased, performance-backed pilots. Build credibility with consistent results before accelerating deployment.*
- **Green premium overreach**—Many products enter the market priced significantly above traditional materials, banking on sustainability credentials to justify the cost. In most cases, the value proposition is insufficient to overcome this gap.
→ *Deliver measurable economic or performance advantages in addition to carbon benefits. Work toward cost parity, not just emissions parity.*

The future of green cement will not be shaped by innovation alone. It will be defined by those solutions that can integrate seamlessly into existing operating environments, protect margins, deliver consistent performance, and scale without relying indefinitely on subsidies.

Many concepts have (and will continue to) fall along this pathway to decarbonisation. But for those that pass the test of integration, scale, and value, the potential opportunity within this sector is immense.

About Beaumont Bailey

Beaumont Bailey is an international executive search and leadership advisory firm specialising in the building materials and heavy industrial sectors, including cement. The perspectives in this article are informed by the firm's ongoing dialogue with senior executives across the global cement value chain.

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