Interview by Peter Edwards, Global Cement Magazine

SAUDI ARABIA'S FUTURE CEMENT INITIATIVE

Saudi Arabia's government, cement producers and university researchers have come together to work on decarbonisation within the Future Cement Initiative (FCI), as its founder Bassam Dally explains...

***Global Cement (GC):* What led to the founding of the Future Cement Initiative (FCI)?**

Bassam Dally (BD): The idea for the FCI arose following a project and a national workshop on decarbonising cement funded by King Abdullah University of Science and Technology (KAUST) that I held in October 2022. The event highlighted the need for a coordinated effort to ensure the sustainability of the cement industry and to research strategies and approaches that will satisfy the government's desire to decarbonise, while maintaining the economic viability of the industry.

I worked closely with cement companies and the Ministry for Industry and Mineral Resources towards the establishment of the FCI, which was formally launched during the Future Minerals Forum in Riyadh in January 2025. Saudi Arabia's Public Investment Fund (PFI) joined as a partner later on. By having all stakeholders around the same table, we can achieve bigger and more impactful outcomes for industry, society and the environment.

Beyond financial support, each partner represents a critical sector in the whole supply chain: KAUST acts as an independent national university with research expertise and infrastructure. The cement companies directly benefit from this, as does the PIF, which is a major end user of cement. The Ministry is key, as it can drive the policies that enable the sector to decarbonise.

The Future Cement Initiative was launched in January 2025. **Source:** KAUST.

***GC:* What are the main aims of the FCI?**

BD: The FCI will support research, development and recommendations of effective agreeable approaches to future-proof cement manufacturing in Saudi Arabia. It will do so by enabling collaborative research, industrial implementation of new technologies, pilot demonstrations, developing interactions with international experts and developing human capital. It will advise and recommend solutions to the government and cement industry stakeholders.

Bassam Dally is a Professor of Mechanical Engineering with 34 years' experience in energy, mineral processing and decarbonisation. Born in Palestine, he moved to Australia to complete his PhD at the University of Sydney in 1991. He moved to the University of Adelaide in 1998, where he switched to the study of industrial combustion, first collaborating with the cement industry in 2010. He moved to the King Abdullah University of Science and Technology (KAUST) in Saudi Arabia in 2021, where he initiated and subsequently founded the Future Cement Initiative (FCI) in 2025.

Another important aspect is that decarbonisation will have to be paid for. FCI will help identify the best ways to spread the costs. Will it come from a government subsidy? Will it come from higher prices? Is it some combination of the two? The FCI will smooth the wheels of this discussion. After all, everyone – from the top down – knows that the trajectory is towards decarbonisation. It is best for all parties to collaborate, rather than butt heads.

***GC:* Where does the Saudi cement industry find itself in 2025, in terms of sustainability?**

BD: The Saudi cement industry is on the right track in terms of sustainability, but more needs to be done. With the help of FCI, I'm confident that we will reach our targets. Lately, the government has implemented its Liquid Displacement Program, where natural gas replaces diesel and heavy fuel oil, at all but five of the cement plants. At present, the alternative fuel substitution rate is still small, 35,000-50,000t/yr. For example, City Cement is using around 25% alternative fuels, most of it municipal solid waste (MSW), with aims for 50% by 2030. Al Safwa also used tyre-derived fuel for one of its lines, but unfortunately this recently became uneconomical.

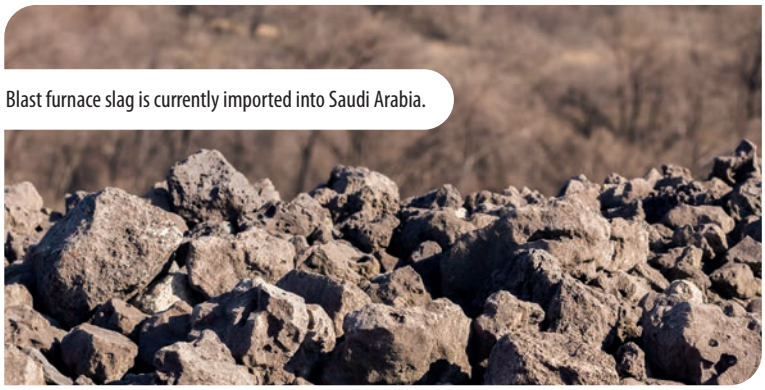
The use of supplementary cementitious materials (SCMs) is highly variable between companies, and is a function of feedstock availability, noting that some plants import fly ash and slag. Locally-sourced SCMs are one of FCI's main areas of interest. We have active projects in identifying and assessing suitable materials near to the different cement plants across Saudi Arabia. The clinker factor across the country is estimated to be around 80-90%, although some products use up to 70% SCMs.

***GC:* What are the main 'levers' in Saudi Arabia's road to decarbonisation?**

BD: The first two levers are described above. The use of alternative fuels, particularly MSW, will be key. The government has an ambitious plan to divert 85% of MSW from landfills by 2035. With 15Mt/yr produced in 2024, this translates to ~12.5Mt of MSW, all of which could theoretically be used by the country's cement sector.

The second is to source local SCMs to reduce the clinker factor while minimising transport emissions and costs. While there is no fly ash – and very little slag – produced domestically, there are extensive

Mixed MSW in Al Ahsa in 2024. **Source:** Wiropidah Dahlan / Shutterstock.



Blast furnace slag is currently imported into Saudi Arabia.

pozzolan reserves, and clays that could be calcined. There's a lot of coordination to be done, which is where FCI steps in. We will act as a centre of expertise and advice for all things pertaining to cement decarbonisation.

It is also important to point out that KAUST is active in many lesser-known fields in and around cement decarbonisation. This includes the development of polymers that can be used to allow for very high SCM substitution rates. We are investigating graphene sources for the development of higher strength concretes and leading research that shows that recarbonation of concrete is particularly rapid in Saudi Arabia. Are there ways to exploit this? We are also investing in magnesium-based cement research, either as a stand-alone product or additive to conventional cement blends. Remember, it is the Future Cement Initiative, not the 'slightly better normal cement initiative.'

***GC:* How will progress be reported?**

BD: Progress will be measured by implementing the outcomes of KAUST's research, by identifying local SCMs substitutions and derisking their adoption, and by developing new additives and technology, all with the aim to help the industry decarbonise while maintaining profitability. In addition, FCI will help the government to develop strategies and policies that will guarantee the sustainability of the industry.

Progress will be reported internally in the form of reports, with some content also available via our website. We are also planning an annual national workshop to report our findings, seek feedback and strategise into the future.

As founder, I travel extensively within Saudi Arabia to present the latest findings to the industry. I also travel internationally to events like the *Global CemFuels Conference* to seek the latest and greatest ideas. I also curate a recommended reading list for the industry in Saudi Arabia, including some articles from your publication.

***GC:* Will a cement sustainability roadmap be published, as has been seen elsewhere?**

BD: I'm not aware of any immediate plans, but if anything emerges it will be top level.

***GC:* How would you like the FCI to develop in the future?**

BD: The FCI is currently due to run for three years, but it was clear from the outset that it will be renewed, hopefully indefinitely. In the coming years, I would like it to retain its independent role as a laboratory and / or thinktank. KAUST will remain as a key participant, but I think that leadership will be more evenly spread between the members in the future.

***GC:* We wish you all the best with it Bassam.**

BD: Thank you!

City Cement uses a large proportion of refuse-derived fuel (RDF) produced from MSW.