



June 30, 2023

Mark Sippola, Ph.D.
California Air Resources Board 1001 I Street
Sacramento, CA 95814

RE: Comments on Workshops for SB 596 Cement Sector: Net-Zero Emissions Strategy

Dear Dr. Sippola:

Thank you for the opportunity to comment on the Workshops for the Senate Bill SB 596 Greenhouse Gases: Cement Sector: Net-Zero Emissions Strategy.

We hope our comments and recommendations below will be beneficial to your efforts to develop a comprehensive strategy for the state's cement sector to achieve net-zero emissions of greenhouse gases associated with cement used within the state as soon as possible. In addition to this letter, we will provide supplemental documents to support the comments and recommendations below.

Summary of Recommendations

We hope you'll consider the following recommendations as you develop the comprehensive cement sector strategy.

- Support the technologies with the most rapid and significant sector-wide emissions reductions, including those from new market entrants with alternative cement and concrete decarbonization technologies
- Support and prioritize the more cost-effective cement and concrete decarbonization technologies. With California's leadership, such technologies are the most likely to be adopted globally for maximum impact on climate change
- Support and prioritize the more scalable cement and concrete decarbonization technologies, specifically technologies applicable to both non-structural AND structural concrete production
- Support, prioritize and incentivize technologies that do not produce CO₂ in the first place (Carbon Avoidance, CA) over long-term initiatives and more expensive technologies that facilitate CO₂ production, capture, transport, utilization and sequestration (Smart Carbon Usage, SCU)
- Avoid subsidizing technologies that utilize concrete as an expensive, limited-scale storage medium for commercially distributed, captured *and manufactured* CO₂, when lower cost alternatives for long-term sequestration and storage of CO₂ are available



- Implement complementary strategies to reduce the greenhouse gas emissions from cement production and grow the demand for low-carbon concrete by establishing ***the embodied carbon in concrete products as a primary metric for industry incentives***, e.g. the framework of the Marin County Low-Carbon Concrete
- Support the development of guaranteed demand-side legislation and policies for the use of low-carbon concrete by State agencies, including:
 - Legislation and policies to incorporate cement and concrete into the State’s Buy Clean California Act (BCCA)
 - Legislation and policies that guarantee procurement of low-carbon cement and concrete, including *ALL* available supplementary cementitious materials (SCMs), for the *MAJORITY* of state agencies’ requirements
 - Low Carbon Product Standards for various concrete specifications and products
- Provide funding for demonstration projects to accelerate the validation and certification of new alternative low-carbon cements and concrete technologies by CalTrans, the gate keeper for the widespread adoption of new cement and concrete technologies

About Ecocem

Ecocem Materials Limited (Ecocem) is a pioneer of high-performance technologies that significantly reduce CO₂ emissions from the cement and concrete industries. Its products reduce the carbon footprint from traditional cement manufacturing by at least half.

For over 20 years, Ecocem has been developing, manufacturing, and supplying low carbon cement and construction solutions, including the lowest carbon cements ever used at scale.

Ecocem’s products have been used in many of the most critical and challenging infrastructure projects in Europe as well as in everyday concrete. Since it started commercial production in 2003 Ecocem has achieved a cumulative reduction in CO₂ emissions of almost 15 million metric tons, equivalent to the annual emissions of more than three and a half million cars.

An independent company with a world-class innovation center and four manufacturing facilities across Europe, Ecocem’s technological innovations, products, and services are helping the cement and concrete industries to cost-effectively decarbonize in alignment with the Paris Accord – and ultimately, build a more sustainable future for all. Ecocem is currently permitting a GGBFS manufacturing facility at the Port of Los Angeles to facilitate widespread adoption of its low carbon cement and concrete technologies in California.

Ecocem latest innovation, ACT, is its most significant to date. It is a breakthrough, High Filler, Low Water (HFLW) cement and concrete technology that combines technical innovations in cement and concrete production to enable the use of widely available low-carbon materials to decarbonize the production of cement by up to 70%, while enhancing the strength and durability of the concrete it is used to manufacture. ACT is universally scalable by design. Through licensing, ACT cements can be produced at existing cement plants with modest investments for grinding and blending capacity and can be deployed rapidly for widespread



adoption. ACT is designed to mimic conventional ready-mixed concrete workability and performance for virtually all applications utilizing the current industry infrastructure.

ACT is the culmination of a decade of innovation by Ecocem's 39-member Innovation team (27 PhDs) to optimize the combination of emerging cement and chemical admixture technologies to create a universally scalable breakthrough low carbon cement technology. ACT has been subject to extensive technical validation and has been successfully demonstrated in industrial trials in ready mixed concrete in France. A European CE mark certifying the product is expected in 2023, and the first commercial applications will follow with full market access by 2025 in the European markets where Ecocem is present (France, UK, Benelux, Ireland).

ACT is a giant leap forward from conventional HFLW low-carbon cement technology, a technological approach to cement decarbonization proven by PLC and LC3 cements among others. By significantly increasing the filler content of cement and concrete with readily available limestone and other mineral fillers used in combination with reduced portions of locally available SCMs, ACT provides a cost effective, universally scalable solution for California to meet its SB 596 decarbonization targets for the cement and concrete industry sector.

The next step to widespread adoption in California is for Ecocem is to localize the ACT technology for its production in California. This process would start with a thorough assessment of locally available California cements, limestones, natural pozzolans, GGBFS etc. as well as local concrete aggregates and sands to establish local formulations and validate the technology according to ASTM, ACI and CalTrans testing standards and performance requirements. The commercialization of Ecocem ACT technology in California is planned to be through licensing to existing companies. ACT commercialization in California is complementary to, but not dependent upon Ecocem's planned GGBFS facility at the Port of Los Angeles.

We urge CARB to include HFLW cements, and specifically the most advanced HFLW technology, Ecocem ACT, in its comprehensive decarbonization strategy for California to achieve net-zero emissions of greenhouse gases associated with cement used within the state **as soon as possible**; prioritizing technologies that can be implemented readily, are scalable for the entire sector and are cost effective. We believe it is imperative that the scope of the comprehensive strategy includes concrete production with alternative cement and concrete technologies. To focus a strategy only on cement manufacturing would exclude many of the most promising and impactful opportunities and would be analogous to a strategy to decarbonize the electrical energy industry by only making conventional fuel burning boilers more efficient and/or use renewable fuels to the exclusion of solar and wind energy technologies, or the automotive industry by only making ICE vehicles more fuel efficient to the exclusion of EVs and hydrogen.

Thank you again for the opportunity to participate in the process and comment. We look forward to working with you and other stakeholders in the coming months to support the development of the Cement Sector Comprehensive Strategy.

All the best,

Steve Bryan
MD Ecocem Americas