



Decarbonized Cement & Concrete Alliance

November 1, 2023

The Honorable Dr. Steven Cliff
Executive Officer, California Air Resources Board
Sacramento, CA 95814

Re: SB 596 - Cement Sector Net-Zero Emissions Strategy

Dear Dr. Cliff:

We write on behalf of the Decarbonized Cement and Concrete Alliance (“DC₂”) to offer our comments to the California Air Resources Board (“CARB”) on the Cement Sector Net-Zero Emissions Strategy (the “Cement Strategy”). We greatly appreciate CARB soliciting community input regarding the Cement Strategy through the recent SB 596 Community Meeting. The Cement Strategy has the potential to not only show how a single state can decarbonize the cement and concrete made and sold within its borders; it promises to demonstrate how governments throughout the United States and around the globe can act comprehensively to zero out the climate impact from one of the hardest to abate sectors.

The ultimate success of the Cement Strategy depends on incorporating a range of strategies to achieve carbon reductions from the incumbent cement industry (e.g., optimizing the use, mixing, and CO₂ content of cement and concrete), while also accelerating the commercialization of newer cement and concrete technologies that promise even deeper, and more sustainable, emission cuts in the future. Critically, as the U.S. Department of Energy indicated in its recent *Pathways to Commercial Liftoff: Low Carbon Cement* report, accelerating the commercialization of transformational low-carbon cement and concrete solutions requires innovative procurement strategies, such as advance market commitments, from the government agencies dominating the U.S. market for cement and concrete.

About DC₂

DC₂ is a coalition of innovative companies at the forefront of the global effort to reduce carbon emissions from cement and concrete. Our ten current members—Biomason, Blue Planet Systems, Brimstone, CarbonBuilt, Cement, Fortera USA, Minus Materials, Queens Carbon, Sublime Systems, and Terra CO₂—are pioneering, North American venture- and private-sector backed climate technology companies dedicated to delivering ultra-low-carbon, carbon-neutral, and carbon-negative cement and concrete solutions. Our technologies collectively rethink production processes and feedstocks, introduce novel materials, and utilize or sequester CO₂

directly in concrete—all with the goal of decarbonizing the cement and concrete sectors. Four of DC₂'s founding members—Blue Planet Systems, Brimstone, CarbonBuilt, and Fortera—are based in California.

Significant Investments and Clear Market Signals Needed to Decarbonize Cement

The leading, near-term carbon reduction strategies offered by the incumbent cement industry—such as adding limestone, calcined clay, or mixing cement with greater proportions of blast furnace slag or coal-derived SCMs—are beneficial, but many of these opportunities have been fully utilized or are limited in their impact. While a promising start, these industry solutions will fall short of achieving the level of carbon reductions required by SB 596 or demanded by the climate crisis.

Achieving that much lower threshold will require significant investments in transformational solutions – technologies able to achieve deeper carbon reductions. This includes bringing new cement and concrete solutions to market, such as those offered by DC₂ members, which hold enormous promise for both zeroing out CO₂ in cement and concrete production and for permanently sequestering CO₂. Together, these solutions could achieve dramatic carbon reductions and the promise of carbon-negative construction. This is fundamental alongside investments for achieving deeper emissions reductions at existing cement facilities, such as through carbon capture, utilization, and storage (“CCUS”) or scaling renewable fuel supplies for the cement sector.

Obtaining financing to scale these low-carbon cement and concrete solutions requires demonstrating market demand to the satisfaction of underwriters in the financial sector or government. Committed offtake is a key prerequisite for achieving the commercial-scale financing needed to decarbonize the sector, where customers agree in advance to purchase the future production of low-carbon cement and concrete plants. So far, this financing model—long the standard for clean energy—has not been applied to decarbonized cement and concrete solutions, thus complicating financing and project development.

Advance Procurement Commitments Critical to Achieving SB 596 Objectives

We appreciate that SB 596 specifically directs CARB to evaluate new measures to overcome the market, statutory, and regulatory barriers standing in the way of decarbonizing cement and achieving net-zero greenhouse gas emissions in the sector. It expressly directs CARB to evaluate “measures to support market demand and financial incentives to encourage the production and use of cement with low greenhouse gas intensity.” As we described in previous comments,¹ offtake agreements, such as advance procurement commitments, are critical to overcoming structural barriers to deploying ultra-low cement and concrete technologies at scale. We urge that the Cement Strategy specifically recommend that state agencies enter into offtake agreements and highlight their essential role in achieving the goals of SB 596.

Additionally, certain structural barriers prevent even the most promising low-carbon cement and concrete technologies and strategies from securing offtake commitments. First, the notorious

¹https://ww2.arb.ca.gov/system/files/webform/public_comments/4211/2023.6.27%20Letter%20to%20CARB%20re%20Advance%20Procurement%20%281%29.pdf

boom-and-bust cycle of construction discourages private participants in the real estate market from entering into long-term financial commitments. More fundamentally, it is government, not the private sector, that is the main purchaser of cement and concrete. In California, public agencies account for about 40 percent of all cement and concrete purchased annually. Accordingly, any financial underwriting will look to the government as the key source of cement and concrete demand and market driver for low carbon products.

Yet traditional public procurement in California and elsewhere in the United States—which focuses on individual projects put out for RFP, with materials specified and not directly procured—is not currently structured for advance purchases of commodities, such as cement or concrete. Indeed, the traditional menu of policy “fixes” for promoting low-carbon materials, such as new product specifications or “Buy Clean” incentives, may help products already in the market find traction. However, they will do nothing to scale up next-generation solutions, which depend first and foremost on entering firm, bankable purchase commitments from customers.

To enable the rapid development and scaling up of next-generation solutions to decarbonize the cement and concrete sectors, and achieve California’s climate goals, advance procurement commitments are essential. Coupling these purchase commitments with other demand-side strategies, such as Buy Clean, can serve an important reinforcing function. Buy Clean or related procurement structures, however, cannot replace the offtake agreements financial institutions require. Advance procurement commitments must be part of a procurement strategy in California to achieve the goals of SB 596.

Growing Recognition for the Role Advance Procurement Commitments Play in Achieving Deep Decarbonization

Advance procurement commitments are increasingly seen as one of the most powerful strategies for accelerating the development and market entry of critical climate solutions. For example, this is the approach taken by the First Movers Coalition—a joint initiative of the Biden Administration and the World Economic Forum—which is focused on bringing critical technologies across an array of hard-to-abate sectors to commercial scale within the next decade to achieve net-zero emissions by mid-century. In particular, the coalition represents large companies who have pledged to use advance procurement commitments to improve the market for a range of transformative, low-carbon industrial materials, including cement and concrete. These private sector efforts, while important, are insufficient on their own to drive growth in the concrete market, given the dominant role of government procurement.

The U.S. Department of Energy has specifically highlighted the essential role of advance procurement commitments from government and the largest private cement buyers in commercializing low-carbon cement and concrete. They first highlighted this need in a publicly released Request for Information (OCED-RFI-21-1). More directly, the agency’s recent report, *Pathways to Commercial Liftoff: Low-Carbon Cement*,² concluded that “liftoff” hinges on:

...creating a strong demand signal from coordinated low carbon procurement—a signal that may come from the government through public procurement. This demand signal will be vital to incentivize the rapid uptake of new technologies, drive aggressive deployment, and mobilize capital

² <https://liftoff.energy.gov/wp-content/uploads/2023/09/20230921-Pathways-to-Commercial-Liftoff-Cement.pdf>

at the required scale... With their commanding market share, government agencies and large private buyers are in the leading position to send this demand signal and transform the market.

The report specifically identifies the need for alternative procurement models that provide direct offtake for projects and include the following elements:

1. A direct, legally enforceable contract,
2. Guaranteed offtake for most or all of a plant's output, and
3. Active management of intermediaries in the supply chain.

Finally, the report outlines several potentially powerful procurement strategies, including “advance market commitments, direct procurement or structured offtake agreements, contracts for differences, contractual price guarantees, and advance purchase agreements for avoided carbon emissions.” (pg. 47)

Using advance purchase agreements has long been the preferred approach for expanding clean energy generation in the electricity sector, as well. Project developers leverage power purchase contracts from utilities, entered into years in advance, to unlock financing for solar, wind, and other renewable projects. California just expanded this concept through Assembly Bill 1373 (Garcia, Chapter 367, Statutes of 2023), which creates a statewide central procurement entity for large, long-lead time energy resources, like offshore wind.

Conclusion

As one of the world's largest purchasers of cement and concrete, the State of California has a tremendous opportunity to shape and develop the market for low-carbon cement and concrete both within and beyond its borders. California can use its tremendous market power to strategically accelerate and scale up the production and availability of next-generation solutions. Establishing a public pathway by which California state agencies could enter into advance procurement contracts would provide the most promising suppliers with the proof of demand they need to finance commercial production. At the same time, it would enable state agencies to establish a pipeline of ultra-low-carbon materials the state will need to meet its ambitious climate goals. Not only would this strategy help achieve the goals of SB 596, but it would also place emerging California companies and their peers in other states at the epicenter of the global effort to decarbonize the cement industry. We encourage CARB to highlight this important strategy and opportunity in the Cement Strategy.

Sincerely,

Decarbonized Cement & Concrete Alliance³

³ Correspondence can be directed to DC2@decarbonizedconcrete.org. Contacts and logos for member companies follow on the next page. Note: Decarbonized Cement and Concrete Alliance was formerly known as the Decarbonized Cement and Concrete Working Group.

DC₂ Alliance Members



Contact: Troy Hottle
troy.hottle@biomason.com



BRIMSTONE

Contact: Simon Brandler
simon@brimstone.com



Contact: Gregory Houchins
greg@chement.co



Contact: Sarah Williams
sarah.williams@minusmaterials.com



Sublime Systems
Contact: Joe Hicken
joe@sublime-systems.com



Contact: Laura Berland-Shane
laura@blueplanetsystems.com



CarbonBuilt
CARBON FOR GOOD

Contact: Sal Brzozowski
sbrzozowski@carbonbuilt.com



Contact: Connor Woodrich
cwoodrich@forterausa.com



Contact: Daniel Kopp
daniel@queenscarbon.com



Michele Blackburn
Contact: mblackburn@terraeco2.com