July 7, 2023

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

RE: Comments on June 14, 2023 Cap-and-Trade Workshop

Dear Dr. Sippola:

Brimstone appreciates the opportunity to comment on the Joint California-Québec Workshop: Potential Amendments to the Cap-and-Trade Regulation. The Cap-and-Trade Program (C&T) is one of the State's primary tools for decarbonizing industry, including cement. We look forward to working with CARB and engaging in the C&T regulatory amendment process to ensure successful implementation of SB 596, to achieve net-zero greenhouse gas emissions in cement, and achievement of carbon neutrality statewide.

About Brimstone

Brimstone is a California-based company, headquartered in Oakland, with a carbon-negative process for making ordinary portland cement. Cement is one of the leading drivers of climate change, with nearly the same greenhouse gas impact as all the cars on the road today, and it has traditionally been one of the most difficult materials to decarbonize – until now.

Our process produces ordinary portland cement from carbon-free calcium silicate rocks rather than limestone. This avoids the process emissions associated with producing portland cement, and also produces a magnesium byproduct that absorbs CO_2 from the ambient air and permanently stores it as magnesite rock.

Brimstone is upending the conventional wisdom that CO_2 process emissions are a necessary outcome of cement production and that carbon capture and sequestration (CCS) and associated high costs and/or subsidies are required to decarbonize the traditional process. We are also proving that carbon removal and direct greenhouse gas emission reductions at their source can, and should, go together, and need not be considered tradeoffs.

Principles for decarbonizing California's cement sector

As described in our recent comments related to the SB 596 Cement Sector Strategy, we suggest the following principles to guide efforts to decarbonize cement, including in C&T:

- The definition of cement should not assume production from limestone.
- Support the most rapid and significant sector-wide emissions reductions possible, including from new market entrants.
- Hold imported cement to similar standards as in-state production.
- Maintain a level playing field in the marketplace, and avoid:
  - Incentivizing greenhouse gas emissions reductions at existing facilities over development of new, low carbon cement facilities.
  - Incentivizing the production and capture of CO_2 at the expense of technologies that do not produce CO_2 in the first place.
- Develop enabling policies supporting demand for low carbon cement (and concrete) products:
  - C&T should provide allowances on an equal basis to both incumbent and new cement industry competitors.
  - Policies should enable low-carbon cement suppliers to obtain guaranteed and bankable purchase agreements.
    - Most critically, as part of a demand-support strategy, advance market commitments are critical for enabling new technologies and ultra-low carbon solutions to reach the market and scale.
- Develop enabling policies to support low carbon cement projects and facilities.

Definition of cement should not assume production from limestone

CARB's current definition of cement in the C&T Program and Mandatory Reporting Regulation does not include Brimstone's technology, even though Brimstone produces the same material – ordinary portland cement – as conventional cement producers. Our product is chemically, physically, and functionally identical to ordinary portland cement produced from limestone. As proposed at the recent SB 596 workshop, we support a definition that includes materials meeting the requirements of ASTM C150, C595 or C1157, or a similar cement definition inclusive of our technology. Likewise, we urge CARB to adopt such a definition in its C&T program and Mandatory Reporting Regulation, to ensure that Brimstone can compete on a fair basis with incumbent manufacturers.

Maintain a level playing field in the marketplace, and avoid incentivizing the production and capture of CO_2 at the expense of technologies that do not produce CO_2 in the first place

Another aspect of ensuring a level playing is to craft potential incentives associated with CCS – including federal incentives and value under C&T or other programs – in a manner that does not advantage technologies that produce CO_2 and later sequester it over solutions designed to avoid carbon emissions. Coupled with the recent increase in the federal 45Q tax credit for CCS, legacy emitters could potentially profit by producing CO_2 only to capture it, and gain an advantage compared to solutions from Brimstone and others that dramatically cut or entirely avoid the production of CO_2. This perverse incentive may grow further if California further incentivizes CCS under Cap-and-Trade.

As you consider amendments to the C&T program, we urge you to carefully review the costs associated with CCS of the process emissions from cement production and federal and state CCS incentives to ensure a level playing field for new, low-carbon or carbon-neutral technologies. Specifically, we request that you ensure that (1) entities are not incentivized to produce CO_2 (that is, combined federal and state incentives do not exceed costs of CCS) and (2) conventional CO_2-intensive processes and technologies are not being supported at a greater level than new low-carbon or carbon-neutral technologies. Put simply, if a company is paid \$130/$MTCO_2$ to produce and capture CO_2, Brimstone and similar companies that avoid producing CO_2 in the first place should receive a similar incentive for CO_2 avoided.

Develop strategies to incentivize and demonstrate new, low-carbon cement technologies

We encourage CARB to consider targeted strategies through the C&T program for funding emerging technologies, including cement production, that do not produce CO_2 via process emissions. We note that CCS of process emissions is well-supported through federal incentives already, and would also enable emitters to avoid Cap-and-Trade costs (assuming CARB amends the program to incorporate CCS). Accordingly, we strongly encourage CARB to consider a separate set of strategies and incentives to foster the commercialization of ultra-low-carbon cement solutions that do not rely on CCS. This should include allocating allowances for new market entrants with low emissions, including those potentially not covered by the C&T due to low levels of emissions, at levels at least equal to the average industrial benchmarks.

Incorporate a wide array of carbon dioxide removal (CDR) strategies into C&T and Mandatory Reporting Regulations

As highlighted in the workshop, we understand CARB's intention, and direction from the legislature and Governor, to include CCS and CDR as part of the State's climate framework, including in the C&T program. We support incorporating CCS into the C&T program, provided, as noted above, that strategies that do not produce CO_2 in the first place are prioritized, and certainly not put at a disadvantage. CCS is synonymous with "hard to abate" because it is a complicated and costly strategy, and we encourage CARB to support it only as a last resort to alternative strategies.

CDR is related but distinct, and absolutely necessary to achieving the State's objectives of net-zero greenhouse gas emissions as soon as possible, and net-negative emissions thereafter. We strongly support CARB incorporating CDR strategies into the C&T program and Mandatory Reporting Regulation, and encourage CARB to account for them as offsets in C&T and negative emissions in the Mandatory Reporting Regulation. CARB should evaluate allowance allocation in the C&T program for industrial entities, such as Brimstone, whose operations generate *negative* emissions, and in those cases, provide allowances equal to the industrial benchmark plus the absolute value of the net-negative emissions. Allocated allowances above and beyond the industrial benchmark could come out of the auction pool. Importantly, CARB should specifically allow mineralization, which permanently sequesters CO_2 as rock, as an eligible CDR strategy in the C&T and Mandatory Reporting programs.

Develop demand-side policies and other mechanisms to further accelerate industrial decarbonization

CARB can further accelerate industrial decarbonization, including for cement, through supportive demand side policies as well as allowance allocation mechanisms that incentivize accelerated and deeper decarbonization than otherwise expected. A key policy lever the State should deploy is Advance Market Commitments for products, including cement, that are produced with very low emissions. Under an Advance Market Commitment framework, the State would enter into an agreement – at no initial cost – for low carbon cement or other products, in order to create bankable contracts that will enable new facilities to be developed and emerging technologies to reach commercial scale. (For more on this concept, please see our comments and those of the DC2 coalition submitted as part of the recent SB 596 workshop.) This is a tool being embraced by the Biden Administration and deployed as part of the First Mover's Coalition to support emerging strategies and technologies to decarbonize hard-to-abate sectors, and is something CARB, Caltrans, and other agencies should consider to help decarbonize cement and other hard-to-abate sectors in the State.

Conclusion

Thank you again for the opportunity to comment on this workshop and the C&T program and related Mandatory Reporting Regulation. We look forward to working with you and other stakeholders in the coming months to support amendments that will lead to the greatest, most rapid greenhouse gas emission reductions, and demonstrate that emissions in even the most "hard-to-abate" sectors can be quickly and eliminated once we put our minds to it.

Please do not hesitate to reach out if you have any questions about Brimstone or these comments.

Thank you,

Simon Brandler
Vice President of Policy
Brimstone