

The Honorable Tom Carper
Chairman
Environment and Public Works Committee
Washington, D.C. 20510

The Honorable Shelly Moore Capito
Ranking Member
Environment and Public Works Committee
Washington, D.C. 20510

Dear Chairman Carper and Ranking Member Capito:

The Portland Cement Association (PCA)¹ appreciates you holding the hearing titled, *Opportunities in Industrial Decarbonization: Delivering Benefits for the Economy and the Climate*. This hearing is essential, as an opportunity to share our progress and challenges with Congress, as the cement industry decarbonizes. We encourage the Committee to use this hearing to evaluate future federal permitting and regulatory reform along with the investments needed to reduce manufacturing emissions. Additionally, as the Committee considers public policies for infrastructure and government procurement, it should consider the availability of the materials, its resilience, and its ability to protect life.

PCA and its members are appreciative of the Environment and Public Works Committee's support of the industry in recent years, particularly in the Infrastructure Investment & Jobs Act and Inflation Reduction Act.

PCA's members represent the majority of cement production capacity in the United States and serve nearly every congressional district. The cement and concrete industry contribute over \$100 billion to the U.S. economy and employs over 600,000 people.

Cement – the principal ingredient in concrete – makes civilization possible. The mixture of portland cement, aggregate, and water makes the building material concrete. Concrete is essential to the modern world. It is used in the pipes and facilities that deliver clean water, to build the ports essential to world trade, to construct mass transit systems connecting people, and in the buildings we work and live in.

Our industry has pledged to become carbon neutral across the cement and concrete value chain by 2050.² By way of brief background, cement manufacturers face a unique chemical fact of life. The chemical process required to convert limestone and other raw materials into clinker, the primary ingredient in cement, generates carbon dioxide (CO₂) as an unavoidable byproduct during pyro-processing. Currently, roughly 60 percent of all emissions from the cement sector come from these manufacturing process emissions, separate and distinct from energy-related emissions. While the industry expects to make great strides in reducing carbon emissions through measures like using carbon-free fuel/heating technologies and low-carbon/carbon-free raw materials, the full elimination of CO₂ generated from raw materials during pyro-processing is

¹ PCA conducts market development, engineering, research, education, technical assistance, and public affairs programs on behalf of its member companies. Our mission focuses on improving and expanding the quality and uses of cement and concrete, raising the quality of construction, and contributing to a better environment.

² https://www.cement.org/docs/default-source/roadmap1/pca-roadmap-to-carbon-neutrality_final.pdf

not possible. Given this chemical fact of life, the cement industry requires expansive tools and technologies to achieve deep decarbonization.

Cement Blends

Other than water, concrete is the most-used material on the planet, representing about 50% of all manmade materials by mass. The United States uses over 120 million tons of cement each year. Because society produces so much concrete each year, even small changes to its formulation can have dramatic effects on the construction industry's annual carbon footprint—and benefit everyone on the planet.

In the near term, cement manufacturers have developed a modified formula: portland-limestone cement (PLC), a blended cement with a higher limestone content, which results in a product that works the same, measures the same, and performs the same but with a reduction in carbon footprint of 10% on average. Modifying a concrete mix design to replace higher carbon materials with lower carbon ingredients is an effective strategy to reduce its environmental footprint. Whereas the U.S. standard for portland cement allows for up to 5% of clinker to be replaced by limestone, the standard for blended cement allows for 5% to 15% limestone replacement in PLC (Type II). The same clinker is used to make portland cement and portland-limestone cement, but there is less of it in PLC. And concrete mixes designed with PLCs are compatible with all supplementary cementing materials (SCMs), so when you substitute PLC for ordinary portland cement, you can continue to use all the other materials you use to make concrete for an even greater reduction in carbon footprint. If all cement used in the U.S. in 2019 had been converted to PLC, it would have reduced CO₂ emissions by 8.1 million metric tons, which the U.S. EPA says is the equivalent of taking 1.75 million cars off the road for an entire year.

It should be noted that cement, like other building materials, must meet rigorous standards to ensure the safety of the building or infrastructure being constructed. PLC is extensively tested, has proven technology, is readily available through the same supply chain that already successfully serves developers, builders, and contractors.

Alternative Fuels

Regulatory and technical barriers exist for cement plants to use alternative fuels, such as industrial byproducts that otherwise would end up in landfills, including plastics, fabrics/fibers, non-recycled paper and cardboard, tires, and other valuable non-hazardous secondary materials, that will help the industry reach its carbon neutrality goal by 2050. Cement kilns provide an effective and environmentally sound solution that avoids landfilling these materials, benefiting the cement industry and society at large. Since 1990, the industry has reduced its use of traditional fossil fuels by over 15% by using these alternative fuels. Reducing legal barriers to allow kilns to increase usage of these lower-carbon alternative fuels to replace traditional fossil fuels, such as coal and pet coke, can help reduce kiln CO₂ combustion emissions.

The U.S. lags well behind the European Union (EU) in its adoption of alternative fuels, which reflects fundamental differences in the regulation of industrial manufacturing, its approach to

conserving, recovering, and using secondary materials, and the EU's use of available levers to discourage landfilling and drive carbon reduction.

We see a tremendous opportunity in the U.S. to reduce emissions, via the use of alternative fuels, with the right policies. In the Department of Energy's (DOE) Industrial Decarbonization Roadmap. The agency identified alternative fuels as a pathway for cement manufacturers to reduce their greenhouse gas (GHG) emissions, and the DOE identified needed research on the subject. Among the research it requested for alternative fuels is research on emissions, heating values, carbon content, and contaminant profiles associated with alternative fuels. In the DOE's Industrial Decarbonization Roadmap, DOE also identified the need to catalog fuel mixtures and evaluate economic & GHG reduction benefits and opportunities for economic scale-up of alternative fuels.

The federal government can facilitate additional technical research to analyze the waste and non-hazardous secondary materials streams to confirm that alternative fuels have similar heating values and lower CO₂ emissions profiles when compared to traditional fossil fuels. Following such research, we hope that Congress will make pragmatic changes to federal environmental policies that will provide for increased alternative fuel usage while responsibly protecting the environment and enhancing America's energy security.

Carbon Capture Utilization and Storage

The cement industry is facing significant obstacles to implementing carbon capture utilization and storage (CCUS) technologies at its plants. Currently, there are no commercial-scale CCUS installations at any cement plant within the U.S. CCUS cannot be widely implemented at cement plants until there is a clear path to siting and permitting these technologies. Additionally, significant infrastructure investments are required for the capture, compression, storage, and transportation of CO₂. Part of that infrastructure will need to supply water and energy for carbon-capture units and associated auxiliary equipment, as well as the energy required for the ultimate delivery of the captured CO₂ to its final end-use.

While many promising technologies are under development domestically and overseas, significantly more research and federal funding is needed for CCUS technologies to reach the commercial development stage for the industrial sector, including cement. The cement industry is conducting research on capture technologies, including a variety of solvent, sorbent, and membrane technologies, carbonation, mineralization, calcium (or carbonate) looping, oxyfuel combustion and calcination, cryogenic capture, and algae capture as carbon reduction and removal technologies to hasten the industry's decarbonization efforts. The cement industry is pursuing various potential technologies because each cement plant and cement kiln is different. Their differences include numerous variables, including plant design, emission control requirements, space constraints, water availability, energy availability, and process parameters, each of which will influence the viability of specific carbon removal and reduction technologies. No single off-the-shelf CCUS commercial design or technology will work for every cement plant, and many plants will likely require a combination of capture technologies. It is essential that federal research and funding be directed at multiple technologies so CCUS can feasibly be implemented for the cement industry promptly.

Provided a CCUS technologies can be proven or demonstrated at scale, with substantial research and the implementation of appropriate federal and state policies, CCUS technologies could become scalable within the next ten years.

Given the challenges in decarbonizing the entire cement and concrete value chain, the cement industry will be unable to reach its carbon neutrality goal by 2050 alone. We can only achieve this goal with significant policy support from the federal government to assist with eliminating regulatory hurdles once carbon technologies are commercialized. Needed policy support includes measures to modernize the permitting programs that cover the installation of carbon capture and energy efficiency technologies, carbon transmission infrastructure, and electricity generation. Federal permitting remains an obstacle to the planning, construction, and installation of carbon capture technologies and the infrastructure needed to sequester or utilize the captured carbon. First, there are regulatory obstacles to installing new energy-intensive carbon capture equipment at cement plants and other facilities. The New Source Review (NSR) Program, established under the Clean Air Act Amendments of 1977, presents regulatory barriers for cement facilities to make GHG reduction and energy efficiency improvements. Under the NSR Program, installing CCUS, investing in significant energy efficiency projects, or other major capital investments to reduce GHG emissions at cement facilities result in extended and costly permitting processes and potentially unrealistic emissions and monitoring requirements. The federal government will need to enact policy reforms to reduce these barriers under the NSR Program to ensure that cement plants can install major GHG reduction and energy efficiency technologies, including CCUS technologies, without unnecessary impediments.

Conclusion

All the above-mentioned needs are currently regulated by numerous federal environmental laws with inconsistent guidance, permitting processes, and agency interpretations.

We encourage the Committee to use this hearing to evaluate future federal permitting and regulatory reform along with the investments needed to reduce manufacturing emissions. Such action is necessary to enable the industry to reach its goal of carbon neutrality across the concrete supply chain by 2050. We look forward to working with the Committee on legislation and agency oversight as it considers its next steps. If you have any further questions, please contact me at soneill@cement.org or 202.719.1974.

Sincerely,



Sean O'Neill
Senior Vice President, Government Affairs
Portland Cement Association