BACKGROUND

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Cement Manufacturing and CO₂: Cement, the essential material to make concrete, is manufactured through an energy intensive process. The heart of the process is the cement kiln, a large rotating industrial furnace in which limestone (the key raw ingredient) and other materials must be heated to 2,700 degrees Fahrenheit—one third the surface temperature of the sun. At this point the materials become molten and then recombine into small stones called clinker, which are then conveyed to mills to be crushed into the final cement powder. During the heating phase, the molecular structure of the calcium carbonate (CaCO₃) found in the limestone breaks apart to form calcium oxide (CaO) and carbon dioxide (CO₂) which is released as process emissions. These emissions are a chemical “fact of life” in cement manufacturing. Currently, there is no commercially viable technology to prevent or reduce the released CO₂ resulting from the chemical process.

Cement Industry Role in Climate Change Mitigation and Adaptation. Cement manufacturers invested billions to reduce CO₂ and other emissions by implementing R&D driven technology improvements, increasing energy efficiency, and reducing reliance on fossil fuels through the use of lower carbon intensive alternative fuels. Concrete and other cement products provide the strength, resiliency, and durability unmatched by other building materials. Importantly, they absorb CO₂ during their life cycle, and are recyclable, making them important contributors to the circular economy. Cement is essential to the production of concrete products, which in turn are critical elements in the national strategy to reduce industrial emissions of CO₂, adapt to changing climate conditions, and provide resiliency in the nation's infrastructure. Congress must play a crucial role in supporting industry efforts to build on these sustainability successes by reducing legal and regulatory barriers to emissions reduction investment and incentivizing development of commercial-scale emission capture and control technologies.

Congressional Overview. During the 116th Congress, there have been various pieces of legislation introduced addressing climate change and related implications. Most bills have focused on carbon pricing mechanisms—some market based and some tax based. In February, Representative Alexandria Ocasio-Cortez (D-NY) and Senator Ed Markey (D-MA) introduced the Green New Deal resolution. The Senate is expected to vote on the resolution in the near future.

The Utilizing Significant Emissions with Innovative Technologies Act (USE IT Act) was introduced by Senators John Barrasso (R-WY) and Tom Carper (D-DE). This legislation increases funding for projects that would sequester carbon from air emissions sources and process it into products of commercial value, provides technical assistance for carbon utilization, and improves permitting for carbon capture and transmission infrastructure. Funding for such projects recognizes the need to develop technology essential for setting realistic and achievable carbon reduction targets.

STATUS

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Regulatory Overview: Following a 2007 Supreme Court decision finding that greenhouse gases can be regulated under the Clean Air Act, the U.S. Environmental Protection Agency (EPA) determined carbon dioxide from new motor vehicles and new motor vehicle engines contributes to the greenhouse gas (GHG) pollution which threatens public health and welfare. The Obama Administration used this “endangerment finding” to impose sweeping GHG regulations on both the transportation sector and the utility sector (notably the Clean Power Plan (CPP), setting the precedent for future regulation of other stationary sources. In 2017 and 2018, the Trump Administration proposed rules to repeal and replace the CPP. EPA is currently reviewing comments on these proposals.

A Commitment to Environmental Stewardship and Sustainability

The cement industry is one of the most heavily regulated industries in the United States. Cement manufacturers comply with stringent requirements under environmental, health, and safety laws and regulations, and have invested billions of dollars to minimize emissions and waste, reduce energy consumption, and use lower-carbon raw materials and alternative fuels. For example:

- The cement industry lowered energy consumption 37 percent since 1972 through equipment and process improvements,
- 17 of 24 U.S. cement companies currently participate in the EPA ENERGY STAR® energy efficiency program. In 2018, ENERGY STAR® recognized 100 certified manufacturing facilities in the country and 24 cement manufacturing facilities were included as part of the top quartile of efficiency for the sector.
- While increasing production by 26 percent between 2010 and 2016, the cement industry has decreased its GHG emissions by six percent.
- From 2011 to 2016, particulate matter, nitrogen oxide, and sulfur oxide emissions have decreased 10 percent, 11 percent, and 24 percent, respectively, per ton of cement produced.
- Currently, 15 percent of total energy used at kilns is sourced from alternative fuels such as tires, used oil, and combinations of plastics, wood, paper, and biomass, lowering GHGs and other air emissions. The cement industry uses around 60 million tires for energy recovery each year, diverting these wastes from landfills.

Advancing the Circular Economy and Providing Resilient Infrastructure

Circular Economy: The cement industry plays a significant role in furthering the circular economy through using waste and end products from different sectors as new resources for the future. Wastes, such as coal ash and slag, can be beneficially reused as additives in the cement manufacturing process, offering environmental benefits of GHG emissions reduction, energy conservation, reduced land disposal, and reduction in the need to mine and process virgin materials.
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Furthermore, the cement industry can use other materials as single-stream sources that are traditionally diverted to landfills as alternative fuels, including tires, plastics, fabrics/fibers, and paper/cardboard, reducing the industry’s use of traditional fossil fuels. Concrete can also be recycled and used for new roads, highways, and other infrastructure uses.

Resilient Infrastructure: Cement and concrete products provide resilient, long-lasting infrastructure that can resist damage and minimize disruption time after disasters. Implementing life-cycle cost analysis for infrastructure projects will maximize scarce taxpayer dollars with more comprehensive information during the design phase.

Carbonation: Studies show concrete, during its life-cycle, is a carbon sink with the capacity to absorb significant amounts of CO₂ from the atmosphere.

Industry Challenges for American Prosperity and Competitiveness
Even considering the numerous advancements in sustainability, cement manufacturers face technical, regulatory, and economic challenges to further carbon emissions reduction.

Technical: Even the most energy-efficient cement kilns face an inevitable chemical fact of life: approximately 60 percent of all cement industry carbon emissions result from the chemical processes of making cement – not fuel combustion. To address these emissions, manufacturers will need options for carbon reduction and carbon capture, use, and storage (CCUS) technologies, but these are currently neither commercially nor economically viable in the cement sector.

Regulatory: Cement manufacturers face obstacles in reducing emissions from government regulations that discourage energy efficiency upgrades to facilities, use of low-carbon alternative fuels like post-industrial and post-consumer wastes and biomass, and development of new blends of cement using lower-carbon additives.

Economic: Seventeen plants have closed since the 2007-2010 recession, and no new cement manufacturing facilities have been constructed in the U.S. since 2009. Further, as of 2017, cement consumption in the U.S. is down 23 percent from its peak in 2005. In addition, as an Energy Intensive Trade Exposed (EITE) industry, cement companies are at a significant competitive disadvantage from foreign countries who can import unregulated, higher carbon cement into the U.S. market without incurring carbon-related costs imposed on domestic manufacturers. Such “leakage” undermines U.S. competitiveness and rewards countries with less rigorous environmental, health and safety regulatory requirements.

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Legislative Advocacy Priorities
Cement manufacturers stand ready to work with Congress to identify strategies for reducing greenhouse gas emissions, furthering the circular economy, and providing resilient infrastructure. The cement industry will require help from Congress to:

- Address the chemical “fact of life” of process emissions in the creation of cement.
- Provide credit for the carbon absorption properties of concrete.
- Modernize federal regulations to encourage the use of alternative fuels.
- Incentivize research, development, and investment in the technologies needed to reduce or capture GHG emissions.
- Address leakage by leveling the playing field for EITE industries like cement that must compete with higher emissions imports.
- Reform and streamline state and federal permitting processes, including the New Source Review (NSR) program, to reduce barriers to making GHG reduction and energy efficiency improvements at cement facilities.
- Support the USE IT Act and other legislation to incentivize carbon capture, use, and storage and other innovative mitigation technologies.

Cement and concrete manufacturers look forward to working with policymakers on sound, sensible climate policies that reduce U.S. emissions, protect communities from long-term climate impacts, and promote sustainable economic development and job creation.

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