Text 22 CONCRETE NEEDS TO LOSE ITS COLOSSAL CARBON FOOTPRINT

Wet concrete has been poured into buildings, roads, bridges and more for centuries. Structures using concrete have survived wars and natural disasters, outlasting many of the civilizations that built them. Alongside its strength and resilience, concrete is also cheap and simple to make. It will still be crucial for much-needed climate-resilient construction. But the cement industry must set out its plan for decarbonization.

Worldwide, 30 billion tonnes of concrete is used each year, 3 times as much as 40 years ago, and the demand is growing more steeply than that for steel or wood. Versatile and long lasting, concrete buildings and structures are in many ways ideal for climate-resilient construction. But concrete has a colossal carbon footprint – at least eight per cent of global emissions caused by humans come from the cement industry alone. We must decarbonize its production.

Concrete is made by mixing sand, gravel and cement with water and pouring it into moulds before it dries. Making the cement is the most carbon-intensive part. It indeed involves using fossil fuels to heat a mixture of limestone and clay to more than 1,400 °C. When limestone is heated with clays, roughly 600 kilograms of carbon dioxide is released for every tonne of cement produced.

There are alternatives to cement, but they’re in the early stages of development, and cement itself remains too profitable. Alternatives include the leftover compounds from iron and steel production, known as “slag”, and heaps of unused “fly ash”, a residual material from coal plants. Researchers are also experimenting with reducing the temperatures needed in the cement-making process – thereby decreasing the energy used. Such replacements, however, still release carbon and have yet to be certified for use in building which need long-term studies on their performance.

In the meantime, since cement will be around for the foreseeable future, its production needs to be decarbonized, which could happen in a number of ways. For example, low-carbon fuels – such as hydrogen or biomass – could be substituted for fossil fuels in the process. […] Capturing the emitted carbon into the produced concrete, locking it up forever—which might also improve the properties of the resulting material – could be another solution. […] In North America bills are making their way through state legislatures to prioritize cement that has a lower carbon footprint. The European Union’s Waste Framework Directive requires seventy per cent of construction waste, including concrete, to be reused. […]

Next month, a cement industry campaign called “Concrete Action for Climate” will announce its road map for carbon neutrality by 2050. This is overdue, but the road map must also explain interim steps, how companies intend to achieve neutrality and how progress will be measured.

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