SHIFTING DECISIONS: INCORPORATING EMBODIED CARBON EMISSIONS IN EARLY DESIGN

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Arcadis' Maisie Sargent Auld extols science-based targets and early carbon awareness.

The building sector currently contributes nearly 40% of global energy-related carbon emissions (World Green Building Council, 2023), highlighting an issue to be addressed as well as a significant opportunity. As a result, and in response to mounting pressures for emissions reduction, changes to regulations and emerging market drivers are transforming the building sector. For example, the World Green Building Council's recent paper "Bringing Embodied Carbon Upfront" calls for coordinated action in driving the reduction of embodied carbon in the building and construction sector. No longer is the focus only on operational emissions. The Science Based Targets Initiative has released building sector guidance, necessitating many companies to set targets for both operational and embodied carbon emissions. With close to 4,000 companies across the globe already adopting science-based targets, the momentum for others to follow suit is rapidly growing. This shift in focus compels companies to consider not only operational emissions but also the embodied emissions of their buildings.

Current design and construction processes often overlook the assessment of embodied emissions until significant design decisions have already been made. This retrospective approach can limit our ability to influence emissions reduction. To truly make a difference, we must shift our mindset and prioritize carbon emissions considerations from the outset – and at every stage – of the design and construction process.

Imagine if designers could visualize the emissions impact of their designs in real time. By integrating emissions evaluation into design programs, designers would have immediate feedback on the environmental consequences of their decisions. This level of awareness and accountability would undoubtedly lead to a reduction in embodied emissions.

To bring about these positive changes, we must redefine the design process. At Arcadis, we have started incorporating the embodied emissions of different pavement and road furniture choices directly onto design drawings. On one recent project, this led to a 10% reduction in embodied emissions simply by choosing to proceed with high modulus asphalt in place of business-as-usual asphalt. This approach was still cost effective as the quantity of material required was reduced. By integrating carbon metrics into the design process, we can catalyze innovation in the design mindset and challenge the designer to explore lower-impact options. This approach enables more informed decision making and ultimately leads to better outcomes for society.

As Ken Lunty, Arcadis' national sustainability lead in Australia, says, "We now have designers coming to us with low-impact ideas that fit within the design specification, rather than the sustainability professional trying to convince the designer to do things differently. It's a subtle but significant change in mindset." Bringing a visual carbon metric front of mind during decision making not only brings carbon into the designer's conscious mind, but it also inspires them to take ownership of the associated carbon impact. While this is an infrastructure-based decision approach, its application and potential are broad.

This is not to say that embodied emissions are never considered under current models. Embodied carbon is a key criterion across many certification schemes, such as Green Star in Australia and the Living Building Challenge and LEED in the U.S., among others. But we still have a long way to go. Many existing schemes require the measurement of embodied carbon, but this typically happens toward the end of the design process. Carbon considerations should be integrated early, where they can best influence design.

Achieving a sustainable built environment requires interdisciplinary collaboration. Sustainability should not solely rest on the shoulders of sustainability professionals; it must become an integral responsibility of all industry professionals. By making embodied carbon considerations standard practice, we can collectively work toward positive outcomes for society and establish sustainability as the norm in our everyday work.

To effectively reduce the embodied emissions of the built environment, we must shift our focus from simply switching out materials late in the game to influencing design choices from the beginning of the programming and design process. By integrating real-time embodied emissions evaluation into design programs and emphasizing early design decision-making, we can accelerate progress in mitigating our global environmental impact.

Let us work together, across disciplines, to ensure sustainability becomes an inherent part of the job for all professionals involved, ultimately shaping a future where embodied carbon is considered every step of the way.

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Maisie Sargent Auld is the Associate Global Technical Director for Sustainability Measurement at the global design and consultancy Arcadis. She has over 10 years of international experience in environmental economics, decarbonization, climate change resilience and sustainability advisory. Trained as an environmental economist, Maisie couples her sustainability expertise with an economic lens, examining and quantifying related social, economic and environmental impacts to support decision-making and improved outcomes for her clients and society.

As the daughter of the late architect, Terry Sargent, appreciation for design and a sustainable built environment was instilled from a young age and these concepts continue in her work today. She lives in Valla Beach, Australia with her husband and son.