

Embodied Carbon 101

Embodied carbon refers to the Greenhouse Gas (GHG) emissions associated with the manufacturing, transportation, installation, maintenance, and disposal of construction materials used in the built environment. Embodied carbon accounts for **11% of the total global emissions** and **28% of the building sector emissions**, as shown in Figure 1.

This fact sheet provides an overview of embodied carbon, which is now an optional measure in the 2025 Massachusetts Stretch Building Energy Code for both Residential and Commercial sectors. For Residential, the HERS rating can be increased by 3 points for meeting either R406.5.3 for Net-Zero GWP Insulation or R406.5.4 for Low GWP Concrete. For Commercial, 8 additional energy efficiency credits can be earned for C406.13 Heavy Timber Construction, C406.14 Low GWP Concrete, and C406.15 Net-Zero GWP Insulation.

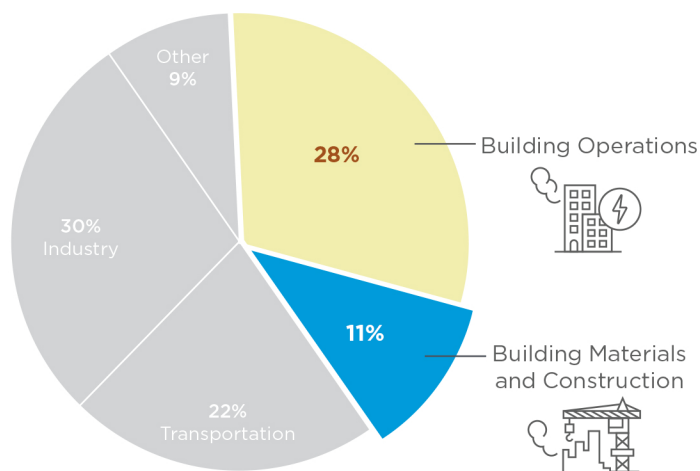


Figure 1: Global Co₂ Emissions by Sector¹
Emissions from buildings comprise **39%** of total global greenhouse gas emissions.

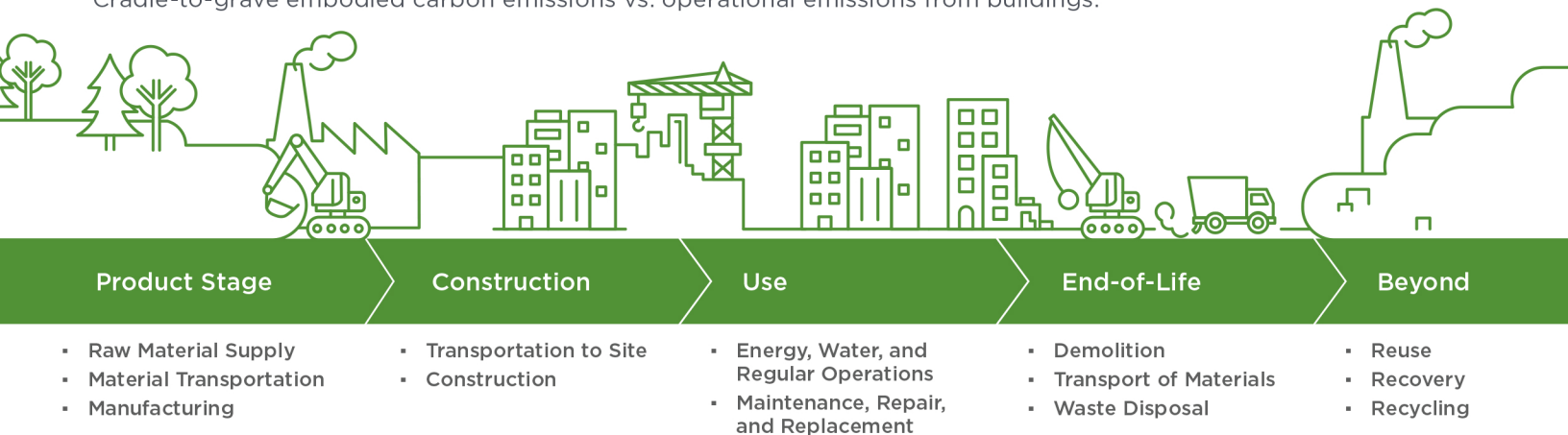
Identifying & Measuring Embodied Carbon

Embodied Carbon is quantified using **Global Warming Potential (GWP)**, which is reported in kilograms of CO₂ equivalent (kgCO₂e). To calculate the total GWP, a method called **Life Cycle Assessment (LCA)** is used, which evaluates the environmental impacts of various construction materials. Figure 2 represents a “cradle-to-grave” approach to lifecycle, which starts with the extraction of raw materials all the way through the anticipated disposal or end-of-life process. This information serves as a standardized metric for determining a product’s carbon footprint, which is documented into an **Environmental Product Declaration (EPD)**. EPDs should be third-party verified (Type III) and can either be industry-wide for a typical product, or product specific from a manufacturer.

For the MA Stretch code, the GWP values from an EPD determine whether a product qualifies for the Embodied Carbon credits found in Section R406.5 and Section C406.

Figure 2: Building Material Life Cycle

Cradle-to-grave embodied carbon emissions vs. operational emissions from buildings.



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