



Reducing Embodied Carbon in the Built Environment

For designers and specifiers

Building Design

Design efficient floor plans. Use lightweight structures that minimize material quantities.



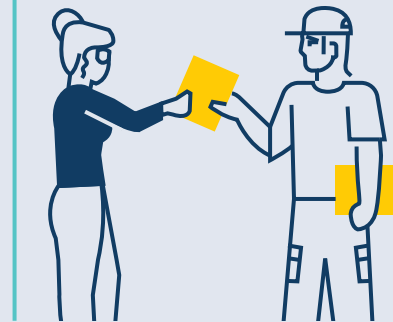
Material Substitution

Use natural or renewable materials, such as plant-based insulation materials instead of petroleum-based foam insulations.



Specification

Specify low-embodied-carbon concrete. Request environmental product declarations (EPDs) from vendors for all materials.



Understanding Embodied Carbon

Buildings account for at least 39% of energy-related global carbon emissions on an annual basis. At least one-quarter of these emissions result from embodied carbon, or the carbon emissions associated with building materials and construction.

The Role of Designer and Specifiers

Designers can drive substantial reductions in a building's embodied carbon by influencing the building's environmental goals and by providing low-embodied-carbon options to project stakeholders at key design decision points. Designers can reduce embodied carbon through whole-building design, specification, and one-for-one material substitution.

Why the Economics of Embodied Carbon Matter to Designers

There are many low- and no-cost strategies that designers can employ to reduce the embodied carbon of a building project without affecting the overall budget. It is always most cost-effective and impactful to reduce embodied carbon early in the design phase, before major design decisions that could be adjusted to meet environmental goals have been set in stone.

5 Key Strategies for Reducing Embodied Carbon through Building Design

Collaborative Design

1

- Involve architects, landscape architects, structural engineers, and other key stakeholders early in the design process to set common goals and expectations
- Work with the real estate developer to set clear goals for embodied carbon reduction

Effective Design

2

- Evaluate options for the adaptive reuse of an existing building
- Incorporate existing foundations, structure, and other material assets into the new building design
- Build on previously developed sites

Efficient Design

3

- Simplify the building's footprint with a floorplan that makes efficient use of space
- Reduce loads where possible to minimize materials needed for structural elements

Low-Carbon Design

4

- Specify low-embodied-carbon, natural or renewable materials
- Make frugal use of high-embodied-carbon materials, such as concrete, steel, aluminum, and certain types of insulation and finish materials
- Prioritize big wins and opportunities, which are usually achieved by reducing embodied carbon in a building's structure and envelope

Design for Longevity

5

- Design for deconstruction at end of life
- Design for flexible reuse of spaces
- Choose materials that have the lowest embodied carbon over their entire life, including disposal, recycling, and/or reuse

Additional Tools and Resources

1. Carbon Leadership Forum, <https://carbonleadershipforum.org>.
2. Carbon Smart Materials Palette, <https://materialspalette.org>.
3. "Roadmap to Reducing Building Life Cycle Impacts," Carbon Leadership Forum, <https://carbonleadershipforum.org>.