STRUCTURAL FOCUS

SE 2050

Embodied Carbon Action Plan (ECAP)

2024

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INTRODUCTION

At Structural Focus, we are proud to be a signatory firm of the SE 2050 Commitment, a critical milestone for our industry's journey towards achieving net-zero embodied carbon structures by 2050.

As structural engineers, we carry a responsibility for the design choices we make, as they directly impact global embodied carbon emissions.

We are actively integrating sustainability into our projects by

- **Educating** ourselves and others
- **Reporting** project data
- **Implementing** reduction strategies
- **Advocating** for change

Buildings have a huge environmental impact, currently accounting for 39% of global carbon (CO_2e) emissions[1]. These carbon emissions can be broken into two types:

Embodied Carbon (11%)[1]
emissions released from the life cycle of building materials, including extraction, manufacturing, processing, transportation, construction, demolition, and disposal.

39%
of global carbon (CO_2e) emissions are from buildings[1]

Operational Carbon (28%)[1]
emissions released from the ongoing operation of a building, including power, lighting, heating, cooling, ventilation, etc.

Between now and 2050, as the power grid becomes more renewable and buildings become more energy efficient, operational carbon will reduce, and **embodied carbon will become a larger portion of a building's total carbon footprint and demands attention now.**

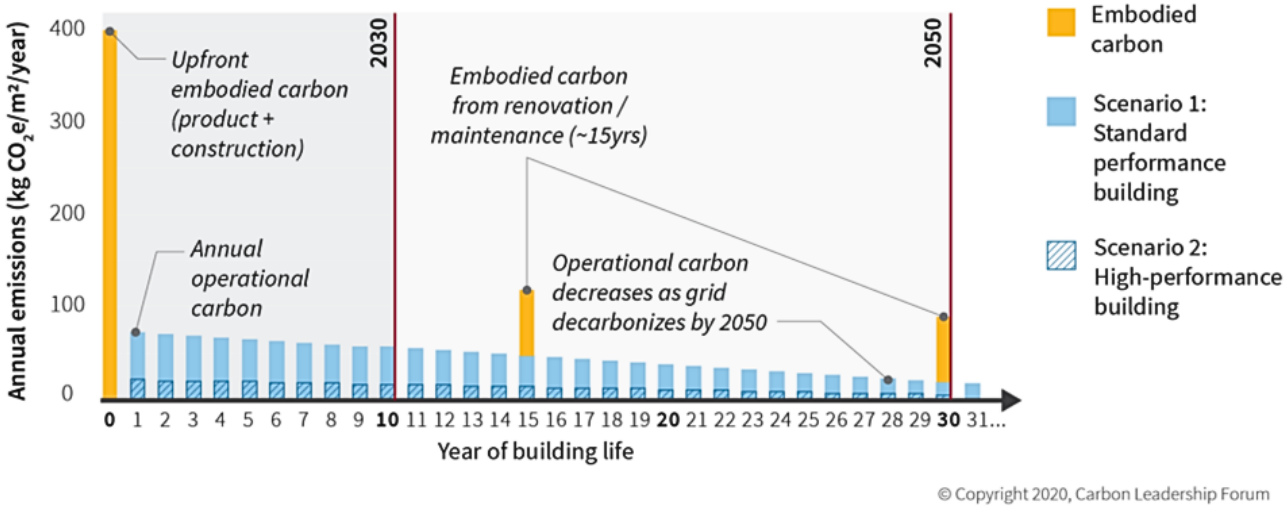

Figure 1: Annual Embodied and Operational Carbon Emissions of a Typical Building Over Time.[2]

[1] World Green Building Council (2019), "Bringing embodied carbon upfront"
[2] Carbon Leadership Forum (2020). "Embodied Carbon 101"

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MEET THE COMMITTEE

Get to know the faces behind our commitment to sustainability! Introducing the Structural Focus Sustainability Committee, an internal team dedicated to integrating sustainable practices into every aspect of our work. Through their expertise and collaboration, they will guide us in achieving the SE 2050 Commitment and building a more sustainable future.

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EDUCATION

By fostering a culture of continuous learning, we equip our team with the knowledge and skills needed to reduce our projects' embodied carbon footprint.

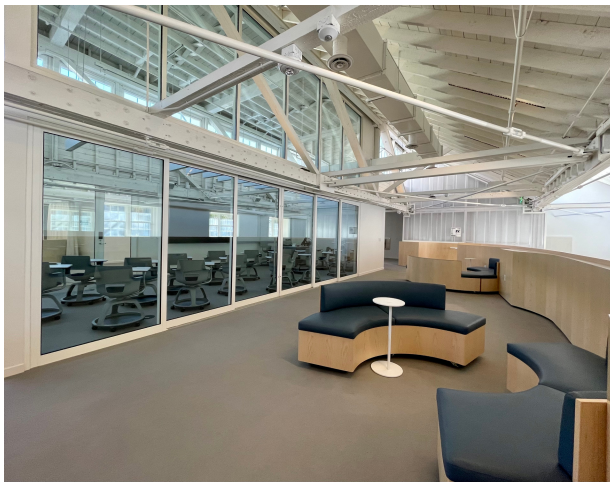
We actively track the latest news, policy, webinars, and events related to sustainable design, encouraging staff attendance. All gathered knowledge is then curated and readily accessible in our internal sustainability digital library.

Our Sustainability Committee holds monthly meetings to discuss the latest advancements and best practices in sustainable design.

To promote sustainable awareness firmwide, we educate our staff by giving seminars. Topics include:

- Introduction to the GWP of Different Structural Materials (*presented July 2023*)
- How to Perform a LCA using Commercially Available Software (*planned for 2024*)
- Understanding Embodied Carbon Policies (*planned for 2024*)

Embodied carbon education and reduction strategies are now part of new employee training.



Lessons Learned:

Involvement in industry associations that promote sustainability creates a culture of continuous improvement, encouraging staff to seek out new information and adopt more sustainable practices over time.

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REPORTING

Structural Focus believes that compiling and reporting our structural embodied carbon data will help keep us accountable within our firm and the industry, leading to more efficient reduction strategies and overall lower embodied carbon on our projects.

We aim to achieve three reporting goals in 2024:

1

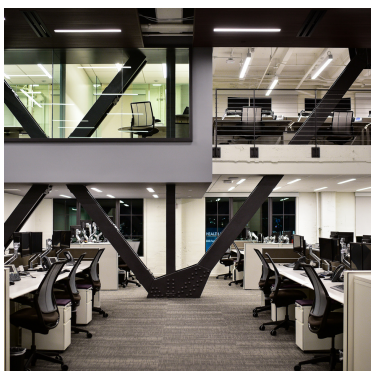
Submit at least 4 projects to the SE 2050 database. We plan to continuously increase the number of submitted projects in future years. We recognize that submitting as many projects as possible to the database contributes to the assessment of industry trends and establishment of achievable reductions.

2

Standardize the use of a REVIT plug-in to create a more efficient system for conducting whole-building life cycle assessments in our tracked projects. This system will streamline the process of embodied carbon tracking and allow us to analyze a larger number of projects.

3

Build a tool to compare the cradle-to-gate emissions for each of our tracked projects. This tool will help us identify the largest contributors of embodied carbon within our projects and allow us to implement reduction strategies in current and future projects.



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REDUCTION STRATEGIES

Since joining SE 2050, Structural Focus has implemented embodied carbon reduction strategies on various projects. **We are now doing the following with our practice:**

- ☑ Designing with efficiency in mind. Efficient structural design not only means fewer materials and therefore a lower embodied carbon footprint, but also a lower cost.
- ☑ Revising guidelines to list all approved supplemental cementitious materials.
- ☑ Utilizing higher strength steel to reduce material quantities.
- ☑ Revising the structural general notes in our design drawings to request that EPDs be submitted when available. (*in progress*)
- ☑ Setting GWP limits on concrete mixes. (*applied on a project by project basis*)
- ☑ Educating our staff on the use of Typle IL cement and encouraging its use whenever appropriate.
- ☑ Specifying low-strength concrete when appropriate and compatible with the most efficient structural design.
- ☑ Referring to internal plots showing the GWP of various structural materials to aid in material selection.
- ☑ Removing limits on water-to-cement ratios in concrete mixes. (*applied on a project by project basis*)
- ☑ Removing modulus of elasticity limits on concrete mixes where appropriate. (*applied on a project by project basis*)

As we continue becoming more sustainable in our practice, **we have a growing list of strategies we will be implementing in the future:**

1. Perform LCAs on the majority of our projects.
2. Work with the project team to set carbon budgets for projects.
3. Incorporate the use of biogenic materials.
4. Design with deconstruction in mind.

These reduction strategies have helped us bring awareness to sustainability both internally and with clients. Measuring the effectiveness of these reduction strategies goes hand in hand with our tracking of embodied carbon.

Lessons Learned:

Communication with contractors and suppliers to obtain product-specific EPDs is important to ensure the accuracy of LCA results.

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ADVOCACY AND KNOWLEDGE SHARING

Embodied carbon reduction requires a collective effort. By collaborating with diverse stakeholders, including building owners, architects, contractors, suppliers, and government agencies, we can advocate for and implement industry-wide changes to achieve carbon reduction goals.

We are active in many industry organizations related to embodied carbon and sustainability including:

- **Carbon Leadership Forum (CLF)**
- **Structural Engineers Association of Southern California (SEAOSC) Sustainability Committee**
- **American Institute of Architects Los Angeles Chapter Committee on the Environment (AIA LA COTE)**
- **Urban Land Institute (ULI)**

1. We advocate for building reuse and promote the preservation of existing structures through retrofits and adaptive reuse over demolition and replacement. This minimizes new embodied carbon by extending building lifespans.

2. During the conceptual and schematic design stages of large new projects, we prioritize educating clients about embodied carbon and the SE 2050 Commitment, and actively work with them to establish project-specific embodied carbon reduction goals.

3. We attend sustainability-focused events such as conferences and symposiums to learn about industry efforts and challenges from different perspectives. We also promote the importance of reducing embodied carbon through our structural engineering expertise.

4. Our commitment to SE 2050 is proudly displayed on the Structural Focus website, making it readily accessible to all stakeholders.

5. We plan to regularly post on LinkedIn regarding SE 2050 and our sustainability efforts.

Lessons Learned:

Embodied carbon reduction policies elevate sustainability from an option to an obligation, creating a level playing field and fostering cross-disciplinary collaboration across the industry.