

ASCE / SEI SE 2050 Commitment Program

Embodied Carbon Action Plan 2024



Maffei Structural Engineering

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Introduction

Maffei Structural Engineering joined the SE 2050 Commitment in 2022, and we present here our annual Embodied Carbon Action Plan (ECAP). We summarize below our goals and our planned and completed activities, following the outline provided in the SE 2050 Program Requirements Guidance Document, version 2023.1.

Embodied carbon reduction champion



Sarah Chen, LEED Green Associate, Structural Designer, is our embodied carbon reduction champion.

Sarah has an educational background in Sustainable Design and has experience with life-cycle assessment and integrative design processes.

Sarah has a strong interest in finding, vetting, and promoting materials and methods that reduce greenhouse gas emissions. She dives deep into the issues around the embodied carbon emissions of buildings and continues to lead Maffei's efforts toward mitigating them.

Education

Our goals this year include the following:

- That all technical staff at Maffei understand the framework and methods for building emissions life-cycle assessment and embodied carbon measurement.
- That a minimum of 5 technical staff are trained to calculate embodied carbon, using the EC3 tool and other sources of certified EPDs.

To meet these goals, we are employing the following **education electives**:

- We will distribute this document to everyone at Maffei.
- As a company, we will watch the "Embodied Carbon 101: Basic Literacy" webinar available on the Boston Society of Architecture website. We will then have a brief discussion about how these principles may apply to our work at Maffei. For further education, we will encourage everyone to watch at least one more webinar from this website or another and share their findings with the rest of the company. For new hires, the webinar will be included with their on-boarding resources.
- We will have one or more employees attend an external education program related to embodied carbon on a quarterly basis.
- We will have 2 firm-wide presentations this year on the topic of embodied carbon.
- We have made the following documents easily accessible to everyone at Maffei:
 - The SE 2050 library of resources
 - The SE 2050 webpage, "Top 10 Carbon Reducing actions for Structural Engineers"
 - "How to Calculate Embodied Carbon" by The Institution of Structural Engineers

Values and vision

Maffei Structural Engineering takes pride in finding creative and successful solutions to challenging structural engineering projects. The challenges typically come from multiple constraints, and the best designs tend to be "win-win-win" across a diversity of constraints and objectives. As a firm, we welcome sustainability and carbon reduction as objectives in our projects.

Environmental sustainability is one of the core values of our firm, and we are eager to support the SE 2050 initiative. SE 2050's commitments for the reduction of atmospheric carbon are synergistic with the other dimensions of environmental sustainability, including clean air and water, protection of wilderness and species, and the health of the land and its vulnerable populations.

Working together with a focus on sustainable design and carbon reduction, we can help make our planet a better place for the generations to come.

- Joe Maffei, SE, PhD, LEED AP
Founding Principal

- Our embodied carbon reduction champion will engage with the San Francisco Bay Area CLF Community Hub.

Additionally:

- We've set up a company-wide chat space for informally sharing information and ideas related to embodied carbon.
- We've set up an in-house digital library for reference materials, templates, and other tools.

Reporting

We will use the EC3 tool to measure cradle-to-gate (A1-A3) embodied carbon for at least 2 projects, calculating structural material quantities by hand. We will begin measuring embodied carbon in the SD phase, updating our calculations through the DD and CD phases.

In 2023, we began development of an in-house life-cycle assessment calculator based on specific project EPDs. This tool will allow us to visualize the environmental impacts of chosen materials and better communicate with clients about embodied carbon reduction strategies.

We have the following **reporting electives**:

- We will submit embodied carbon data for 2 U.S. projects to the SE 2050 database.
- For a project we plan to submit to the database, we will ask the architect or owner if the project has a carbon budget or if there are established project sustainability goals. We would like to at least start the conversation around embodied carbon on a project.

Embodied carbon reduction strategy

We are focusing this year on becoming familiar with the embodied carbon accounting process, on training our staff, and on determining how we can best produce project-specific data for the SE 2050 database.

As we continue to take steps toward embodied carbon reduction, we plan to work on the following **reduction electives**:

- We will update our specification templates to incorporate embodied carbon performance objectives, and to require the submission of EPDs for review.
- We will continue to build our internal EPD databank.
- We will incorporate biogenic materials on at least one project.
- We will develop a project-specific embodied carbon reduction plan.

Knowledge sharing

We will look for opportunities to advocate for the adoption of embodied carbon targets in building codes, following Marin County's example for concrete. We will share our discoveries of available methods and materials to reduce embodied carbon with our architecture and engineering clients and colleagues.

We have the following **advocacy electives**:

- We will continue to discuss the SE 2050 Challenge with our clients and collaborators who are not familiar with it.
- We will develop boilerplate language for use in our proposals, noting our participation in the SE 2050 Commitment.
- We mention our commitment to SE 2050 on our company website.
- We will continue to engage with structural material suppliers for our projects to communicate the importance of EPDs and low-carbon material options.

Lessons learned

As we enter our second year to the SE2050 commitment, we find that many of our previous year goals are still in progress, such as training technical staff to calculate embodied carbon. However, in the process we have learned a great deal about the industry LCA tools, such as Tally and EC3. We now have a better understanding of EPDs, their limitations, the impact categories they include, and what we can incorporate in future projects to aid in embodied carbon calculations. Moving into 2024, we plan to build on this knowledge and share these lessons learned with fellow small firms new to SE 2050.