FORELL | ELSESSER

EMBODIED CARBON ACTION PLAN

SE 2050 / 2024 Edition

SE 2050 / EMBODIED CARBON ACTION PLAN
2024 Edition

FORELL ELSESSER
160 Pine Street, 6th Floor
San Francisco, California

WEBSITE
FORELL.COM

OUR CORE COMMITTEE
Lindsey Maclise / l.maclise@forell.com
John O' Hagan
Lori Jue
Brenna Marcoux
Aditi Palsapure
Jenika McClay
Maya Rao

SE 2050 COMMITMENT

The mission of the SE 2050 Commitment is to support the SE 2050 Challenge and transform the practice of structural engineering in ways that are holistic, firm-wide, project based, and data-driven. By prioritizing the reduction of embodied carbon through the use of less and/or less impactful structural materials, participating firms can more easily work toward net zero embodied carbon structural systems by 2050.

60+

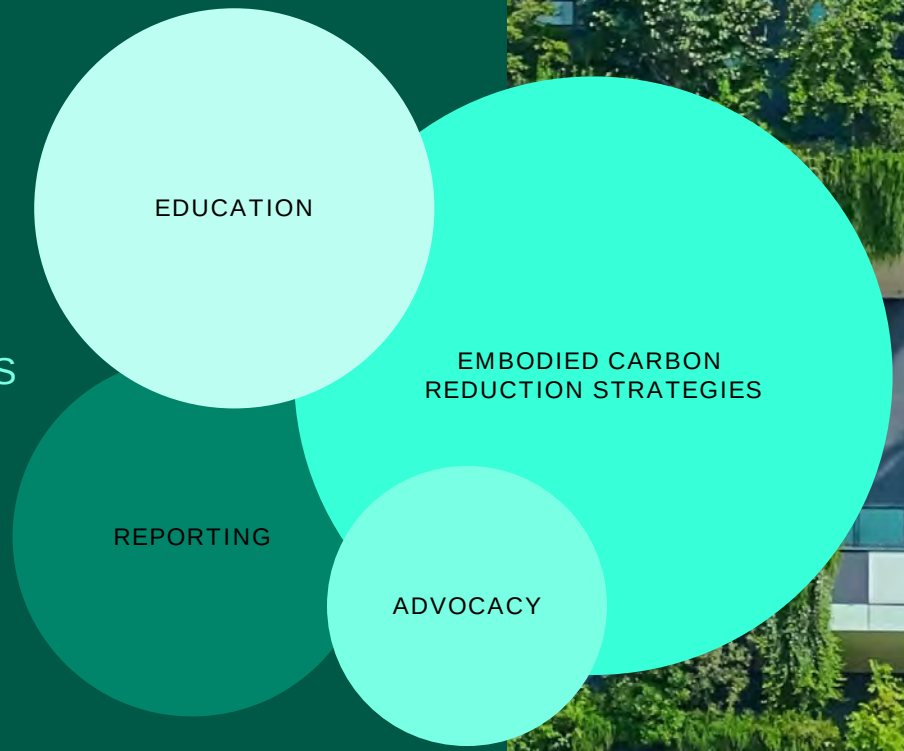
Years of Resilient, Sustainable & Climate Conscience Design

At the core of our profession is improving and protecting the communities we live in. The far-reaching effects of climate change are just as much a threat to our communities as the earthquakes and other natural disasters we have focused on for so long.

If we are to continue preserving the past and building towards the future, we must consider how our actions now will affect the generations to come.

For us, joining the SE 2050 commitment is the perfect way to help lead the change we want to see. Over the past year we've worked to implement our prior SE 2050 goals and have used lessons learned to inform our focus areas and goals as a company for the 2024 year.

FOCUS AREAS



EDUCATION

At Forell Elsesser we have created an internal education program to integrate the goals of SE 2050 and our Carbon Neutral Initiative with all our employees.

The focus of these goals include:

- Importance of sustainable design
- Incorporation of carbon reduction strategies into the design process
- Sustainability literacy
- Life Cycle Analysis

Presentations & Workshops: We have created an annual series of presentations and workshops centered around Earth Day where we engage with external speakers, explore new technologies and host brainstorming sessions for the staff.

Bringing Awareness: Monthly updates on sustainability happenings occur throughout the year to continue to bring awareness and specifically target our primary focus areas noted above.

External Education Opportunities: We have also expended our external education outreach presenting at Greenbuild and local Architectural offices.

Firm Alignment & New Processes: In the past year, to create better alignment with our staff and implement our LCA's more effectively on projects, we have created an onboarding and training program for all new hires.

LinkedIn Campus, Building 1, Mountain View, CA / New Construction / 244,000 SF / LEED Platinum headquarters constructed using Carbon Cure's low-carbon concrete

EDUCATION

Looking forward, Forell Elsesser is actively curating relationships with local Universities, industry organizations, trade partners, and start-ups to bring to market rapidly emerging technologies and enable integration into our design and specifications.

Our areas of focus for this coming year include:

Low Carbon Concrete: Building on our success in this area, we will continue to look for areas to push the envelope on embodied carbon reductions in concrete through existing technologies and finding opportunities for implementation of new technologies. We are actively partnering with new technologies and suppliers to bring these into our projects.

Research Partnerships: The area of embodied carbon is a quickly changing landscape. Forell Elsesser is partnering with our local universities to bridge the gap between research and implementation. We have partnerships will these universities for studies to create meaningful impacts on embodied carbon reduction goals.

External Education: We have begun working with Architects, Owners and Contractors with education and streamlining the process for embodied carbon reduction goals on projects. We look to expand on this during the coming year, through collaborative partnerships.

City of Millbrae Recreation Center / New Construction / 24,000 SF / Hybrid structural system with exposed CLT panels

EMBODIED CARBON REDUCTION STRATEGIES

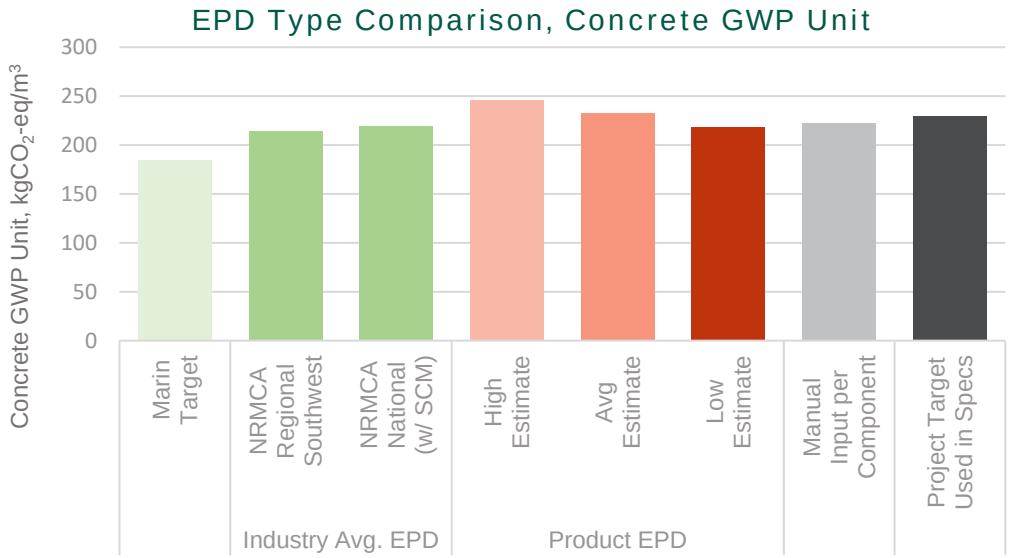
Sustainable Design Practice: While Forell Elsesser has long been an advocate for sustainable design, our commitment to SE 2050 has pushed us to formally pursue specific goals that enable us to more directly contribute to our projects' sustainability goals. To that end, we have focused on electives that work to improve the foundation of our sustainable design practice.

Incorporating Carbon Reduction Goals: One strategy has been to incorporate carbon reduction goals into our specifications. For our concrete specifications, we developed a tool that not only determines a target GWP but allows for the user to evaluate the practicality of that target by comparing it to several different national and local benchmarks.

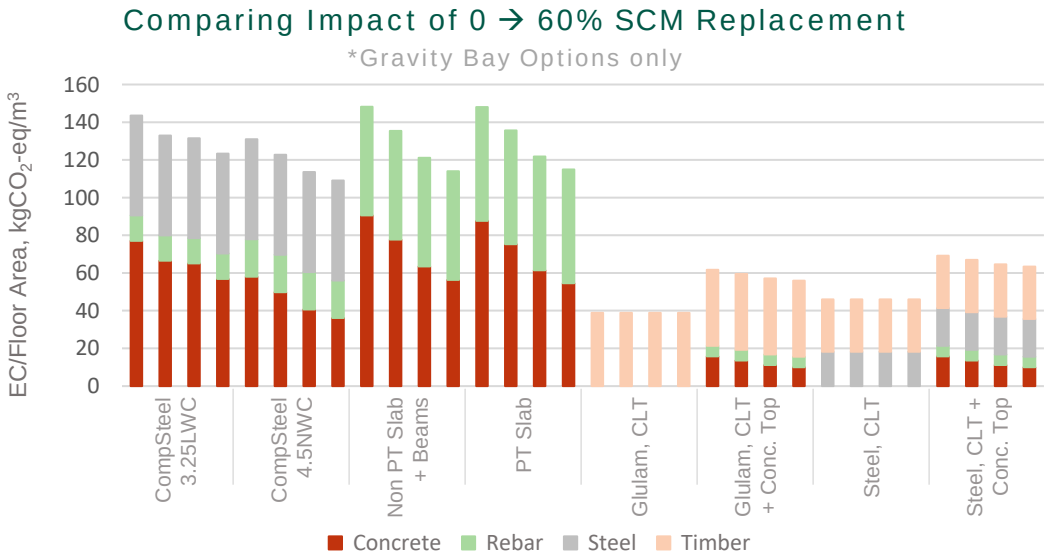
Tool Development: We have also developed an LCA tool that is intended for to compare design options in early schematic design. It utilizes multiple types of EPDs and accounts for GWP uncertainty to compare a range in GWP for each option rather than a single number. Using this tool, we completed comparison studies on detailed components and larger structural systems. The results of these studies have been shared with our office to demonstrate how the tool can be used.

Next Steps: In order to put these tools to use on projects, the next step has been to work with project managers across our firm to educate them on how to recognize the right opportunities for contributing to a project's sustainability goals. We are encouraged by this progress.

EPD Type Comparison
Concrete GWP Unit



Comparing Impact of 0 to 60% SCM Replacement
Gravity Bay Options



EMBODIED CARBON REDUCTION STRATEGIES

Our Goal: The overall goal for this year is to focus on utilizing the knowledge and tools that we have developed to inform the decisions we make on projects.

This coming year, our goals are to:

- Continue to develop visualizations that communicate embodied carbon metrics to our staff.
- On a minimum of five (5) projects, we are committed to sharing the embodied carbon data of the concrete components in our projects with the client, including information on how the data changes throughout design.
- Collaborate with concrete suppliers to reduce embodied carbon in a mix design below the project target baseline.

Lick-Wilmerding High School, San Francisco, CA / Expansion + Renovation / 53,000 SF / Living Building Challenge, LEED Platinum, and Net Zero Energy

REPORTING

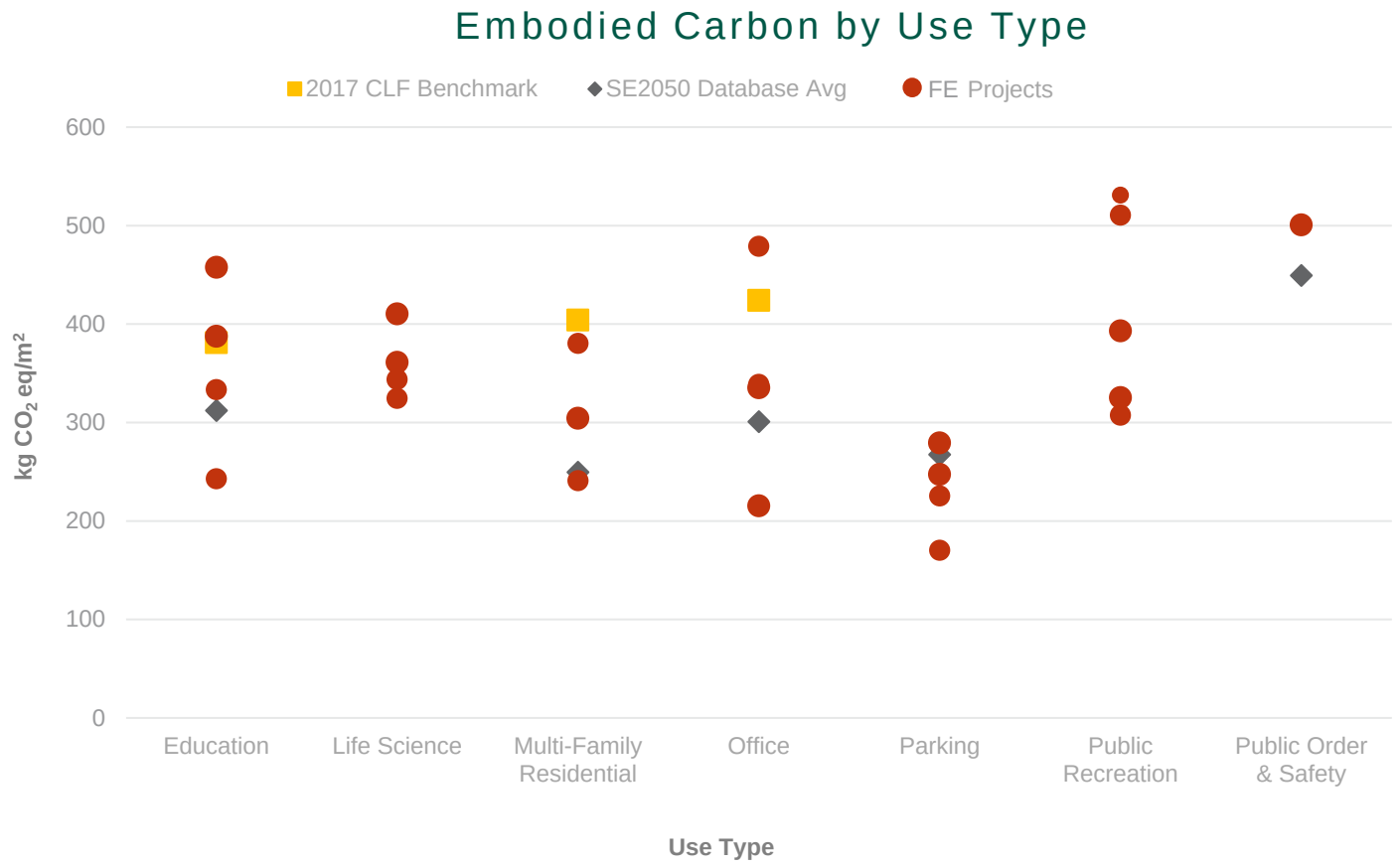
Forell Elsesser has invested time and resources to develop tools and standards for tracking and reporting embodied carbon on past and present projects. Along with contributing to SE 2050's LCA database, we aim to increase staff familiarity with embodied carbon metrics and use LCA results to inform sustainable design choices.

LCA tracking at Forell Elsesser utilizes:

- Tally REVIT plug-in
- Tally-CAT REVIT plug-in
- Internally developed embodied carbon calculator tools

LCAs: Similar to LEED standards, we use tools that reference the TRACI methodology in our project LCAs. The scope focuses on product manufacturing to transportation stages. We are also capable of including end-of-life scenarios depending on the project information available.

Forell Elsesser commits to report LCA results from at least 4 anonymous projects on an annual basis.



Embodied Carbon by Use Type

Embodied Carbon totals for FE projects compared to the CLF Benchmark and SE2050 Database Average

ADVOCACY

Forell Elsesser recognizes our role in reducing the embodied carbon of our projects and advocates for a range of reduction strategies to our clients. We are a leader in the structural engineering community for sustainable design strategies and share our expertise with the wider AEC industry on our website, LinkedIn, and at industry events.

Internal Reference Guide: We created an internal reference guide that outlines questions to ask during schematic design regarding a project's sustainability goals for engineers and firm leaders

Marketing Materials: Marketing materials for project pursuits include a brochure highlighting our firm's expertise in sustainable design strategies

Sharing Our Commitment: We highlight our commitment to SE 2050 to our clients, market our Carbon Neutral Initiative on LinkedIn, and are developing a sustainability section of our website

Active Participation at Events & Conferences: Forell Elsesser engineers have presented at AEC events and conferences regarding our sustainable design practices

Knowledge Sharing with Industry Leaders: We invite industry partners and leaders in the academic space to present their work and research to our staff on reducing embodied carbon in structural design (e.g. Brimstone, Professor Kyle Douglas from Stanford)

Engineering Community Involvement: Forell Elsesser engineers are involved in organizations such as SEAONC Sustainable Design Committee, AIA SF's Committee on the Environment, Carbon Leadership Forum, ACI local chapters, and SEI's Sustainability Committee

SE 2050 Outreach Strategy

The value of SE 2050 is conveyed to clients in marketing materials and our commitment has been highlighted on LinkedIn. F|E staff have presented at SEAONC meetings/events and at GreenBuild on embodied carbon.

2024 Advocacy Goals

2024 advocacy goals include a sustainability section of our website and engaging with structural material suppliers in our region regarding EPDs.

UCSF, Regeneration Medicine Building, San Francisco, CA / First LEED Innovation & Design Credit for an Innovative Seismic System

CSU Monterey Bay, Arts, Humanities, & Social Sciences Building, Monterey, CA / 56,000 SF / LEED Platinum

ELECTIVE DOCUMENTATION

Education:

- Provide a narrative of how the Embodied Carbon Reduction Champion will engage embodied carbon reduction at each office. (Required)
- Present at least (1) webinar focused on embodied carbon and make a recording available to employees. Include this resource in your orientation and on-boarding program. (Required)
- Incorporate embodied carbon education in your onboarding process for all new employees.
- Provide narrative outlining plans for minimum (2) firm-wide presentations per year on the topic of embodied carbon.

Reduction:

- Continue to develop visualizations that communicate embodied carbon metrics to our staff
- On a minimum of five (5) projects, we are committed to sharing the embodied carbon data of our concrete with the client, including information on how the data changes throughout design.
- Collaborate with your concrete supplier to reduce embodied carbon in a mix design below an acceptable baseline

Advocacy:

- Describe the value of SE 2050 to clients. (Required)
- Publicly declare your firm as a member of the SE 2050 Commitment. (Required)
- Engage with structural material suppliers in your region to communicate the importance of Environmental Product Declarations (EPDs) and low-carbon material options.

Reporting:

- Submit a minimum of (4) projects per U.S. office with structural engineering services to the SE 2050 Database. (Required)
- Compare the embodied carbon emissions from multiple projects across your firm

FORELL | ELSESSER

SEI ASCE STRUCTURAL ENGINEERING INSTITUTE | SE2050 COMMITTING TO NET ZERO

FORELL.COM