



S E 2050

EMBODIED CARBON **ACTION PLAN**

2022

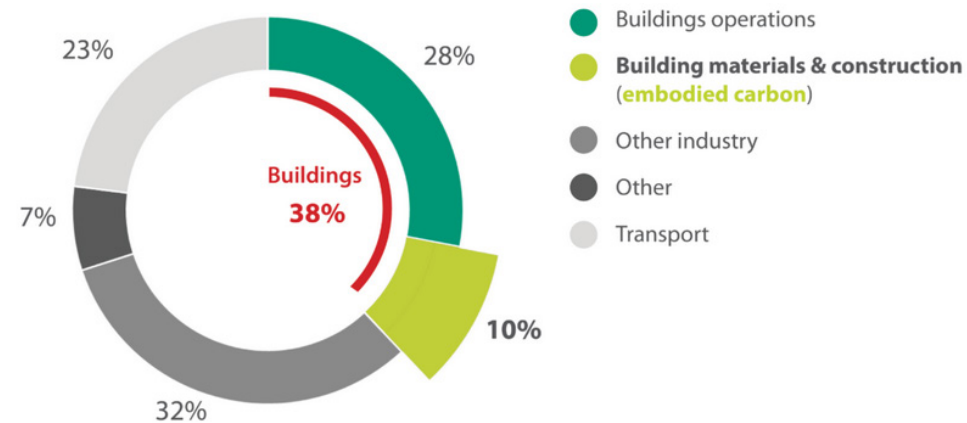
INTRODUCTION

Degenkolb's purpose is to **engineer the future** for our **clients** and **communities**.

Structural engineers have the opportunity and the responsibility to combat the climate crisis. The construction industry accounts for nearly 40% of global carbon emissions. As designers of buildings and other structures, we are actively working to reduce the embodied carbon impact of projects by increasing structures' service lives, designing efficient systems, procuring lower-carbon products, and measuring our impact by conducting life cycle assessments (LCA). Degenkolb Engineers, a west-coast structural engineering firm with 240 employees, has committed to participate in the **Structural Engineers 2050 Commitment Program (SE 2050)**, an SEI-endorsed program formed to foster coordinated action among structural engineering companies toward net zero embodied carbon by 2050.

► **SE 2050 Mission Statement:** All structural engineers shall understand, reduce and ultimately eliminate embodied carbon in their projects by 2050.

Annual Global Energy Emissions



Source: "Net-zero Buildings: Where Do We Stand?" World Business Council for Sustainable Development. <https://www.wbcsd.org/contentwbc/download/12446/185553/1>. Accessed 13 Sept. 2021.

PROGRAM FOCUS AREAS

Our Embodied Carbon Action Plan summarizes the actions we are taking in the program's focus areas:

- Education
- Reporting
- Reduction
- Advocacy



"WE SEEK TO UNDERSTAND OUR CLIENTS' AND COMMUNITIES' NEEDS AND ADAPT TO CHANGING CONDITIONS. WE BELIEVE THAT DOING OUR PART TO CURB CLIMATE CHANGE BY REDUCING EMBODIED CARBON ON OUR PROJECTS AND INDUSTRY-WIDE WILL HELP MEET THOSE NEEDS AND ENABLE US TO BETTER SERVE OUR CLIENTS AND COMMUNITIES FOR YEARS TO COME."

- Stacy Bartoletti, CEO, Degenkolb Engineers

PEOPLE



► **Degenkolb's Sustainable Design Committee** manages the firm's involvement in SE 2050 by leading our firm-wide embodied carbon education program, developing our LCA capabilities, updating our specifications and standard design practices, and creating resources to advocate for embodied carbon reduction.

EDUCATION

Degenkolb sees the importance of **educating employees** across all experience levels and offices.

- Degenkolb has created an **Embodied Carbon Interest Group** with quarterly meetings involving topics of concrete, steel, wood, and embodied carbon accounting advancements.
- We have had company-wide **Cross-Group Forum presentations** regarding lower carbon concrete specs and embodied carbon estimation tools. We also have hosted sustainability experts from suppliers and fabricators such as Central Concrete and Nucor to present their sustainability efforts.
- We are growing the number of Degenkolbers with experience with **embodied carbon accounting** and aiming for more than half of new LCAs to be performed by a new user in 2022.
- We have shared an **embodied carbon education series** with all our staff consisting of the “**Embodied Carbon 101**” webinar as well as resources and presentations to help reduce embodied carbon in materials we use in our design.
- Employees regularly attend **external education programs** and share their experiences with staff at internal forums and meetings.



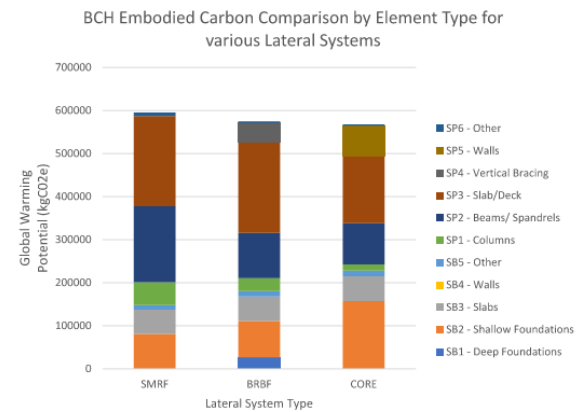
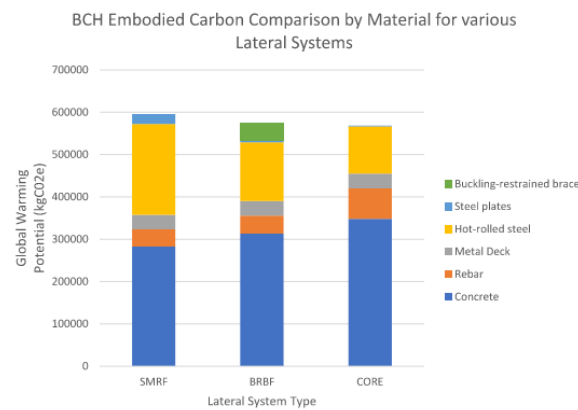
GOALS

- ▶ Continue Embodied Carbon Interest Group and expand discussion topics to include lessons learned from implementing lower carbon strategies on our projects
- ▶ Broaden involvement in each of our offices. Foster participation in the Sustainable Design Committee firm-wide and host company-wide presentations to ensure all staff are involved
- ▶ Continue to share SE 2050 resources with the staff and encourage participation in external education programs

REPORTING

Degenkolb recognizes that **quantifying the embodied carbon** in our designs is instrumental to developing benchmarks and setting goals for reducing impact. The data produced by performing LCAs will help Degenkolb and the structural engineering industry set quantifiable goals for future reduction.

- In 2021, we developed an **embodied carbon accounting tool** for use with data from Revit and structural analysis software. The tool uses material quantities to determine carbon impact from material procurement to manufactured product (A1 – A3). With this tool, we can efficiently track embodied carbon quantities for design development, or throughout project phases.
- Many LCA tools are developed for new design projects. Degenkolb recognizes both the **cost and carbon savings of retrofitting an existing building**, rather than demolition and subsequent new design. We are working to equip our staff with resources to provide meaningful embodied carbon data for modifications to existing buildings.



A project LCA study comparing embodied carbon quantities by lateral system chosen. The study can help inform project teams in choosing a structural system for their building.

GOALS

- ▶ Continue to develop our embodied carbon accounting tool via additional features and comparison against commercial software
- ▶ Continue to develop our internal database of project data
- ▶ Expand the number of users of our LCA software across offices to capture projects along the west coast
- ▶ Increase the frequency of embodied carbon accounting performed on projects, including retrofit projects
- ▶ Continue to train staff on the value of embodied carbon accounting through presentations and forums



UCSF JOAN AND SANFORD I. WEILL NEUROSCIENCES BUILDING

Photo Credit: Kyle Jeffers

REDUCTION

In order to measure our progress toward zero carbon, we must first establish a baseline. We are working to expand our LCA database to establish baselines and **reduction targets** for various project types.

While we are in the process of gathering data and developing baselines, there are significant reduction actions we are taking to reduce carbon on our projects:

- We are educating our staff about general principles of **designing lower carbon buildings**: reuse, design efficiently, use lower carbon materials, and use **environmental product declarations (EPDs)** to procure lower carbon products.
- We took a close look at our **concrete specifications** and collaborated with a supplier to update cement replacement limits, global warming potential (GWP) limits, and other performance variables in our company standard specifications.
- We worked with AISC and Nucor sustainability experts to update our standard **steel specifications** and develop resources to share with our engineers for designing lower carbon steel buildings.
- We are educating our staff about **Buy Clean California** and have updated our specifications to adopt the Buy Clean CA GWP limits for structural and reinforcing steel.
- We are educating ourselves about **sustainable wood and compiling resources** and project experience related to mass timber design, aiming to be able to offer it more frequently.

GOALS

- ▶ Continue to build our database and contribute to the SE 2050 database of embodied carbon project data
- ▶ Implement lower carbon concrete specifications as the standard company-wide, and set direct GWP limits based on NRMCA baselines in our concrete mixes wherever possible
- ▶ Continue to educate our staff about designing lower carbon steel buildings, especially as we work on some of the first projects under Buy Clean California
- ▶ Grow our knowledge about mass timber design
- ▶ Continually update project specifications and general notes to incorporate lessons learned and new technologies for lower carbon materials



**THE STANFORD UNIVERSITY BRIDGE PROJECT
INCORPORATED LOWER CARBON CONCRETE AND STEEL
SPECIFICATIONS FOR SIGNIFICANT OVERALL CARBON
REDUCTION ON THE PROJECT.**

We see that sustainability is a priority for peers, clients, and other partners in the construction industry. We **advocate** for climate action and SE 2050 on several fronts.

- We **volunteered** in engineering outreach groups such as Engineering Alliance for the Arts which educates high school students on engineers' role in climate action.
 - ▶ Degenkolb is launching a **donation matching program** to support employees' personal choices in philanthropy.
- We created and shared **helpful resources on social media**, such as our "What You Should Know About Embodied Carbon Series" (see below for links to parts one through four).
 - ▶ We are publishing a video interview series to help people get to know our Sustainable Design Committee members.
- Degenkolb staff regularly participates in **building and material code development** work, ensuring that the next generation of codes incorporates sustainable practices.
- Internally, we are **creating resources for project managers** to explain the benefit of SE 2050 to clients and practices to reduce embodied carbon throughout projects.

▶ **What You Should Know About Embodied Carbon Series** (click to access)



GOALS

- ▶ Educate and enable project managers to share the benefits of SE 2050 and apply carbon reduction strategies on projects
- ▶ Continue to create engaging social media content to spread the word about sustainability and SE 2050
- ▶ Volunteer and donate to organizations which support the next generation of engineers



CONTACT US & GET INVOLVED!

- ▶ Email us at sustainability@degenkolb.com
- ▶ Look us up at degenkolb.com/se2050/
- ▶ Follow us on Instagram [@degenkolbengineers](https://www.instagram.com/degenkolbengineers)
- ▶ Add us on [LinkedIn](#)
- ▶ Learn more about SE2050 at se2050.org/