SE 2050
EMBODIED CARBON ACTION PLAN
2025-2026

In March 2021, Simpson Gumpertz & Heger (SGH) signed on to the Structural Engineering Institute (SEI) SE 2050 Commitment program. In our first four years, we have reported thirty-five projects to the SE 2050 database, presented about the program internally and externally, disseminated educational resources, and updated our specification and proposal templates to highlight opportunities to incorporate carbon reduction strategies, life-cycle assessment (LCA), and green material procurement strategies into structural design projects.

As we head into our 2025-2026 term, we use this Embodied Carbon Action Plan (ECAP) to summarize how we will continue to fulfill the four pillars of the program—Education, Reporting, Advocacy, and Reduction—and share highlights and lessons learned from the program to date. We also continue to provide internal updates to our firm via presentations and internal communications.

As a working group, we are looking to make progress both internally and externally. Parallel to our regular SE 2050 commitments, we are strategizing how the SE 2050 program will look at SGH in the future by streamlining and improving our processes and expanding upon the lessons we've learned to date.

Photo: Duke University, Environment Hall, Durham, NC, by Warren Jagger

EDUCATION

Our goal is to incorporate embodied carbon reduction into our engineering decisions. We provide educational materials and presentations, as well as regular learning opportunities to stay up to date on state-of-the-art practices. We are working on a deployment strategy to share LCA best practices and other embodied carbon knowledge firmwide, including helping SGH's building enclosure consultants incorporate embodied carbon reduction strategies on their projects.

ACTIONS AND COMMITMENTS

- SGH's Sustainability Special Interest Group is actively engaged in promoting firmwide education programs for embodied carbon reduction and SE 2050. The group identifies, creates, and promotes resources to help our team members learn about embodied carbon and work to reduce our footprint. The group publishes an internal newsletter with content provided by the SE 2050 working group to share many of our education-related initiatives and project highlights.
- We distribute our ECAPs to the firm via SGH's internal Sustainability Special Interest Group newsletter and intranet platform.
- To increase education and engagement among SGH employees, we created a general SE 2050 presentation for internal and external use.
- We hosted an internal embodied carbon webinar series covering embodied carbon basics before diving into considerations specific to structural materials (concrete, structural steel, and wood framing), building enclosure systems, and fireproofing.
- We have presented and will continue to present SE 2050 goals to internal groups, disseminating knowledge of the program and SGH's commitment throughout the company. These presentations include a smaller audience and offer space for internal collaboration.
- We present SE 2050 updates to the company annually to increase engagement and knowledge of the SE 2050 program and our progress. We presented the inaugural address in 2024 and presented as part of a firmwide "State of Sustainability" presentation in 2025.
- Julia Hogroian and Michael Tecci are SGH's Embodied Carbon Reduction Co-Champions and represent and advocate for the program at SGH. In addition, our SE 2050 working group has members in many SGH office locations, helping to promote our SE 2050 goals at the local level.
- Members of our staff regularly attend external education programs and sustainability committee meetings with Carbon Leadership Forum (CLF), SE 2050, ASCE, SEI, AISC, SEAOSC, BE+, and AIA.

- We continue to update our internal embodied carbon library with new resources from SE 2050, CLF, and other external sources. We highlight some of these resources to the firm via internal communications and office staffing meetings.
- The SE 2050 reporting group developed a novice training module to teach SGH colleagues how to conduct LCAs on projects using Tally. This training module is part of a larger effort to engage more staff in conducting LCAs and participating in SE 2050 project reporting.
- The SE 2050 working group is committed to making sustainability-related content accessible on SGH's intranet and external website. The working group is helping to collect embodied carbon-related resources and technical topics for the group space internally and for sharing externally.
- We will conduct another internal survey to assess employee engagement in SE 2050, embodied carbon, and sustainability as a whole. We will continue to monitor company projects that qualify for SE 2050 program requirements to reevaluate our reporting targets.
- Our employees are actively involved in mentoring local structural engineering undergraduate students on how to incorporate embodied carbon reductions into their projects by exploring design and material-specific strategies. We are also active participants in design critique sessions for nearby universities, offering engineering feedback including embodied carbon reduction strategies.

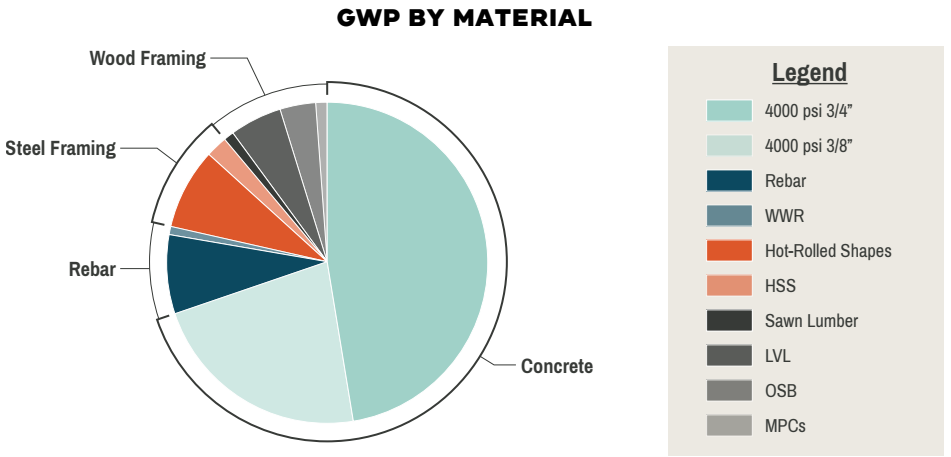
Photo: Federal Office Building, Andover, MA, by David Lena

REPORTING

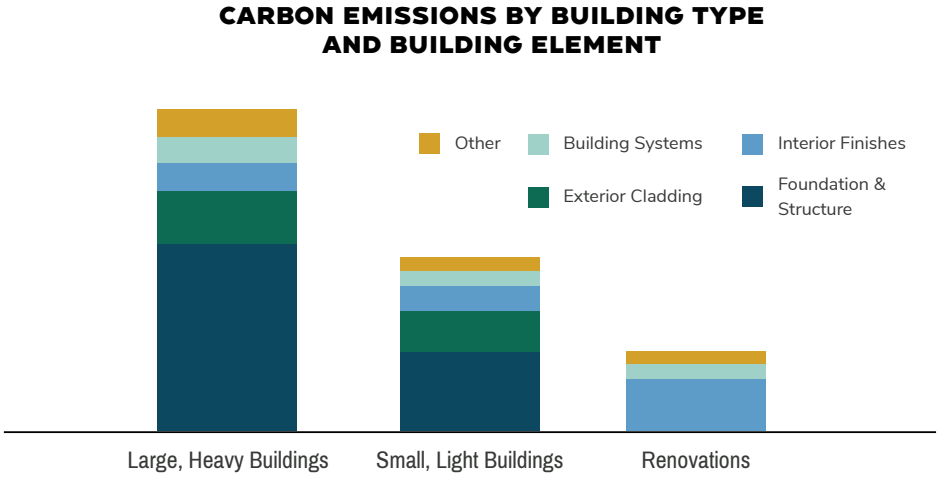
Tracking the embodied carbon on our projects across multiple offices helps us establish internal benchmarks for different project types and implement reduction strategies. Contributing embodied carbon data from our projects to the SE 2050 database helps develop benchmarks for the industry. Last year, the SE 2050 reporting group distributed a survey to our principals to gauge the firm volume of qualifying new design and renovation projects, which helped us refine our reporting goals.

COMMITMENTS

- We will calculate embodied carbon for at least fifty percent of our qualifying structural design and renovation projects this year. We will seek projects that are substantially complete or beyond the design phase from at least half of our major office locations with qualifying project work.
- We will continue to grow our understanding and skillset for reporting projects. As part of this, we will continue learning about the various tools available for calculating embodied carbon. We will also continue developing in-house tools in an effort to optimize the process and output.
- We will extract structural material quantities on all reported projects for submission to the SE 2050 database no earlier than the end of the construction documents phase.
- We will coordinate with our clients to identify appropriate projects for estimating embodied carbon throughout design development and aim to reduce it over the course of the project.
- Our working group is developing additional resources for professionals to reference when completing their embodied carbon calculations. These references will build on the resources developed last year, including a guide on performing an LCA, Revit modeling practices for integration with LCA software, and guidelines for importing projects into the SE 2050 database. We deployed this tutorial to beta testers in mid-2024.
- We will distribute embodied carbon reporting tutorials to additional engineers throughout 2025 and work with them to report a qualifying project. We will solicit their feedback to improve the tutorials and dissemination process. We will use the results of these trials to inform budget allocations for reporting in future project proposals.
- We will continue offering assistance to internal design teams in measuring the embodied carbon of projects through easy-to-use tools, such as the Embodied Carbon Order of Magnitude (ECOM) tool on the SE 2050 website for structural materials and C.Scale for measuring enclosure impacts.



Graph: Previous project report showing Global Warming Potential (GWP) by material.



Graph: Taken from SGH's article, "Embodied Carbon in Structures," adapted from CLF's "The Time Value of Carbon."

ADVOCACY

SGH continues to use multiple channels to spread the word about SE 2050 and the need to address embodied carbon. Our Marketing Team won awards from the Society for Marketing Professional Services (SMPS) national organization and Boston chapter for the SE 2050 group-led "Cutting Carbon" campaign and webinar series held in Fall 2023.

COMMITMENTS

- We annually publish our ECAP on sgh.com and share the news on our social media channels.
- We will continue to make SE 2050 and embodied carbon reduction a priority in our external communications.
- We will continue to meet with clients and partners to discuss the importance of embodied carbon reduction strategies. We have developed and presented client-specific materials, including embodied carbon reduction strategies on potential future projects.
- Recognizing the critical role of policy drivers in reducing embodied carbon, our SE 2050 team is working with local jurisdictions and state legislators to implement embodied carbon reduction incentives through zoning requirements, buy-clean legislation, and other related mechanisms.
- SGH is collaborating with other structural engineers and the wider AEC community to improve the availability of low-carbon concrete and environmental product declarations (EPDs) in the Boston area and establish embodied carbon benchmarks for concrete.
- We continue to be active in carbon-reduction-focused educational and advocacy organizations, such as CLF Regional Hubs.
- We are working to increase our sustainability and embodied carbon marketing material for use with proposals and clients.
- We will promote our team members' involvement and professional activities addressing embodied carbon internally and externally.
- We continue to look for opportunities to collaborate with industry groups and other firms to share embodied carbon education. This spring, three of our working group members will present and sit on panel discussions as part of a SEAMASS embodied carbon webinar series.

Photos: SGH employees presenting about embodied carbon reduction strategies.

REDUCTION

SGH will continue to develop effective strategies to help us meet our embodied carbon reduction goals.

COMMITMENTS

- We will gather lessons learned from employing embodied carbon reduction strategies and present these lessons to the company.
- We are analyzing embodied carbon reduction data on SGH-completed projects to compare with the baseline values we calculated in previous years. We will compare the embodied carbon intensity of projects submitted during 2024 with these baseline values to look for any trends.
- We continue to explore Revit-integrated LCA tools and their data visualization capabilities to highlight the embodied carbon contribution of major structural components. As we explore these options, we are working to develop internal data extraction and visualization tools to use in conjunction with the Revit-integrated tools.
- We will create a project-specific embodied carbon reduction plan for one project.
- We will implement options for embodied carbon tracking and embodied carbon reduction planning into our standard basis-of-design document.
- We have updated our internal material specifications for concrete and steel. We will conduct internal reviews of masonry and timber material project specifications for embodied carbon reduction strategies.
- We actively help develop codes and standards, including Massachusetts embodied carbon provisions, with the SEI Sustainability Committee and offer commentary on LEED v5. Our work includes participating in the development of a new SEI pre-standard for calculating the embodied carbon of building structural systems; commenting on the proposed RESNET 1550 standard for reporting the embodied carbon of residential buildings; commenting on proposed utility incentives for reducing embodied carbon; and commenting on recently adopted Massachusetts stretch code provisions for reducing the embodied carbon of concrete and insulation in commercial and residential buildings.
- We will work with concrete suppliers to run material characteristic tests for Type 1L cement. We will run strength, time-of-set, and heat evolution tests to compare the material with Type I/II cement. We will provide a topic brief for reduction strategies for general structural engineering, as well as material-specific options to project teams moving forward.

- We continue to work with SGH's building enclosure engineering teams to apply LCA skills and best practices to roofing and facade comparison studies.
- We continue to seek out and respond to requests for proposals and requests for qualifications with strong sustainability components. These RFPs and RFQs give us an opportunity to highlight our sustainability competencies and motivate us to continue pushing and developing our competencies.
- We are part of a DOE-funded research team developing a deconstructable hybrid steel-CLT composite floor system. This system can be used to construct carbon-negative buildings up to at least twelve stories tall.

Photo: HITT Contracting, Co|Lab, Falls Church, VA

HIGHLIGHTS

Here, we share several program highlights from March 2024 to March 2025.

- We successfully reported ten projects to the SE 2050 project database from two different offices.
- We expanded embodied carbon language into project specification templates, including expanding language in the steel and wood specifications. These changes include requesting project-specific EPDs for structural materials—including structural steel, concrete, and wood—and recommending embodied carbon reduction language to reference specifications involving cast-in-place concrete, structural steel, and wood.
- We provided guidance to jurisdictions on the implementation of embodied carbon measurement requirements.
- Our members continued to serve on sustainability committees and participate in embodied carbon advocacy groups, including the AISC Sustainability Committee, ACI Sustainability Committee, SEI Sustainability Committee, and SE 2050 Committee, as well as local chapters of the CLF and NCSEA Sustainable Design Committees.
- We developed a project import form to obtain relevant information from a project engineer prior to completing the LCA. This form is based on SE 2050's project import form and requests information on project size, mix design submittal history, and modeling procedures. The goal of the form is to create a more efficient reporting process.
- We presented SE 2050 goals and resources to several internal groups in smaller, informal, collaborative spaces. Through these conversations, we received feedback on how we can foster wider participation within our company in reporting and reducing embodied carbon.
- Our Marketing Team won first prize in the Society for Marketing Professional Services (SMPS) Boston Chapter's Marketing Communications Awards program for our promotional campaign supporting the SE 2050 group-led "Cutting Carbon" webinar series. We also won a national Merit Award from SMPS.
- We met with GSA representatives to discuss the durability of low embodied carbon concrete exposed to de-icing salts, particularly concrete installed for repairs of historic structures. We will present to a GSA working group in July 2025 on surface scaling of concrete flatwork, incorporating aspects of sustainable construction.

LESSONS LEARNED

- The accuracy and quality of an LCA performed through a Revit add-in is only as good as the model itself. General material assignments must be consistent and concrete design information (e.g., compressive strength, weight, reinforcement layout) should be included in the modeled element, as these details can greatly impact LCA results. This guidance needs to be incorporated into learning modules for engineers as they learn to conduct their own LCAs.
- Organizing project information and tracking design changes are critical to performing an accurate LCA. Without a procedural set of steps adopted by an organization, there is not an effective or consistent way to implement this practice firmwide. This guidance needs to be incorporated into learning modules for engineers as they learn to conduct their own LCAs.
- Early conversations with clients are important to build confidence in the effectiveness of embodied carbon reduction strategies. However, even an educated client will often need convincing of the merits of embodied carbon reduction strategies.
- For resources to be effective, awareness and ease of access are as important as quality.
- Internal education requires frequent updates through multiple communication channels.
- The industry is open and ready to implement strategic changes to improve the built environment by reducing embodied carbon.
- Designers can play a role in embodied carbon reduction through conscious design and material specification. However, this effort needs to be shared across the design team and effectively communicated to the owner and construction team to ensure these design goals are achieved through project completion.

Photo: Downtown Cary Park, Cary, NC, by Tzu Chen

Simpson Gumpertz & Heger (SGH) is a national engineering firm committed to delivering holistic advice for our clients' most complex challenges. We leverage our collective and diverse experience, technical expertise, and industry knowledge of structures and building enclosures, advanced analysis, performance & code consulting, and applied science & research to deliver unrivaled, comprehensive solutions that drive superior performance. With 750 employees in nine office locations throughout the United States, SGH's industry-leading teams constantly seek to advance the meaning of what's possible.

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