

SE2050

EMBODIED CARBON ACTION PLAN

SUBMITTED 2025



208 Flynn Avenue, Suite 2A
Burlington, VT 05401

(802) 863-6225

www.engineeringventures.com

INTRODUCTION

ABOUT US



In 2021, Engineering Ventures PC (EV) committed to the SE2050 movement. We have announced this internally and publicly, as outlined in the SE2050 Commitment requirements. Our commitment includes

- Educating our company, clients and local industry.
- Sharing knowledge.
- Planning carbon reduction in structure.
- Performing additional electives intended to supplement these goals.
- Sharing our lessons learned.

All of these things—written down and published internally and on the SE 2050 website—comprise this document: our Embodied Carbon Action Plan (ECAP).

Per the SE2050 Commitment and Challenge, EV hopes to contribute to transforming the practice of structural engineering through a holistic, firm-wide, project based, and data-driven approach. By prioritizing reduction of embodied carbon through the use of less and/or less environmentally impactful structural materials, we can more easily work toward net zero embodied carbon designs by the year 2050.

EV is a civil & structural engineering firm located in Burlington, Vermont, Lebanon, New Hampshire, and Saratoga Springs, New York. We understand that our livelihoods industry contributes significantly to global carbon emissions. It's a simple fact, if something new is built in the current age it's likely creating and leaving a carbon footprint. Drastic measures must be taken to change the approach to the building industry in our region.

HURDLES

Two of our biggest hurdles are a lack of local manufacturers, and engrained building practices. A local CLT or glulam manufacturing facility would significantly reduce the carbon footprint of a mass timber build on transport emissions alone. We do have local concrete plants, but they have remained resistant to changing their mix designs, and it seems fly ash and GGBFS' are often "unavailable." Addressing these challenges would be huge first steps in reducing the GWP of our structural elements

In congruence with our aims to educate staff, clients, owners, local product suppliers (concrete plants), we are also fostering relationships with alternative construction pioneers. They use straw bale panels or helical anchors, and are helping to lay the groundwork for future use of local resources. (F1)



FOOTNOTES

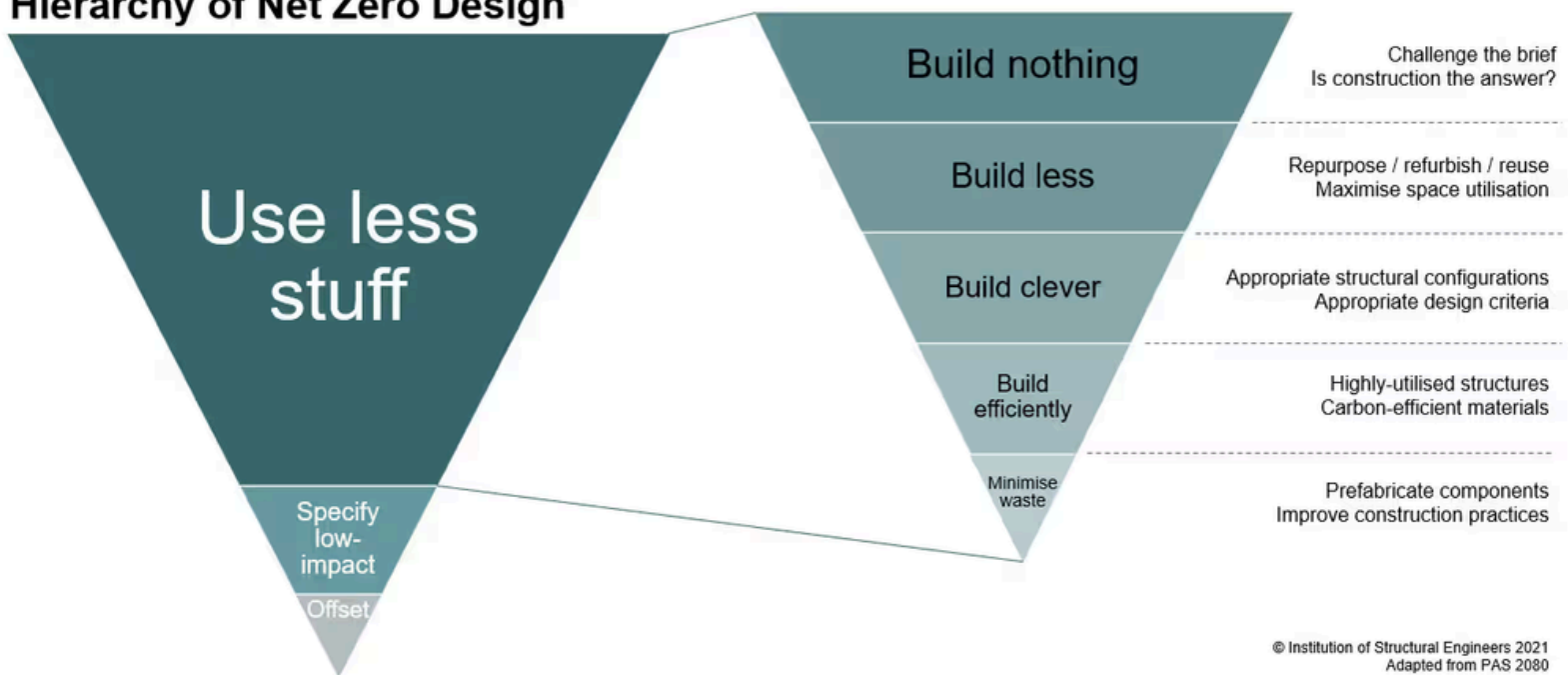
The CLT panels used at the Tang Science Annex at the Fairbanks Museum utilized CLT made from local species (Eastern Hemlock) that was recently tested at UMass Amherst with support from the Massachusetts Executive Office of Energy and Environmental Affairs. This process allowed panels made from locally sourced lumber to be certified through the American National Standards Institute (ANSI) and the American Plywood Association (APA) to meet the industry standard PRG 320 performance requirements.

As a firm of ~35 people, our influence can sometimes seem small. But as people who find value and purpose in sustainable design, we would be ecstatic to have an impact on our local communities. We whole-heartedly support the vision that structural engineers can contribute to reducing a project's carbon footprint and ultimately reaching for and achieving net zero embodied carbon for every project.



Our sustainability efforts will continue to focus on the renovations and adaptations of existing buildings, improving their resiliency to environmental factors—which significantly reduce embodied carbon effects through re-use vs. new construction. We hope to understand and emphasize efficient structures and lower impact materials. We will emphasize working to implement local materials and trades' craft for overall project reliance on transport. We consider the SE2050's guidance for Net Zero, as a footprint for what's not to be left behind.

Hierarchy of Net Zero Design



COMPLETED

As outlined in the SE2050 Program Requirements Guidance Document our ECAP is meant to be a plan to accomplish tangible goals for the coming year. As this is not our first year of commitment, there are some program requirements which we have already completed such as:

- A commitment letter signed by our president at the time, explaining our motivation to join (2021)
- Distributed a firm wide announcement of our pledge to SE2050 (2021)
- Presented “Embodied Carbon 101” webinar to the firm (9/22/2022)
- Incorporated SE2050 education and “Embodied Carbon 101” education into our orientation/on-boarding programs for structural employees (as of 9/2022)

FOR 2025

Our goals for the coming year are outlined below and include:

- Education Plan Outline and Electives
- Knowledge Sharing Narrative
- Reduction Strategy and Electives
- Reporting Plan and Electives
- Advocacy Electives
- Elective Documentation
- Lessons Learned

2024 HIGHLIGHT SUMMARY

Have each Project Manager work through an LCA with the SE2050 team; Use EC3, while on projects; BEAM added.

We were partially successful in meeting this goal. We engaged 3 new project managers in the LCA process. Previously only the two members of the SE2050 team and one additional member of staff have been involved. This included an initial meeting to review the project with the project PM as well as a staff member who would be inputting the data into the EC3 platform. After the data was input into EC3, we reviewed the input process as well as the results and comparisons to other buildings with the PM.



Provide narrative outlining plans for minimum (2) firm wide presentations per year on the topic of embodied carbon.

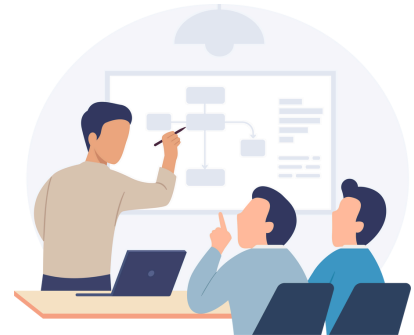
This year we have homed in on our webinar offerings for the company as a whole (not specifically carbon related). As a result, I believe we can improve our carbon related webinar offerings for the coming year. We can ask the PM managing webinar offerings to provide embodied carbon focused webinars more regularly. While we have fulfilled this elective, we plan to be more focused and intentional.



Reference our previous years ECAP as well as the “Lessons Learned” section in this document which shows some of the struggles of achieving the 2024 goals and additional challenges we’ve discovered or realized over the past year.

EDUCATION ELECTIVE 1: PROVIDE A NARRATIVE

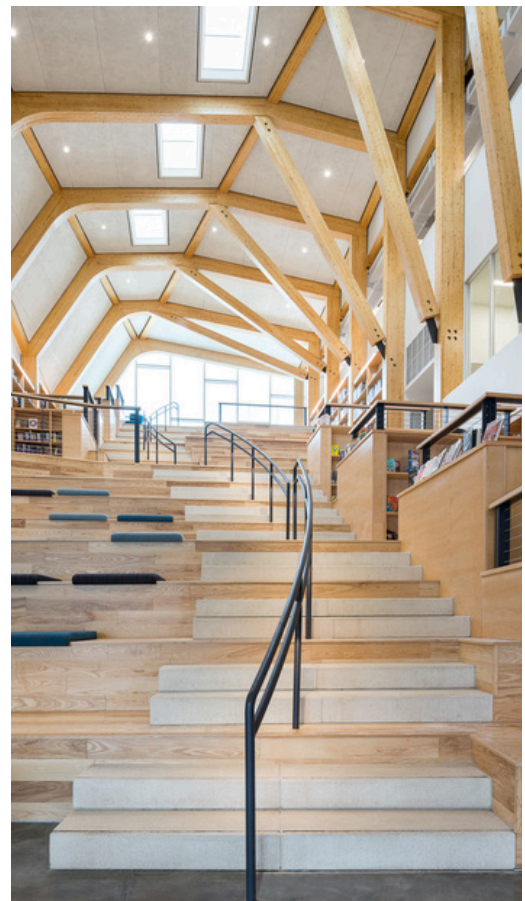
Our education plan is two-pronged, with internal and external pathways and a focus on awareness. This year, our primary focus is on expanding staff awareness beyond our SE2050 team. This is on-going. We believe expanding our in-house knowledge and initiative will lay a solid foundation for effective implementation of change. EV staff who are aware of embodied carbon, and how structural elements contribute to environmental footprints can speak knowledgeably with clients. We aim to promote that skill among more of our staff, and expand our ability to advocate for sustainable alternatives firm-wide.



We've found that we can make the most impact when this information is communicated effectively to project owners. Informing them aids in their buy-in when discussing initial cost for materials, or the use of an alternative building material or approach. The best way to reach owners is through our clients – architects. Hence, educated staff makes educated clients who can work effectively with owners. This is an important partnership as we perform a large percentage of work with architects as our direct clients. This knowledge sharing can transcend projects and even partnerships.

We also have an internal, operations-based approach. We continue to push our employees to use less paper and work electronically. Additionally, born out of the COVID-19 pandemic, we have gone to a hybrid work system which includes 1-3 remote days for most employees. Inadvertently, this saves fuel driving back and forth to the office. While this provides an immediate reduction in carbon, we are also weighing the long-term investment in effective in-person communication. Our leadership believes in person work is the best for communication, collaboration, career growth, education and innovation. All of which are methods to communicate our SE2050 goals. We believe we need to find a balance to reach our staff as well as efficient design.

For example, the tangible goal of “reduce gas” is lost if remote quality control or review prevents economizing a design. Do more mistakes happen on drawings because people are not communicating as well remotely? As a result, is more communication, fuel, time, fee, materials, spent on resolving unvetted or under communicated designs?



EDUCATION ELECTIVE 2: WEBINAR

Present at least (1) webinar focused on embodied carbon and make a recording available to employees.

Action: We plan to share additional webinars and education directly related to carbon reduction in structures including videos by the Boston Society for Architecture.

EDUCATION ELECTIVE 3: ONBOARDING

Incorporate embodied carbon education into our onboarding process for all new structural employees.

Action: We have SE2050 as a dedicated section in our initial onboarding process that is reviewed with the new employee by the Embodied Carbon Champion. Embodied Carbon 101 webinar is required viewing material by the new employee.



ADDITIONAL EDUCATION ELECTIVES

As schedule and time allows, EV will engage in additional electives from the Program Requirements Guidance Document.



OUTLINE

Below is an outline of our firm's strategy to communicate our embodied carbon reduction work externally. This includes sharing our firm's efforts, successes, and lessons learned with clients, the design community, and the public.



Engineering Ventures knowledge of embodied carbon, admittedly, is growing and we are building our program. As EV grows and becomes more confident in our ability to select or propose materials, products and strategies to architects and owners, we will most certainly advocate for them. Several members of our team are long-time advocates for carbon reduction and have a vast amount of knowledge and context. They have worked hard over the years to inform and educate clients and owners on the benefits and approaches to reducing carbon, including presenting at local and national conferences on related topics, suggesting specification changes to include EPD's (environmental product declarations) and working with several local business to assist with developing new products such as foam glass (crushed stone replacement) and panelized straw construction techniques.



This institutional knowledge combined with continued internal education will help us share more knowledge externally. These are long term strategies. Through ongoing electives noted withing our ECAP, and education year after year, we believe this will become part of our culture.

OUR GOALS

OKAY, LET'S REDUCE CARBON!

But first things first — relative to what? What are we reducing from? We can look at national data results, but there are many regional factors that are specific to EV's reach (VT, NH and NY's capitol region). What we are realizing is that we have begun to establish a baseline through our LCA's for different project types. From the first few years, we have a starting point and can begin to track changes in carbon.

Our goal over the next few years is to develop a tracking system consisting of several common construction types that we work with the most. These are: residential wood frame, steel frame with slab-on-deck, CMU bearing walls, mass timber/alternative, and renovations.



We will note that in the past year there have been some local EPD's added to the EC3 database. This is already an improvement from past years when they were not available, and we utilized national averages. As the database improves, so will our ability to accurately track and reduce relative to our established baseline.

We plan to demonstrate leadership by not only applying but developing best practices and actively collaborating with the design community. This is our profession's opportunity to take action and make an impact.

REDUCTION ELECTIVE 1: TARGETS

Set clearly stated, firm-wide reduction targets in the short-term (<1 year) and long-term (5+ years).

Action: As indicated above, we are working to implement a tracking system to track changes year after year. Our long-term goal is to understand and establish reasonable benchmarks, e.g. 5% overall reduction in steel and slab-on-deck type new construction.

REDUCTION ELECTIVE 2: SPECIFICATIONS

Update your specifications to incorporate embodied carbon performance. Included embodied carbon in your submittal review requirements.

Action: We have done this in the past year on several projects. We will advocate for this on future projects.



REDUCTION ELECTIVE 3: MATERIALS

Incorporate sustainably harvested biogenic materials in at least one project.

Action: We continue to work with a local company that is a straw bale panel manufacturer and supplier.

REDUCTION ELECTIVE 4: CONCRETE

Collaborate with your local concrete supplier to reduce embodied carbon in a mix design below an acceptable baseline.

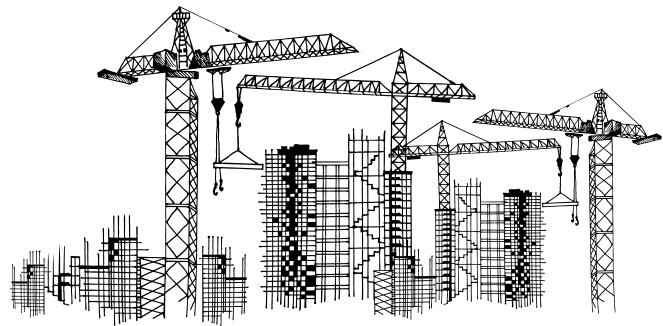
Action/Note: We have tried and most local suppliers are not open to deviating from their traditional mix designs. Feedback suggests they cannot obtain fly-ash or GGBFS. They note it will compromise surface finishes, they say it will be out of the budget etc. One positive step recently is that a large concrete supplier has EPD's available for some of their concrete mix's. We have used them on our LCA data this year in lieu of the national average.

Quality data is essential to making informed decisions and setting important benchmarks and the development of appropriate embodied carbon reduction targets. The SE 2050 database is a central component to building a successful Commitment Program and reaching our collective embodied carbon reduction goals by 2050.

REPORTING ELECTIVE 1: PROJECT DATA

Submit a minimum of (2) projects.

Action/Notes: Our VT office has about 10 structural employees (qualifies as an “office” per the Program Requirements). Our NH and NY office have (2) employees each (Does not qualify as an “office” by the Program Requirements). Therefore, we are required to submit a minimum of 2 projects. We have exceeded this each year. As indicated previously, we plan to A.) engage multiple project managers (and therefore more projects) and B.) submit and track multiple construction types (and therefore more projects). At this point we have established 4 or 5 project types, and our goal is to submit one of each type every year, and engage as many project managers each year.



REPORTING ELECTIVE 2: PROJECT COMPARISON

Compare the embodied carbon emissions from multiple projects across your firm.

Action: Analyze and document what data or pieces of information are most important and communicate the findings to your firm.



ADVOCACY ELECTIVE 1: VALUE

Describe the value of SE 2050 to clients. How can your design teams collaborate to reduce embodied carbon?

Action: Ongoing. Our goal is to build confidence in our structural team and coach them so more people can do this. Currently limited to 2 or 3 people with the confidence to discuss, advocate or promote for the program.



ADVOCACY ELECTIVE 2: SE2050 PUBLICITY

Publicly declare your firm as a member of the SE 2050 Commitment however you see fit.

Action: Continue to indicate on our website, via blog post(s), proposals, social media etc. Ongoing.

ADVOCACY ELECTIVE DOCUMENTATION

We have indicated our required and optional electives within the different sections of this ECAP. Please see above for elective and actions associated with them.



TIME & CAPACITY

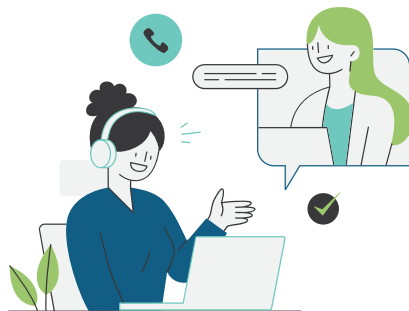
One of our goals last year was to have every project manager perform an LCA on one of their projects. Ultimately this proved to be a bit of a bite for us. Time is the biggest factor. We have 10+ structural project managers and about 10 more in the civil engineering department. Based on SE2050 elective requirements and overall office sizes we are only required to provide data for 2 LCA's.



While we have been providing data on more than the base requirement, getting every project manager up to speed on software and selecting an appropriate project (if they did have an appropriate project that year) would be too much of a drain on resources in one year. We are likely to have 4 new project managers engaged in LCA's for 2024 and going forward. We are realizing we need to pace ourselves better and balance our involvement with our workload.

HONING SCOPE

We also realize that our civil department—though we are one company—is not necessarily a fit for the SE2050 program. We have dialed back a lot of the reporting requirements based on our structural staff, as many civil projects are permitting, wastewater and site work (non-building, non-structure components).



CLIENT INTEGRATION

Presenting Carbon Reduction Strategies to clients is an ongoing process and struggle. As we develop our program, we are educating our staff, who in turn can speak better about carbon reduction strategies.

EPD SUBMITTAL CONSTRAINTS

We have attempted to update specifications to require EPD's in submittals. This has been challenging once in construction. E.g., contractors are resistant to the additional information required. In some cases, the architect added the EPD because the contractor refused to do it, stating they couldn't find it or it was additional time that would delay the project from "real work".



BARRIERS TO IMPLEMENTATION

One of the biggest disconnects we find with SE 2050 and our company/region is that SE 2050 approach seems to be based on having structural engineers engaged by architects and owners to develop systems that are lower carbon. However, on most of our projects we are consultants to the architect where we are brought in after concept or SD and initial pricing has occurred. Some of the SE 2050 electives seem to imply that we are helping develop the building program and have some sort of say in this process, but we largely do not, this is not often the approach in our region.

That is to say, if we only accepted projects where we would have a substantial say in setting the carbon goals, we would have very few projects and likely go out of business. We hope to be selected for projects where the architect and/or owner are invested in reducing carbon. Often our hopes and approaches for reducing carbon fall on deaf ears. We realize one of the goals of SE 2050 is to change this and we find it exciting to be participating in this movement. We hope to make an impact in whatever way we can.

