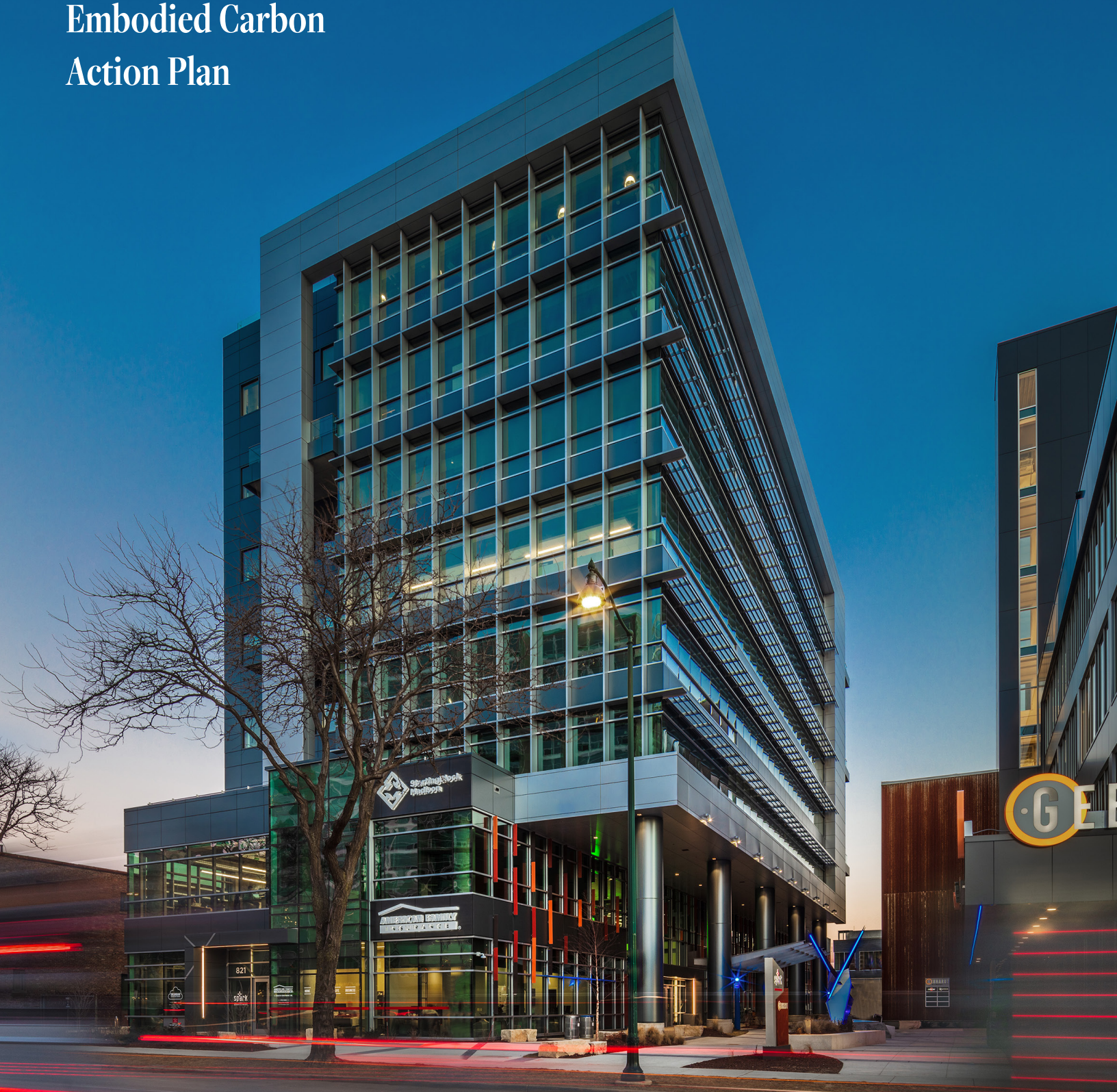
SE2050 Embodied Carbon Action Plan



PIERCE ENGINEERS
CONSULTING STRUCTURAL ENGINEERS

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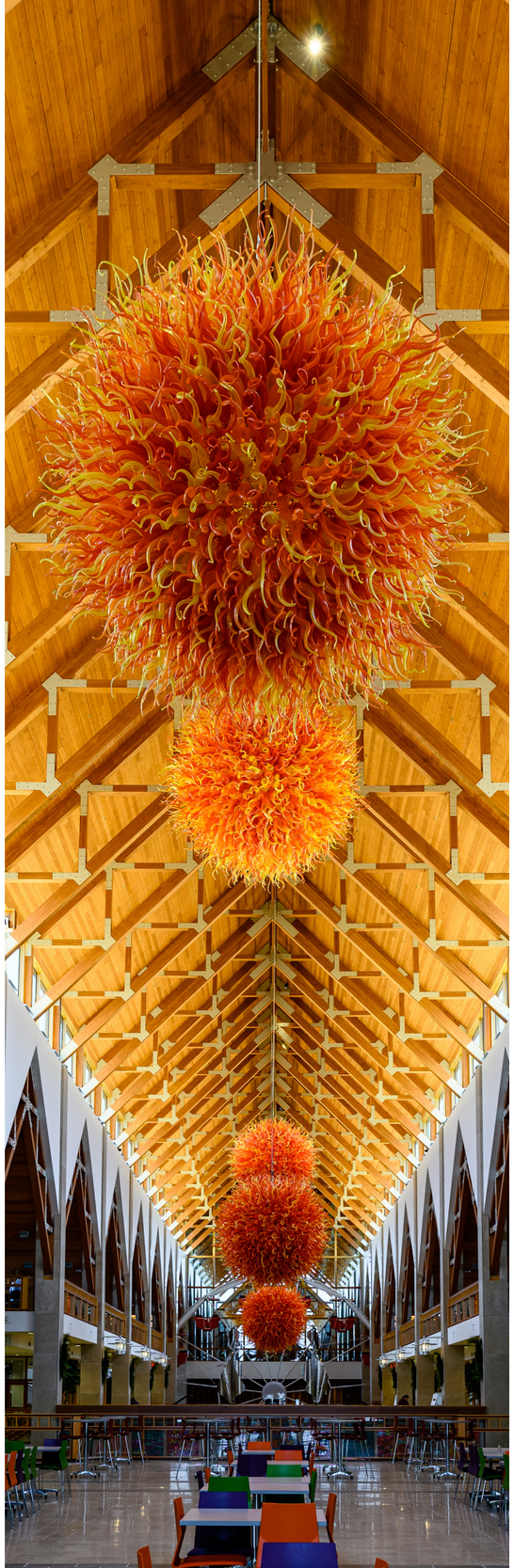


PIERCE ENGINEERS
Milwaukee | Madison | Chicago

November 1, 2023

Laura Champion, Director
Structural Engineering Institute

Re: Letter of Commitment to the SE 2050 Program

Dear Laura

Pierce Engineers, a 70 person firm located in Milwaukee, Wisconsin, Madison, Wisconsin, Chicago, Illinois, and Denver, Colorado, is hereby signing on to the SE 2050 Commitment Program. We support the vision that all structural engineers shall understand, reduce, and ultimately eliminate embodied carbon in their projects by 2050.

Recognizing the impactful role that the built environment contributes to carbon emissions and subsequently a changing climate, we are joining SE 2050 because we are committed to embracing and promoting sustainable design practices. As the industry continues to evolve, we understand the critical role structural engineers can play in shaping a sustainable world. Pierce Engineers strives to take a proactive stance in combating climate change and contributing to global efforts to limit the effects of greenhouse gases.

We are motivated to innovate and explore new technologies, materials, and processes that promote sustainable building design and construction. We are enthusiastic about being part of a movement that fosters positive change in the industry and that leaves a lasting legacy for future generations. By aligning with SE 2050, Pierce Engineers hopes to inspire our design and development partners to follow suit and collectively work towards a more sustainable future.

We therefore commit Pierce Engineers to take the following steps which are part of the SE 2050 Commitment Program:

Within six months and annually henceforth, we commit to reporting an Embodied Carbon Action Plan (ECAP) and permit the ECAP document or form be made public on the SE 2050 website. Within one year and annually henceforth, we commit to submit data to the SE 2050 project database in a collaborative effort to understand embodied carbon in structural engineering projects and to set attainable targets for future projects.

We look forward to joining this coalition and industry effort to achieve the goals of the SE 2050 Program.

Sincerely,

Pierce Engineers

Sarah Frecska, PE, SE
Principal

About PE

Pierce Engineers, founded in 1991, is a 70-person structural engineering firm based in the Midwest, working with clients across the nation. Our four offices in Milwaukee, Madison, Chicago and Denver work as one team with daily interaction and coordination on technical topics, projects, and management.

The PE team has a traditional hierarchy of positions and roles, but we work horizontally fostering engagement from all levels of experience to create a successful team and develop our younger staff. Our practice is founded on building lasting relationships with clients and industry partners, who appreciate our teamwork and cost-focused approach to structural engineering.

While our experience and expertise encompass all types of building projects, we find that the best projects are the ones where the team works in a collaborative approach to deliver a successful project.

Services

PE specializes in structural designs utilizing concrete, structural steel, wood framing, and cold-formed metal framing systems, for both new construction and renovation projects. We also design various foundation systems as required for each project site. Using our familiarity with a variety of materials and framing systems, we evaluate multiple systems in schematic design to determine the ideal system for each project, considering constructability and cost.

Pierce Engineers also offers restoration services for structural, non-structural, and historic building elements along with waterproofing, sealant and coating protection of structures. Our services provide owners with performance-based, cost-effective repair and protection solutions for their specific structure's issues and use criteria.

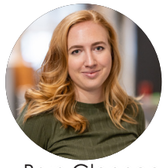
SE 2050 Committee

Alex Olson
Structural Designer
Milwaukee Office

Alex Schleis
Structural Engineer
Chicago Office

Alex Stern
Structural Designer
Chicago Office

Ashley Sanner
Project Manager
Denver Office



Bryn Glennon
Structural Designer
Milwaukee Office

Dale Feil
Structural Engineer
Madison Office

Frank Niziolek
Structural Designer
Madison Office

Kylee Radmer
Marketing Coordinator
Milwaukee Office

Sarah Frecska
Principal
Milwaukee Office

Intro and why we joined SE 2050

We are joining SE 2050 because we are committed to embracing and promoting sustainable design practices. We understand the critical role structural engineers can play in shaping a sustainable world. Pierce Engineers strives to take a proactive stance in combating climate change and contributing to global efforts to limit the effects of greenhouse gases.

We are enthusiastic about being part of a movement that fosters positive change in the industry and that leaves a lasting legacy for future generations. By aligning with SE 2050, Pierce Engineers hopes to inspire our design and development partners to follow suit and collectively work towards a more sustainable future. We look forward to joining this coalition and industry effort to achieve the goals of the SE 2050 Program.

Initial Internal Announcement

"We are excited to announce that Pierce Engineers has officially signed on to participate in SE 2050 – the Structural Engineers 2050 Commitment program. The SE 2050 Commitment Program is an industry-wide effort to eliminate the embodied carbon in new projects by 2050. Our letter of commitment is attached to this e-mail. You can read more about the program, its goals, and our role as a signatory here: se2050.org.

Building construction is one of the largest contributors to carbon emissions annually and as engineers we can have a vital role reducing, and eventually eliminating, the embodied carbon associated with our work. In order to avoid irreversible and destructive impacts to our environment, we must as a society become fully carbon neutral by 2050. Joining the SE 2050 program is how Pierce Engineers can do its part to help.

Over the next few months, we will be developing our Embodied Carbon Action Plan and beginning to track the embodied carbon on a number of our projects. If you are interested in helping with this effort, please contact Sarah to join PE's SE 2050 committee."

Education

Pierce Engineers believes there are two important steps to embodied carbon education for our firm. Internally, we must continue to educate ourselves – we all must constantly evolve and improve. Externally, we must educate our clients and our community to help them make decisions that will have a positive impact on the sustainability of their projects.

Embodied Carbon Champion Responsibilities:

Educating Ourselves – Promoting education internally within the SE 2050 Committee at PE allows for growth for all, whether in a design or management role. Providing webinars, presentations, and demonstrations as continuing education is a staple of our industry and can be translated to sustainability in the same ways.

Educating Company – Our goal is to provide access for everyone at PE to find a way to work sustainability into our current design philosophies. We plan to implement Life Cycle Analysis programs, Sustainability folders within our company cloud, and present seminars from our SE 2050 committee.

Educating Clients/Contractors - Pierce Engineers specializes in a vast array of materials and works with clients to determine the best for that project dependent on cost and constructibility. It is our duty to bring all pertinent information in regards to the structure to the clients attention, including the environmental impacts.

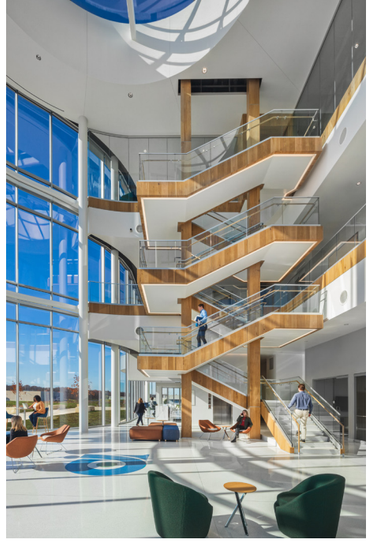
Education Goals

Distribute company-wide announcement of joining SE 2050.
- Internal announcement sent November 30, 2023

Provide marketing on PE's partnership with SE 2050
- Our commitment has been shared on our website, socials, client newsletters and in our 2024 year in review.

Provide updates to Company Standard Specifications to include reduced carbon elements.
- Work with PE's material standards committees to create reduction targets and narratives

Completed Education Electives:
- Educated staff on Tally analysis
- Created "Sustainability" folder within the PE standards drive
- Provided narrative for each office



Knowledge

Collaboration and knowledge sharing are critical components of all projects. Bringing our learned experience to the table with all stakeholders: architects, contractors, developers, other consultants, and our fellow structural engineers will lead to lasting change including reducing embodied carbon one project at a time. Our intended outreach extends through AIA presentations, partnering with other industry members on innovative structural systems, and encouraging life cycle analyses as a trade standard. PE SE 2050 committee members are participating in local structural engineering embodied carbon groups and design charettes.

Knowledge Sharing Initiatives

Publicly declare your firm as a member of the SE 2050 Commitment
- In our first email announcement of 2024, we included our SE 2050 commitment statement. We also added it on our website and our year in review document that was shared with clients.
- Our first ECAP (Embodied Carbon Action Plan) will be shared publicly once completed.

Describe the value of SE 2050 to clients. How can your design teams collaborate to reduce embodied carbon?
- Incorporate embodied carbon discussion in early structural system decisions
- Offer early-stage Life Cycle Analysis to clients as an additional service

Participate in local SE 2050 committees
- PE representatives are participated in the SEAOI Sustainability Design Committee by joining sustainability design charrettes.
- We participated in the inaugural AISC Sustainability Design Charrette.

Incorporate Life Cycle Analysis Discussion into our Mass Timber AIA Presentation
- PE launched an AIA-approved Mass Timber presentation, educating architects on the use of mass timber.
- A portion of the presentation is dedicated to a comparative LCA looking at different structural systems and their embodied carbon impact.

Develop innovative low carbon hybrid systems with contractor and supplier input
- We are working with a local mass timber manufacturer and a cold formed metal framing subcontractor to explore cost-effective CLT spanning to CFMF hybrid building typology.

Reduction

Our reduction strategy includes implementing innovative design strategies and tools, optimizing our structural systems, using materials with lower embodied carbon, and engaging in life-cycle assessments. Taking these steps towards carbon reduction not only aids meeting the SE 2050 objectives, but further establishes Pierce Engineers as a leader in promoting environmentally responsible engineering practices in the AEC industry.

Reduction Initiatives

Develop and implement a workflow that simplifies early design decisions based on embodied carbon.

- Begin implementing Tally. Tally is a life cycle analysis software capable of reporting the global warming potential (GWP) of the modeled structural elements.
- With Tally's ability to conduct design option comparisons, we can compare various structural systems and recommend the best option for lower embodied carbon and structural efficiency.

Update your specifications to incorporate embodied carbon performance.

- On a project specific basis PE incorporates embodied carbon performance language.

Communicate the embodied carbon impacts of different design options to clients with creative and effective data visualization.

- PE has created a Mass Timber AIA presentation highlighting the sustainability benefits of using mass timber in building construction. It has been presented to numerous architecture firms and to all PE employees.

Compare different design options with embodied carbon as a performance metric during the project concept phase.

- For a recent project, PE conducted a comprehensive design option comparison for an office building that was required to achieve net zero embodied carbon.

During the concept design phase, LCAs were performed on mass timber, steel, and concrete options for the main structural material. The mass timber proved to have the least global warming potential.

→

Comparison studies of different mass timber grid layouts were conducted, looking at CLT and Glulam material quantities, and the number of connections.

→

The structure was optimized in accordance with the embodied carbon results from the comparison study.

Participate in a LEED, International Living Future Institute (ILFI) Zero Carbon, or similar project design charrette and speak to potential design considerations impacting embodied carbon.

- Our staff regularly attends sustainability webinars and workshops.
- We will push for a sustainability kickoff meeting with project teams early on in design, allowing us to start the design with embodied carbon in mind.
- We participated in the ILFI Zero Carbon and AISC Sustainability Design Charrette.

Incorporate sustainably harvested biogenic materials in at least one project

- PE has historically promoted wood-framing in many multi-family housing projects and we are excited to continue to encourage the use of biogenic materials to our clients.

Reporting

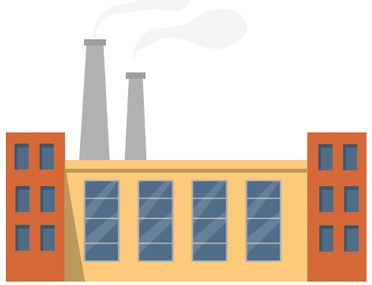
Summary:
Reporting of the embodied carbon results for diverse types of construction projects is an important aspect of self-reflection. As engineers, we have a responsibility to help improve our industry practices by mitigating negative environmental impacts. The measurement and reporting of these values assists project stakeholders in assessing the impact of material choice during planning and design stages. We are joining SE 2050 because we are committed to embracing and promoting sustainable design practices.

Tally will be used to calculate the embodied carbon of primary structural elements by pulling data directly from 3D elements created within our Revit project models. Although PE is diverse in our material expertise, during our first year of SE 2050 we will be reporting the LCA results of five steel construction buildings. As our internal database expands, we will broaden our scope to encompass the other materials we design.

Production Stage

Extract Raw Materials
A1

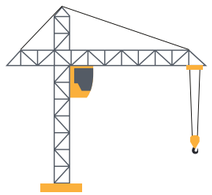
Transport to Factory
A2



Manufacture Products
A3

Construction Stage

Transport to Site
A4



Construct the Building
A5

Use

B1-B7

End of Life

C1-C4

Measuring and Reporting:
- Through collaborating between all offices, we will create a standardized measuring and reporting process for all building material types. This process will allow us to compose results in a manner that facilitates cohesive and easy comparison.

Analysis, Comparison, Documentation and Communication:
- Analyze the impact on embodied carbon for each material type of equivalent size projects.
- Share our findings through company monthly email and marketing platforms.

Promoting:
- Include language recommending embodied carbon analysis into contract documents.
- Promote our involvement in SE 2050 in our continuing education presentations, our annual year in review and on our website.

Year 1 Goals:
- Create a "Tally Expert" position in SE 2050 Group.
- Perform LCAs for the cradle-to-gate production stages (A1-A3)and for the applicable projects, analyze construction stages (A4-A5).

Future Goals:
- Create a "Tally Expert" position in each office.
- Perform LCAs
  - during the SD, DD, and CD phases of the design process.
  - at the end-of-life stages (C1-C4) of restoration projects.

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