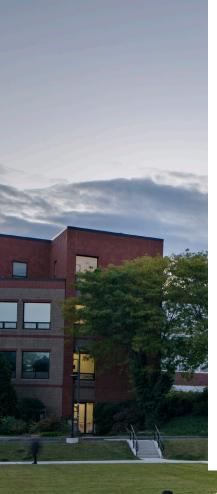
Embodied Carbon Action Plan SMRT/





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1. Introduction

At SMRT Architects & Engineers, we see it as our professional responsibility as designers to create a zero-carbon, healthy, just, resilient, and equitable built environment. The need for meaningful, immediate action to reduce carbon emissions on our projects has never been more apparent. As a collaborative, full-service A/E firm we are committed to continually working towards a solution to tackle this challenge, recognizing that we must be an active participant in our collective community to help drive the industry towards carbon neutral solutions.

As proud signatories of the SE 2050 Commitment, we are committed to pushing ourselves to make meaningful impacts, advocate for progress, develop new low-carbon solutions, and achieving net zero carbon structures by 2050. This imperative is critical to reducing greenhouse gas emissions and limiting global warming to 1.5°C – with the ultimate goal to create harmony between environmental quality and human health and wellbeing. To meet these goals and support SE 2050 commitment, we are focused on several key initiatives:

- Implementing carbon assessment tools to track and reduce embodied carbon throughout the design and construction process.
- Exploring low-carbon material options and collaborating with industry partners to drive sustainable innovation.
- Educating our teams through continuous learning, training programs, and cross-discipline collaboration to promote carbon-conscious design.
- Engaging clients to integrate carbon reduction goals into project objectives, encouraging thoughtful decision-making across all phases of design.
- Monitoring and refining our strategies to ensure that we stay on track toward achieving our carbon reduction targets.

By integrating these steps into our design practice, SMRT is fully committed to playing an active role in the global movement towards decarbonization and creating a better, healthier future for all.

See our SE 2050 announcement:

https://www.smrtinc.com/news/smrt-reaffirms-se-2050-commitment



All structural engineers shall understand, reduce and ultimately eliminate embodied carbon in their projects by 2050.



10/19/2024

Laura Champion, Director Structural Engineering Institute

LETTER OF COMMITMENT TO THE SE 2050 PROGRAM

Dear Laura,

As a full-service architecture and engineering firm, SMRT, Inc. is proud to reaffirm our commitment to the SE 2050 Program. We recognize the urgent need to reduce and eliminate embodied carbon from our projects by 2050.

While we have long championed operational carbon reductions, we are increasingly focused on the growing significance of embodied carbon in the built environment. We remain committed to integrating low-carbon materials and methods into our designs and to educating our clients and partners on the critical importance of embodied carbon reduction.

As part of our ongoing participation in the SE 2050 Program, SMRT reaffirms the following commitments:

- We will continue to update and publish our Embodied Carbon Action Plan (ECAP) annually, ensuring it remains publicly accessible.
- We will continue to submit project data to the SE 2050 database each year and contribute to establishing embodied carbon benchmarks for structural projects.
- We will actively engage with our clients and partners to raise awareness about the importance of embodied carbon reduction and promote collaborative approaches that drive systemic change across the design and construction industry.

As structural engineers and sustainability leaders, we recognize that the future of our profession is deeply intertwined with the need to reduce carbon emissions. We remain fully committed to the vision of the SE 2050 Program and will continue to align our practices with its ambitious goals. Together, we can pave the way toward a more sustainable and resilient built environment.

Judan Salley

Andrew D. Bradley, PE Senior Principal, Senior Structural Engineer abradley@smrtinc.com

Bradley R. Baker, AIA, CPHD Associate Principal, Sustainability Leader bbaker@smrtinc.com

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SMRT's SE 2050 commitment letter (2024)

Our Carbon Team

At SMRT, our SE 2050 commitment is driven by a dedicated team of professionals who are passionate about advancing carbon reduction efforts across all aspects of our practice. Led by Brad Baker, SMRT's Sustainability Leader, and supported by Nicholas Tibbets and Zeb Pease as Carbon Champions, this team plays a critical role in ensuring we meet our ambitious carbon reduction goals.

This team has been instrumental in the development and refinement of our carbon modeling and benchmarking processes. The group is currently focused on:

- Developing and refining our carbon modeling workflow.
- Identifying common embodied carbon hotspots in structural elements to inform early designs.
- Establishing internal benchmarks for use in early design phases to guide low-carbon decision-making.
- Advocating for carbon reduction within the firm through educational sessions and sharing lessons learned from projects.
- Driving adoption of embodied carbon modeling on projects and supporting project teams in their impact reduction measures.

Our team operates across our four office locations ensuring that every project, regardless of location, aligns with our sustainability objectives. By working together across multiple offices and disciplines, we leverage the collective expertise of our firm to push forward our commitment to carbon reduction and help lead the industry toward a more sustainable future.







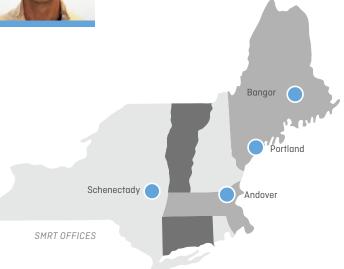
Chuck Dudas PE, LEED AP, CPHC Sustainability Leader Associate Principal, Senior Mechanical Engineer



Nicholas Tibbets Structural Designer Carbon Champion



Zeb Pease Structural Designer Carbon Champion





2. Education

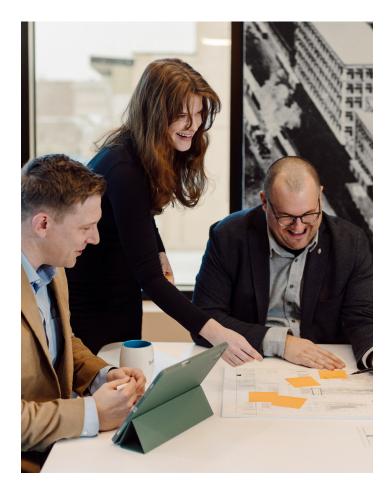
At SMRT Architects & Engineers, we are committed to being a Learning Organization, recognizing that continuous professional development is essential to the success of our projects, our clients, and our people. Whether through our virtual, firm-wide SMaRTer Sessions, bi-annual Together Day, or our Intern Development Program, we continually seek to expand our knowledge, improve our practices, and share insights across the firm.

Education is central to achieving our SE 2050 carbon reduction goals. By equipping our staff with the tools and knowledge to make carbon-conscious decisions, we foster a culture that promotes sustainable design at every level. We believe that the sharing and acquisition of knowledge will empower us to develop low-carbon solutions and push our industry toward achieving net-zero carbon by 2050.

To support our teams education we have incorporated new techniques along with long established methods that are integral to SMRT's culture. In addition to routine engagement, our carbon team is currently developing reference documents for our embodied carbon workflow, practice guide, and incorporating materials into our new staff on-boarding process.

Champion

Achieving our carbon reduction goals relies on empowering Carbon Champions within our firm—leaders who advocate for sustainable practices and drive carbon-conscious design. SMRT is proud to have Nicholas Tibbets and Zeb Pease from our structural group as Carbon Champions. They work alongside Brad Baker, SMRT's Sustainability Leader, to promote carbon reduction across all disciplines. Nicholas and Zeb play pivotal roles in developing our carbon modeling workflow, which helps identify carbon hotspots and track reductions. They also contribute by regularly addressing the structural department in weekly meetings, sharing insights, educational resources, and lessons learned, while providing updates on our firm's carbon performance and goals.



Internal Knowledge Sharing

Achieving carbon-neutral design by 2050 is not just a target—it's a responsibility we take seriously. A crucial part of this commitment is ensuring our structural engineers are equipped with the knowledge and tools they need to design for sustainability. SMRT provides training and educational opportunities in several ways:

- SMaRTer Sessions: Monthly virtual sessions open to the entire firm. These sessions allow employees to share expertise, project lessons, or new research, with all presentations accredited by AIA. Previous topics include "Embodied Carbon 101," "Life Cycle Assessment," and "The Carbon Loophole." Recordings are stored for later access, fostering continuous learning.
- SMRT Together Day: Held bi-annually, this event brings all SMRT employees together for a "Day of Learning." A miniconference format, it offers educational presentations from both internal and external experts, enriching firm-wide understanding of sustainability and other key topics.
- Sustainability Forum: Our quarterly forum encourages open discussions on sustainability-related topics. These forums provide a platform for Carbon Champions and other staff members to engage the wider firm, sharing project experiences, educational resources, and emerging strategies.

External Training

To fill knowledge gaps, we actively support employees' participation in external learning opportunities. Each year, team members attend key conferences such as GreenBuild and the Mass Timber Conference, along with relevant webinars and training sessions that align with our sustainability goals. The insights gained are applied directly to their work and are shared across the firm, strengthening our collective knowledge base. By embedding sustainability into every phase of engineering, we not only stay ahead of current standards but also help lead the way in designing structures that benefit future generations. Ongoing employee training throughout the year ensures that our engineers remain well-informed as new tools, materials, and methods emerge.

External Engagements

Engaging with industry experts is another crucial part of our carbon education. As active members of the Boston Carbon Leadership Forum (CLF) Regional Hub, our staff attends monthly meetings, including sub-committee discussions on Low Carbon Concrete. These engagements allow us to learn from other industry leaders, contribute to collective knowledge, and bring new ideas back to our firm. Through these engagements, we continue to drive positive change, sharing what we learn with our teams and implementing those insights into our projects.

3. Reporting

SMRT is committed to using the most advanced tools and methodologies to accurately track and reduce embodied carbon across our projects. We rely on this data to guide important discussions and decisions within our project teams, ensuring that carbon reduction is embedded in every phase of design. In line with our SE 2050 Commitment, we are dedicated to regularly submitting our structural life cycle assessments (LCAs) to the SE 2050 database, contributing to industry-wide knowledge and advancing best practices in carbon-conscious design. By sharing our findings with clients, the design community, and the public, we aim to promote transparency and collaboration in achieving the collective goal of carbon-neutral buildings by 2050.

SE 2050 Reporting Plan

We have set a goal of submitted at least five (5), but commit to a minimum of two (2), structural life cycle assessments (LCAs) to the SE 2050 Database, providing valuable insights into our embodied carbon performance. The LCA scope will include A-D, including biogenic carbon when applicable, and be measured at various phases of design. While the final workflow is still being developed, the following is a general approach for each design phase:

- Conceptual/Schematic Design: Utilize order of magnitude quantities based on building mass to compare the different structural schemes, their carbon impacts, and identify hotspots
- Design Development: Perform actual material take-offs from structural models to develop a baseline case and design case. Use these explore opportunities for further carbon reduction through design and procurement.
- Construction Documents: Update quantities and EPDs of previous model to reflect the as-designed case.
- Construction Administration: Use modeling to determine impacts of substitutions and change-orders before their approval. At the completion of construction, provide a revised carbon model to include the as-built case.

CONCEPTUAL / SCHEMATIC DESIGN

- Establish Carbon Goals
- Study Structural Concept
- Establish Embodied Carbon Targets

DESIGN DEVELOPMENT

- Identify Hot Spots
- Optimize Material Volume
- Finalize Reduction Strategies

CONSTRUCTION DOCUMENTATION

- Research Low-Carbon Materials
- Incorporate Carbon Specifications
- Final As-Designed LCA

CONSTRUCTION ADMINISTRATION

- Review Submittals against Carbon Requirements
- Asses substitutions for impacts
- Final As-Built LCA



4. Advocacy

At SMRT, we believe that a strong knowledge base is key to empowering our project teams to design high-performance, sustainable buildings. By sharing knowledge and data, we enable informed decisionmaking and ensure that carbon reduction remains a priority.

Each client and project comes with unique sustainability goals, and SMRT is committed to educating our clients on the role of embodied carbon. At the start of every major project, we discuss embodied carbon considerations and outline our commitments to initiatives like SE 2050. We encourage clients to make informed decisions that consider the full building lifecycle. Our advocacy extends to promoting low-carbon materials, high recycled content, and waste reduction strategies.

SMRT is also actively involved in the broader industry. As participants in the Boston Carbon Leadership Forum (CLF), we collaborate with structural engineers and design professionals to address the complex issues surrounding embodied carbon. Through CLF events and discussions, we continue to push for industry-wide change.

By advocating for carbon-conscious design, both with clients and within the industry, we aim to lead the way in creating a sustainable future and meeting the goals of SE 2050.

2°C **2°C IMPACTS** DIRECT IMPACTS 1.5°C EXTREME HEAT 14% 37% 2.6X WORSE AT LEAST 1 EVERY 100 YEARS AT LEAST 1 EVERY 10 YEARS SEA-ICE-FREE ARCTIC **10X** WORSE (34 SEA LEVEL RISE 0.40 METERS 0.46 METERS 0.06m MORE SPECIES 1.5°C 2°C 2°C IMPACTS SPECIES LOSS: VERTEBRATES 8% 4% 2X WORSE ST. SPECIES LOSS: PLANTS 8% 16% 2X WORSE SPECIES LOSS: INSECTS 18% 6% **3X** WORSE 2°C IMPACTS 1.5°C 7% 13% 1.86X WORSE 4.8 MILLION KM² 6.6 MILLION KM² 38% WORSE 3% 7% 2.3X WORSE **OCEANS** 1.5°C 2°C 2°C IMPACTS **UP TO** 070-**CORAL REEFS** 99% 29% WORSE 1.5 3 MILLION TONNES 2X WORSE

The difference in projected climate impacts between 1.5°C and 2°C of warming. **Source:** IPCC 2018 Report

IMPACTS AT 1.5°C AND 2°C OF WARMING



5. Lessons Learned

At SMRT, we believe that every project presents an opportunity to learn, improve, and grow. As we deepen our commitment to reducing embodied carbon, each design allows us to refine our methods and apply new insights. We approach every project as a chance to expand our understanding and bring forward the lessons learned to future work. This continuous improvement not only strengthens our ability to meet carbon reduction goals but also enhances our collaboration with clients, contractors, and the broader industry.

Our commitment to learning and applying the latest strategies in sustainable design is central to our work. Through this process, we ensure that each project is a step forward in reducing carbon emissions and contributing to a healthier, sustainable built environment.

Our experience with embodied carbon modeling as part of the SE 2050 Commitment has provided valuable insights into reducing carbon emissions in structural design. We've consistently identified structural components, such as floor and roof systems or concrete reinforcement, as major contributors to the global warming potential (GWP) of a building. This understanding has led us to work directly with concrete suppliers to optimize mix designs by incorporating low-carbon supplementary cementitious materials. Additionally, we collaborate with contractors to identify steel procurement opportunities that lower carbon impacts by selecting producers who provide Environmental Product Declarations (EPDs) and use sustainable methods, such as electric arc furnaces.

Looking ahead, SMRT will continue to engage with clients, manufacturers, contractors, policymakers, and fellow structural engineers to enhance our collective understanding of embodied carbon and its effects on the built environment. Sharing knowledge and data is essential to accelerating industry-wide efforts to eliminate embodied carbon, and we remain committed to developing practical, science-based solutions.

We will revisit and revise this Embodied Carbon Action Plan annually, incorporating new data and findings to ensure our approach remains aligned with the latest advancements in carbon reduction.







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