



**SE 2050 COMMITMENT PROGRAM
EMBODIED CARBON ACTION PLAN
2023**



TABLE OF CONTENTS

Introduction.....	pg. 3
Martin/Martin's Responsibilities	pg. 4
Looking to the Future	pg. 5
Education	
- Summary.....	pg. 6
- Review/Lessons Learned	pg. 8
- 2023 Action Plan.....	pg. 9
Reporting	
- Summary.....	pg. 10
- Review/Lessons Learned	pg. 12
- 2023 Action Plan.....	pg. 13
Embodied Carbon Action Plan	
- Summary.....	pg. 14
- Review/Lessons Learned	pg. 15
- 2023 Action Plan.....	pg. 16
Advocacy	
- Summary.....	pg. 17
- Review/Lessons Learned	pg. 19
- 2023 Action Plan.....	pg. 20
Mission Statement.....	Back Cover

INTRODUCTION

The international scientific community has demonstrated that nations must reduce their collective greenhouse gas emissions to control the effects of global warming.

People in countries across the world are being negatively impacted by climate change as rising sea levels, extreme weather patterns, and rising temperatures stress our ecosystems, infrastructure, and health.

Globally, the construction and operation of buildings accounts for approximately 40% of energy-related carbon dioxide emissions. As building energy use is reduced through design improvements and the energy grid's transition to more sustainable resources, the embodied carbon of construction materials makes up a growing percentage of the overall impact that the built environment has on global greenhouse gas emissions.

Reducing the embodied carbon of the built environment is the responsibility of the design team, including structural engineers. We pledge our support for this effort by committing to the SE 2050 Commitment Program and submitting this Embodied Carbon Action Plan.

MARTIN/MARTIN'S RESPONSIBILITIES

Globally, it is important to commit to an initiative that prioritizes the future of our planet and people. We proudly provide designs that benefit our clients and community now and consider their well-being in the future.

Carbon emissions already directly negatively impact the health of our communities. Wildfire smoke lowers our air quality, rising temperatures increase the likeliness and severity of heat-related illness, and water scarcity stresses our agricultural systems. Reducing embodied carbon in our structures will improve the health of our communities if implemented on a large-scale basis.

We understand the large role that the building industry has historically played in contributing to climate change. It is our responsibility as a design firm to do our part in reducing embodied carbon and the harmful impacts of climate change. It is equally as important to work alongside other organizations in the industry to collaborate and develop progressive, sustainable practices for the betterment of our environment.

Our collaborative communication and file-sharing software can be utilized to create an embodied carbon interest group to share relevant research and new embodied carbon reduction strategies. Martin/Martin also has a history of giving back to our community, and our participation in this program is another way we can help better the world around us. We look forward to collaborating with other structural firms, architects, owners, contractors, and consultants to be at the forefront of developing proactive, sustainable, and effective solutions to reduce embodied carbon.





LOOKING TO THE FUTURE

Martin/Martin has a solid foundation in a wide range of structural engineering applications, both regionally and around the United States, which will enable our firm to serve as an industry leader in embodied carbon reduction. To name a few, these include: project sustainability, technical material specifications, innovative material uses, structural systems in various locations, demands of small and large-scale projects, and LEED project design. With a year of experience participating in the SE 2050 Program, Martin/Martin has been motivated even further to expand on our previous goals and keep pushing our initiatives forward. We are excited for all that we plan to accomplish in 2023!

The Martin/Martin SE 2050 team joined the SE 2050 Commitment Program in 2021 and has formed sub-committees. These committees will further our internal education, share industry-specific sustainability information with outside organizations, develop our embodied carbon reduction methods, and establish an embodied carbon project baseline using Whole Building Life Cycle Analysis tools to evaluate structures and enclosure materials for future work.

Structural baselines are being established by considering the building material, project size, and location and comparing these values to national data. Each sub-committee is focused on creating goals to improve performance from the established baselines. A milestone for the Martin/Martin SE 2050 team is to understand the company's current project baseline for carbon emissions to improve upon in the future.

The remainder of this Embodied Carbon Action Plan (ECAP) is subdivided into four sections as described by the SE 2050 Program Requirements: Education, Reporting, Embodied Carbon Reduction Strategies, and Advocacy (knowledge sharing).





EDUCATION

Summary:

In order for Martin/Martin to be successful in the SE 2050 Commitment Program, we need participation from our engineers. Fortunately, Martin/Martin is already committed to the development and growth of our staff and has systems in place that the SE 2050 team can utilize to engage and educate our engineers. Our structural department weekly continuing education classes provide a great opportunity to introduce SE 2050 to the entire structural department. These classes will explain the benefits of reducing embodied carbon, as well as provide our engineers with the technical tools and information they need to make sound engineering decisions regarding embodied carbon.

In 2022, Martin/Martin laid the foundation for future success in our efforts to reduce embodied carbon in our designs. We completed training to establish the importance of reducing our carbon footprint and taught our designers the fundamentals of Life Cycle Assessments. Our efforts in educating our staff will bolster the other components of our SE2050 commitment by inspiring our engineers to advocate for carbon-reduction strategies with other members of the design team. We will continue these efforts in 2023 and develop new educational materials to further enhance our engineers' expertise.





EDUCATION

2022 Year in Review:

- Announced our ongoing participation in the SE 2050 commitment.
- Provided continuing education classes for Martin/Martin employees.
 - April 2022 – SE 2050 Overview to the Martin/Martin Innovation Committee
 - June 2022 – AIA Sustainable Design Class
 - August 2022 – Updates to MM Material Specifications
 - October 2022 – Life Cycle Assessments
 - November 2022 – Case Studies and Introduction to “Talking Sustainability” Guide
 - December 2022 – SE 2050 Updates to Principal's Meeting
- McKenzie Glass served as the leader of Martin/Martin's SE 2050 initiative and will continue in the role in 2023.
- Shared our online library of resources during our Life Cycle Assessment class in October 2022.
- Moved our internal sustainable design resources to the new Martin/Martin intranet “Milo.”

2022 Lessons Learned:

- We learned that many engineers in the industry are not aware of the SE 2050 Challenge.
- We learned that engineers are not familiar with basic terminology and acronyms commonly used in the discussion of embodied carbon assessment and reduction strategies.
- We learned that basic information must be repeated both due to the unfamiliarity of the topic and due to our engineers not being able to attend each presentation given.
- We learned that there is an exciting opportunity to engage in early design phase decision making, by offering embodied carbon metrics for multiple building types and materials. We hope to be a larger part of this conversation in future projects with stakeholders, architects, and other consultants.



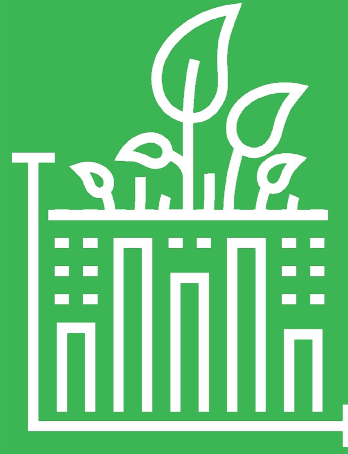


2023 Action Plan:

- Required
 - We will distribute our ECAP to the firm upon publishing.
 - We will make a webinar focused on embodied carbon available to employees.

Electives:

- Deliver a minimum of (2) internal education classes focused on SE 2050 initiatives.
- We will continue to educate our employees through a minimum of (2) classes or presentations from external speakers.
- We will finalize and distribute our internal “Talking Sustainability” guide Version 1.0 to employees.
- We will begin to develop resources and collect information with the eventual goal of producing an internal Sustainable Design Manual for employees, to include information such as case studies, comparison of EPD's for various materials, and other useful data to help assist engineers throughout the project design.
- Develop and deliver a presentation to incoming M/M employees introducing SE 2050, outlining our involvement, and encouraging participation as part of our standard on-boarding process.
- Continue to establish baseline embodied carbon data for projects with the goal of ultimately creating a “Carbon Reduction Award” for the design team that reduces the most embodied carbon in their designs year over year.
- Finalize “Tally How To Guide” for Stages A1-A3 reporting (see Reporting section for more information).



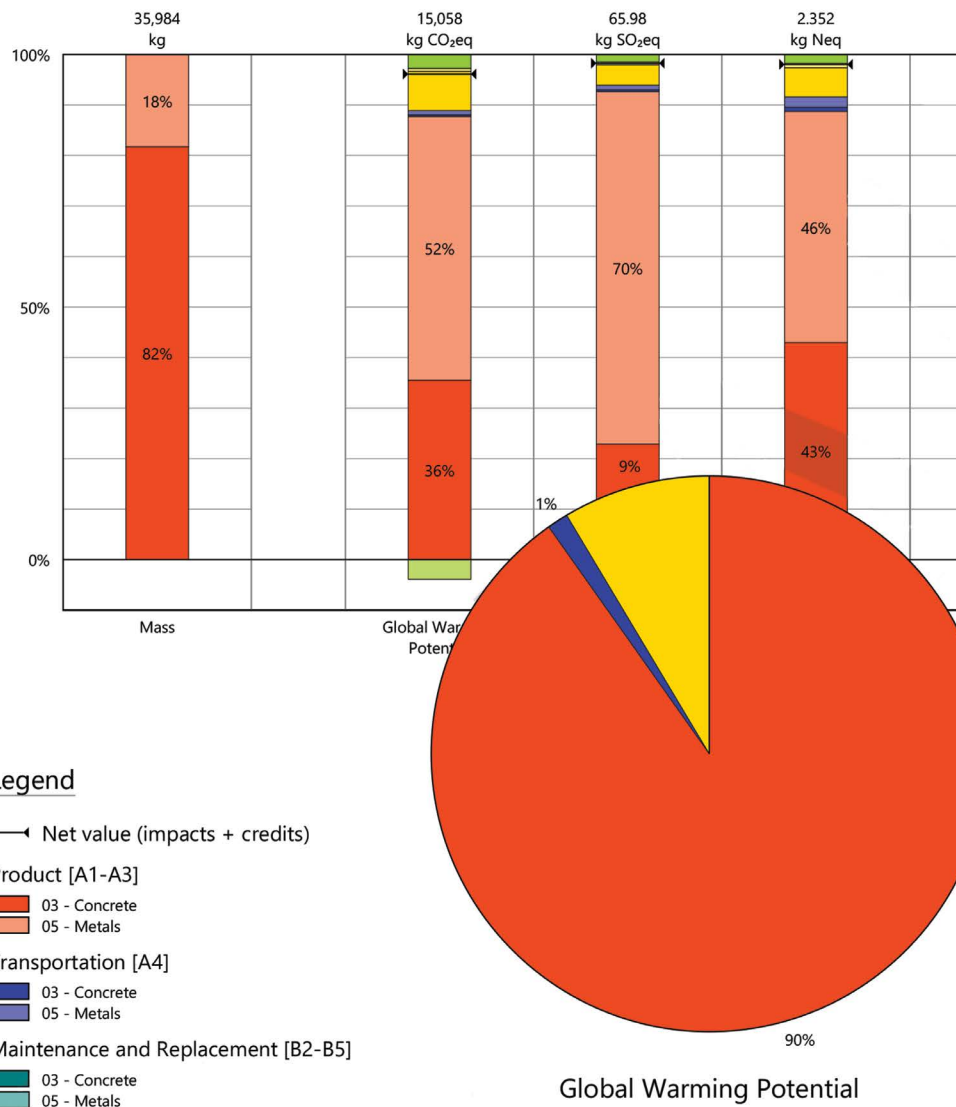
REPORTING

Summary:

Reducing the environmental impact and increasing the sustainability of the built environment will require careful measurement and reporting of building materials' embodied carbon. In 2022, Martin/Martin reviewed a variety of industry Life Cycle Assessment (LCA) software packages, and elected to utilize Tally in conjunction with EC3 as our primary method of measuring and reporting embodied carbon.

Initially, Martin/Martin will focus its efforts on cradle-to-gate analysis and will only perform LCA on completed designs. Once a baseline has been established, Martin/Martin aims to expand the LCA to later life cycle stages for a more accurate estimation of embodied carbon. Likewise, engineers will perform the LCA analysis at SD, DD, CD, and as-built phases in order to define the change in embodied carbon as the design progresses, thus evaluating the effectiveness of any applied reduction strategies and informing future designs.

Results per Life Cycle Stage, itemized by Division





REPORTING

2022 Year in Review:

- Developed a Martin/Martin-specific Revit template file to easily assign materials in Tally.
- Aggregated a database of Colorado-based concrete suppliers that have publicly available EPDs.
- Calculated the cradle-to-gate embodied carbon for (5) new construction projects using Tally and EC3 and submitted the results to the SE 2050 database.
- Developed a Tally How To Guide for internal use, (Stages A1-A3 only).
- Taught an internal class to educate our staff on how to complete simple embodied carbon calculations during early design phases.
- Collaborated with a local sustainability consultant to review our LCA practices and validate results.
- Performed cradle-to-gate embodied carbon analyses during the early design stages of two projects so clients could consider embodied carbon when deciding on a structural system.

2022 Lessons Learned:

- We learned that by using Tally and EC3, we are only accurately analyzing stages A1-A3.
- We learned that calculating embodied carbon based on material quantity estimates of early-stage designs is relatively simple and can add an extra factor for clients to consider when selecting the structural system of their project.
- We learned that CarbonCure is available in our market, which reduces the cement content of concrete by 4-6%. Similarly, we learned workarounds for calculating mix-specific embodied carbon when product-specific EPDs are not available.



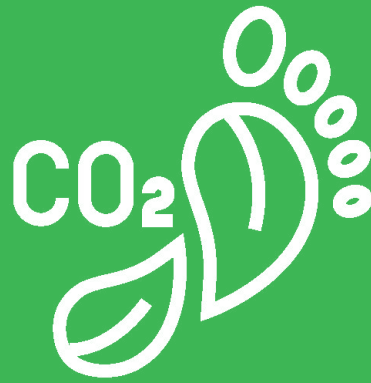


2023 Action Plan:

- We will continue to calculate embodied carbon using Tally and EC3. Tally calculates material quantities automatically by pulling data directly from Revit. Often, we export projects (and therefore material quantities) directly from Tally to EC3. When calculating the embodied carbon of components not modeled in Revit (including reinforcing bar splices and miscellaneous metals), quantities will be calculated by hand and manually added to EC3.
- We will use the regional average EPD data available in Tally and the product-specific EPDs available in EC3, when applicable.
- We will limit our embodied carbon calculations to cradle-to-gate (A1-A3).
- We will calculate embodied carbon at the Schematic Design (SD), Design Development (DD), Construction Documents (CD), and as-built phases for (2) projects in 2023. For the rest of our projects, we will only calculate embodied carbon at the CD phase.
- We will submit (6) projects to the database in 2023. Target areas include the following:
 - (1) project will be adaptive reuse
 - (1) project will include wood materials
 - (1) project will be tracked at the SD, DD, CD, and as-built phases
 - If EPDs of repair compounds become available in 2023, it is our goal to calculate the embodied carbon of a concrete repair project.

Electives

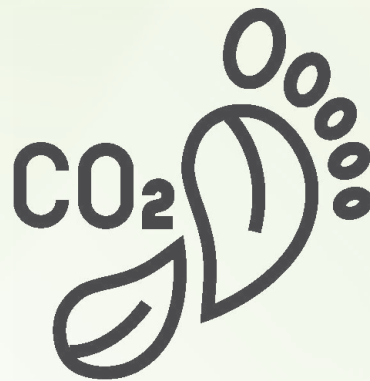
- We will submit (1) additional project to the database beyond the required (5) projects, thus increasing percentage of projects from the previous year.
- We will increase our capacity by educating our staff and increasing the number of engineers who are capable of calculating embodied carbon.
- We will continue developing an embodied carbon calculator to be used internally during early design phase decision making.



EMBODIED CARBON REDUCTION STRATEGIES

Summary:

Reduction of embodied carbon in buildings is a challenge best tackled in a collaborative manner with members of Martin/Martin's structural department; with other structural engineers, architects, and owners in our local/regional community; and with manufacturers, suppliers, and builders. Martin/Martin has begun this process by evaluating changes we can make to our standard operations which recognize embodied carbon and our impact on the environment. Efforts include revisions and addition of sustainability goals to project requirements via drawing notes, specifications, and more importantly, education of our project managers and senior staff on the importance of these strategies towards achieving our sustainability goals. The objective is to promote a company-wide collective understanding that every project has an opportunity to reduce the embodied carbon of the structure.



EMBODIED CARBON REDUCTION STRATEGIES

2022 Year in Review:

- Updated specifications and drawing notes for concrete and steel materials with significant changes to how we specify these materials and communicate the sustainability goals for which the company aims. Revisions include requirements for EPD submittals, more optimistic recycled content goals, and information on embodied carbon goals.
- Met with local and national material suppliers for both concrete and steel to understand their embodied carbon goals, innovative technologies being developed, and their perspective on how the designer can dictate sustainability. This provided good insight into the contractor and supplier perspective on the aims of SE 2050 and gave our team an opportunity to highlight the importance of the pledge we have made to improve sustainability efforts.
- Presented reduction strategies and highlighted the importance of structural efficiency in building design to clients via AIA classes and other project specific sustainability goals.
- Reviewed published building owner and developer sustainability plans to understand how the goals and objectives of these parties can influence and interact with the design team's goals and objectives.

2022 Lessons Learned

- We learned that there are numerous options and strategies which can be used to target embodied carbon in concrete, and we were pleased to feel the energy behind these efforts coming from concrete suppliers. Our committee believes that this is in part due to concrete suppliers having been on board with embodied carbon reductions for a number of years and an increase in recognition which improves their practices and promotes innovation.
- We learned that a lot of the success in the embodied carbon world is driven by material suppliers and contractors, especially through the innovations they choose to pursue. If our company does not get a supplier or contractor excited about collaborating on a reduction effort, there is little chance of making a difference without strategies. Thus, having partners in the effort outside of our simple design strategies is critical.
 - An important lesson from this year's efforts is that the success of any measure and strategy taken towards reducing embodied carbon requires a great amount of thought and time to educate and gather buy-in from clients, company staff, and management. To achieve anything, we need to clearly communicate what these efforts are and why they matter or else the strategies we develop will be unlikely to make a difference.





2023 Action Plan:

Complete an embodied carbon comparison study during the project concept phase:

- Communicate the embodied carbon impacts of design options to clients with creative data visualizations.
- Martin/Martin will seek out projects where owners and clients will be receptive to a study of the embodied carbon reduction potential of a project. These types of studies are a natural progression from our practice of studying project design options in the concept phase for cost or material reduction purposes and can be incorporated into regular project workflows with training of project manager staff and practice.

Update specifications to incorporate embodied carbon performance and submittal requirements:

- Martin/Martin will continue to revise and update project specifications to include maximum embodied carbon goals, recycled content goals, fabricator disclosures, and EPD submittal requirements. Focus will be on materials not yet evaluated such as masonry and wood. We will also monitor the response from owners, clients, contractors, and product suppliers to tailor sustainability requirements for project needs.
- Martin/Martin will continue to revise and update drawing General Notes to include maximum embodied carbon goals, recycled content goals, and other embodied carbon reduction strategies. Focus will be on materials not yet evaluated such as masonry and wood.

Incorporate biogenic materials in a project:

- Martin/Martin will collaborate with clients and owners to utilize a biogenic material in a project. We will investigate industry innovations and available products, particularly in our typical local markets, to work with those suppliers on incorporating their products into a project and to aid in their development.



ADVOCACY

Summary:

The efforts of structural engineers reducing embodied carbon will be rewarded when the industry as a whole accepts the challenge of lowering embodied carbon in buildings. For this reason, advocacy will be a key role in the success of the SE 2050 Commitment Program. As a part of the advocacy initiative, we will call attention to embodied carbon reduction to our clients and industry associates through SE 2050 in a variety of methods.

Martin/Martin will focus on initiating conversations about reducing embodied carbon early in the project design phase, engaging and collaborating with local and regional professional groups and manufacturers to spread awareness and change to a larger audience, and building upon our previous sustainable project experience.

Our carbon-reduction narrative will be shared with our employees through our structural department practice and company initiatives. Opportunities will also be identified for individuals, both in-house and industry wide, interested in learning more about SE 2050 or embodied carbon reduction. Ultimately, facilitating shared knowledge through a common goal will allow Martin/Martin to join other design firms in leading the industry to a more sustainable and promising future.



 **MARTIN/MARTIN**
CONSULTING ENGINEERS



ADVOCACY

2022 Year in Review:

- Shared our SE 2050 Commitment posts on social media, LinkedIn and Instagram.
- Included our commitment to the SE 2050 Program on our website along with additional company sustainability information.
- Engaged with local clients by presenting our AIA Sustainable Design Class (8) times.
- Helped to lead the formation of a Structural Engineers Association of Colorado Sustainable Design Committee as a resource for Colorado structural engineers.
- Presented to other states about the sustainability initiatives and legislation taking place in Colorado.
- Reached out to local contractors to provide feedback for our specification updates.
- Reached out to industry professionals to provide feedback on our specification updates.

2022 Lessons Learned:

- We learned that architects and contractors in the Colorado region are generally unaware of SE 2050.
- We learned that architects and clients are excited to learn about embodied carbon and have valuable feedback to share about their sustainability efforts.
- We learned that other structural firms in the Colorado region are eager to join the initiative and help each other to move the initiative forward.
- We learned it can take multiple efforts of following-up with clients before starting to make project changes toward sustainability.





2023 Action Plan:

- Determine the best way to declare our firm as a member of the SE 2050 Commitment within our proposal language.
- Meet with at least (8) clients this year to communicate the value of SE 2050, receive feedback on our structural sustainability initiatives, and understand our clients' sustainability goals and needs.

Electives:

- Present our AIA Sustainable Design Class (10) times this year. Present this class to clients outside of Colorado.
- Reach out to local manufacturers and suppliers to promote a general understanding of the SE 2050 goals, the reduction of embodied carbon in products, and potential ways our specification changes could affect a client.
- Create a volunteer sustainability event for our employees to participate in.





MISSION STATEMENT

Exceptional engineering solutions
through our culture of integrity, service, creativity, and quality
to benefit our clients, employees, and community.



SUSTAINABILITY