

SMRT ARCHITECTS AND ENGINEERS

# Embodied Carbon Action Plan



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# Impact

**SMRT Architects and Engineers are uniquely positioned to have significant impacts on the built environment, and we see it as our professional responsibility to design buildings and shape the landscape in the most sustainable way we can.**

The need for meaningful, immediate action to reduce and eliminate embodied carbon 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 help drive the industry towards carbon neutral or carbon positive solutions.

As a firm, we make big decisions every day. We have an obligation to protect the health, safety, and welfare of our local and global communities. To that end, we will:

- Bring the entire team to the table on day one to initiate the best design direction with input from all disciplines
- Keep current with trends and best practices, to learn from our peers and apply industry best practices
- Integrate focused sustainability discussions into our project delivery program to continually push for more innovative strategies
- Run embodied carbon analysis to compare structural solutions and continually optimize reduction through the entire design process
- Track and report our embodied carbon data so we can measure our progress and benchmark against our peers
- Educate our clients about effective strategies to achieve better outcomes for the long term
- Build our in-house embodied carbon modeling expertise
- Understand the carbon impact of the materials we select and specify and move to carbon neutral or carbon positive materials whenever possible



# Education

SMRT believes continuous professional development is essential to the success of our practice, our clients, and ourselves as individuals. We are a learning organization, committed to expanding our capacity to create, acquire, and transfer knowledge at every opportunity.

In order to achieve the goals of the SE2050 commitment, we have implemented the following:



### 1. Awareness.

- In November of 2020 SMRT gave a firm-wide presentation to bring the issue of Embodied Carbon to the awareness of our entire staff. Entitled The Carbon Loophole the hour-long session highlighted the difference between operational and embodied carbon, and how our design choices impact the total realized carbon footprint of our projects.
- On October 11, 2021 SMRT made an official declaration of our cosigning of the SE2050 Commitment during our quarterly firm-wide fireside chat, and in follow up postings to intranet and social media platforms. Social media will allow us to engage with individuals or manufacturers that are on the cutting edge of new carbon reduction and sequestration strategies, it will allow us to gather analytics and insights on embodied carbon issues for study purposes, and it will allow us to share and communicate with fellow team members, enhancing our project collaboration and workflow.



**2. Champion.** SMRT has appointed Andrew Bradley, PE to champion Embodied Carbon Reduction for our structural group, and to act as a liaison with the Sustainability Council to expand carbon reduction efforts across all firm disciplines.



### 3. Educational Streams.

- SMRT provides access to LinkedIn Learning for every employee and will promote courses and webinars that relate to embodied carbon, and strategies for embodied carbon reduction.
- SMRT holds monthly educational workshops for all employees ('SMRTer Sessions') which are a platform for SMRT's Sustainability Council to provide opportunities for employees to present information to their peers. These sessions are on-going throughout the year and are a way to share lessons learned on previous projects, new design strategies and data, or general education around a specific topic. We have scheduled an 'Embodied Carbon 101' for presentation in the first quarter of 2022 to kick-off an internal educational series.
- SMRT hosts a bi-annual "Day of Learning", where employees and invited experts provide seminars and panel discussions. In collaboration with the Sustainability Council, SMRT plans to host a deep-dive into embodied carbon to follow-up the 'Embodied Carbon 101' session at this year's events in May of 2022.



**4. Resources.** Our intranet site provides an easily accessible resource to our employees that is continually growing. A dedicated resource page for our SE 2050 library provides employees quick access to online resources, video and slides to past internal educational sessions, specific training on tools and design strategies, and an opportunity for knowledge sharing.



# Reduction Strategy

SMRT’s Sustainability Council leads the firms’ carbon reduction strategy to meet both the SE2050 and the AIA2030 sustainability goals. To reach these goals the Council is developing a framework to educate employees, create methods for measuring and analyzing EC in design solutions, and provide training for effective implementation of reduction strategies.

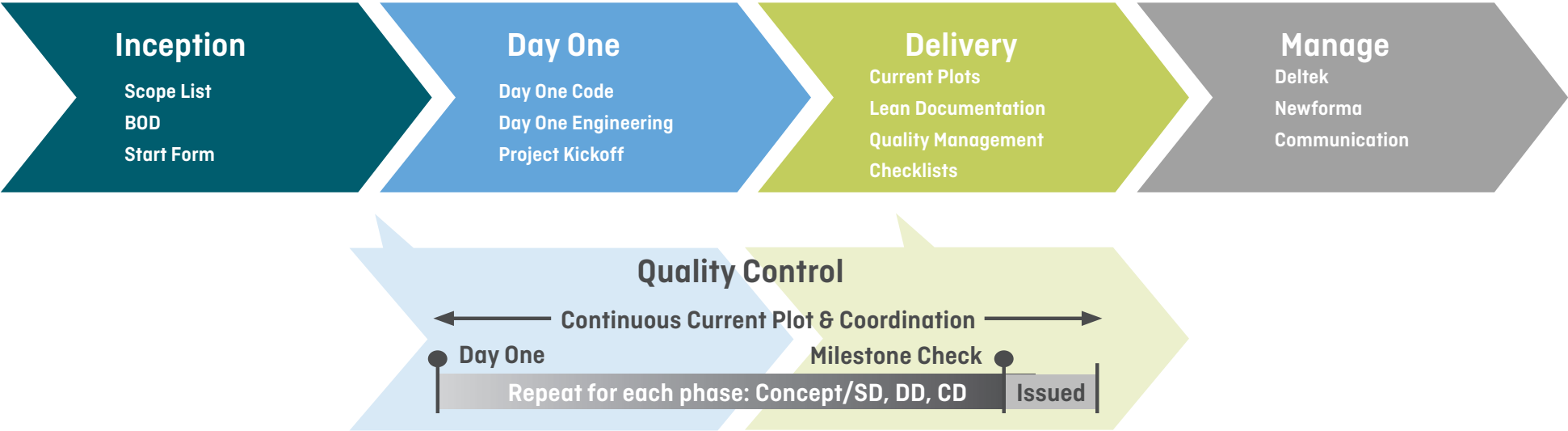
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Implementing an integrated design process provides the opportunity for all team members to make an impactful contribution to embodied carbon reduction. This effort will entail a multi-year strategy

to alter current design and construction practices, leading to multiple benefits: significant increase in the use of renewable and reused materials, increases in the use of renewable energy for material production, reduction in the use of extracted resources, minimization of waste products, and promoting the regeneration of natural resources.

One method will be to implement our “SMaRT Delivery” approach to reducing embodied carbon. SMaRT Delivery is a firmwide overarching methodology to project execution, which follows carefully sequenced steps to yield powerful results. A key component of SMaRT Delivery is our commitment to explore critical decisions early in the design process, with the integrated team and our clients at the table to optimize results. Together we will establish specific performance and carbon reduction goals for every project and will track the progress during each phase of design.

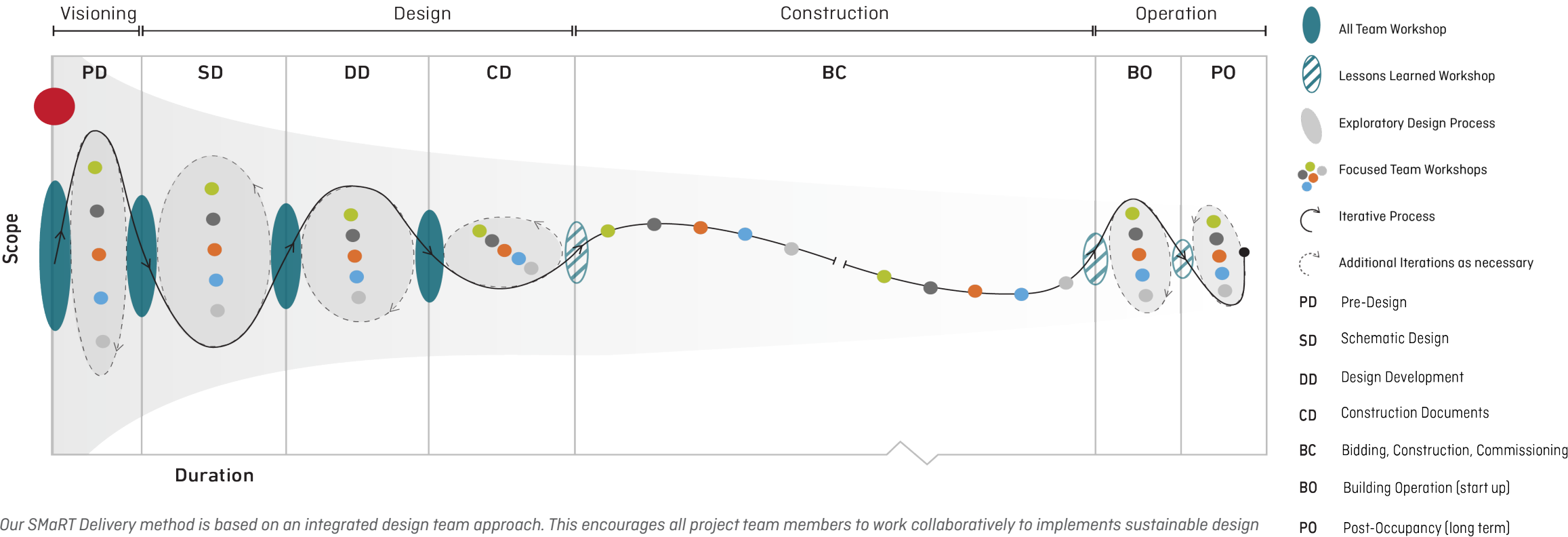
## SMaRT Delivery





# Integrated Design Process

The Integrated Design Process provides a means to explore and implement sustainable design principles effectively on a project while staying within budgetary and scheduling constraints. It relies upon a multi-disciplinary and collaborative team whose members make decisions together based on a shared vision and a holistic understanding of the project. It follows the design through the entire project life, from pre-design through occupancy and into operation. The IDP proceeds from whole building system strategies, working through increasing levels of specificity, to realize more optimally integrated solutions.





# Analysis Tools

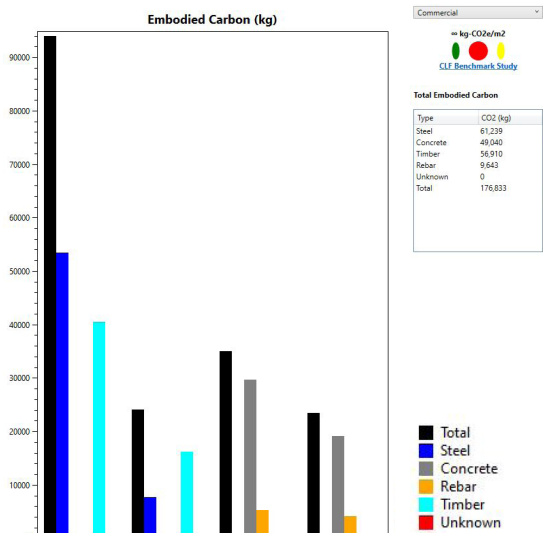
Over the past two years the Sustainability Council has been working on a firm-wide approach for quantifying both embodied carbon and operational carbon to establish reduction and performance goals for all our design projects. In November of 2020 the Embodied Carbon Workgroup (ECW) was formed under the umbrella of SMRT’s Sustainability Council. ECW’s charge is to evaluate available tools to track embodied carbon in projects, create an EC workflow for each discipline and firm-wide, and devise a method for collection of EC data on a project-by-project basis.

Through the process, we have measured the embodied carbon in selected projects to serve as a test platform for carbon tracking, and to be a benchmark for measuring future improvement of our designs. After piloting different software platforms, SMRT has implemented the use of Beacon, Tally, and EC3.

**Beacon** (Figure 1) is an open-source Revit plug-in developed by Thornton Tomasetti. This program provides high-level feedback of a project’s embodied carbon quantities, it categorizes calculations based on material type and building floor level, and it uses the most current embodied carbon coefficients established by the Carbon Leadership Forum.

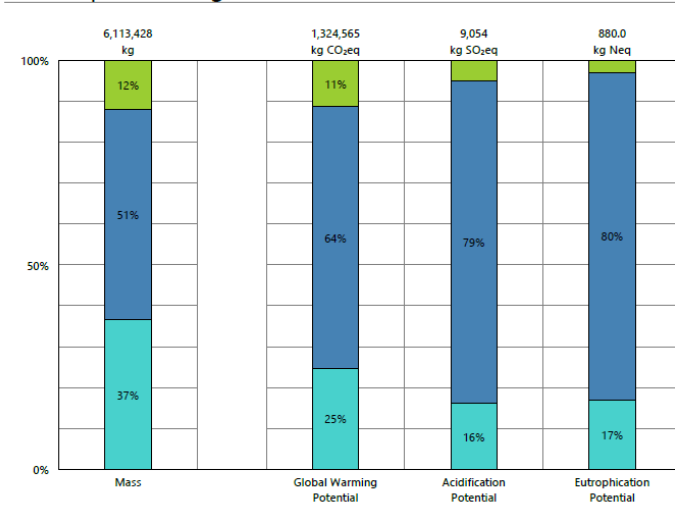
**Tally** (Figure 2) is used as a Revit plug-in to quantify and compare the carbon impact of the designed structural system. The tool enables our team to run simultaneous comparative analysis on various structural solutions and identify “hot spots” in our designs from both carbon impact and mass. We use this same process to evaluate the envelope assemblies detailed by our architectural group within projects.

**Embodied Carbon Construction Calculator** (EC3) (Figure 3) is utilized to find and compare materials, plan and compare buildings, declare products, and verify and audit EPDs for incorporation into full lifecycle analysis. Complimenting Beacon and Tally, EC3’s greatest impact is to assist with the selection and specification of products during the procurement phase of design. Design teams are able to choose between product specific EPD’s and evaluate the best product for the specific project type and location.



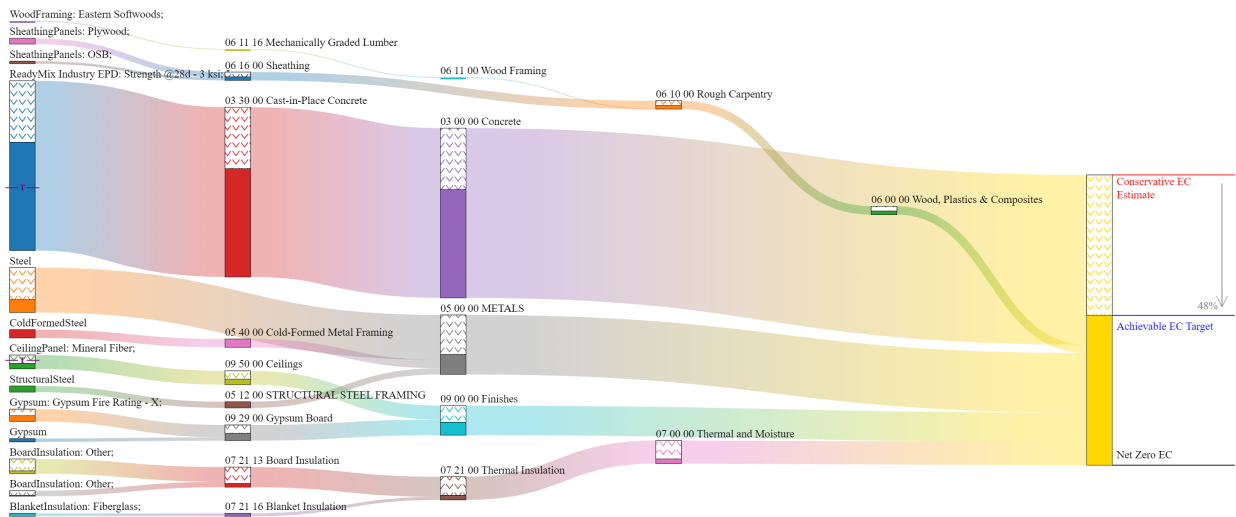
[Figure 1]

## Results per Building Element



[Figure 2]

[Figure 3]



ADMINISTRATIVE BUILDING



# Reporting

To track and report our projects embodied carbon data, we have developed a sustainability metrics tracker for projects teams to record data a key project milestones. Easily accessible to the entire project team, this tool provides an equal opportunity for team members follow the progress and project performance.

Facilitated by the Embodied Carbon Work Group, data is collected from the sustainability tracker and uploaded to the SE 2050 database. Additionally, SMRT has developed interactive sustainability dashboards, accessible to all employees through our intranet, that generates data visualizations illustrating project performance across many sustainability metrics, including embodied carbon.

Although the commitment to SE2050 is spearheaded by our Structural Engineering department, as a multi-disciplinary firm, we see a responsibility to collect embodied carbon data on everything from structural steel to carpeting to chain link fencing. As part of our commitment to sustainability, SMRT will submit a minimum of two (2) projects to the SE2050 database for the 2022 calendar year.



Please note: This tracker was designed to support project teams in tracking performance metrics, sustainable initiatives, and populating the Sustainability Metrics Drawing Sheet throughout the duration of the project. This data will be used for various applications like project close-out, marketing information, AIA 2030 reporting, design narratives, etc.

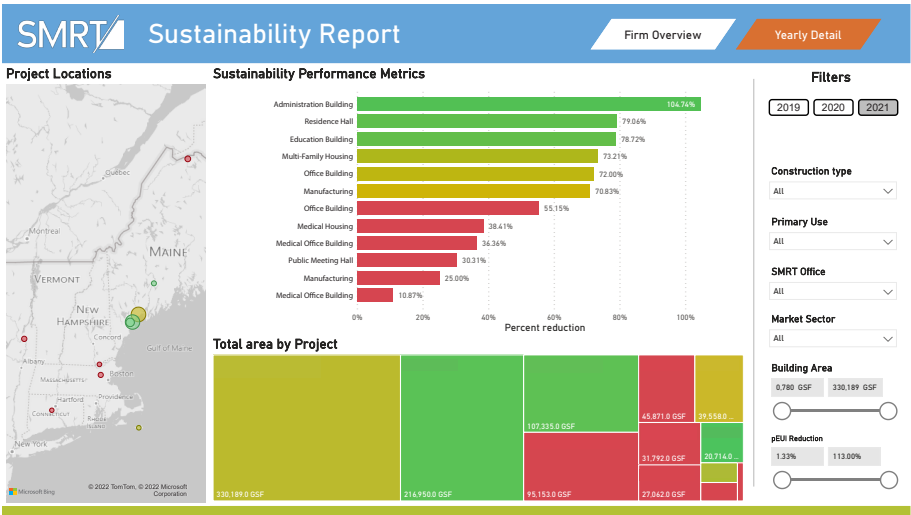
If you have questions about the spreadsheet or data inputs, reach out to a Sustainability Coordinator.

-Sustainability Council

AIA Framework for Design Excellence: <https://www.aia.org/resources/6977668-framework-for-design-excellence>  
SE 2050 Commitment <https://se2050.org/>

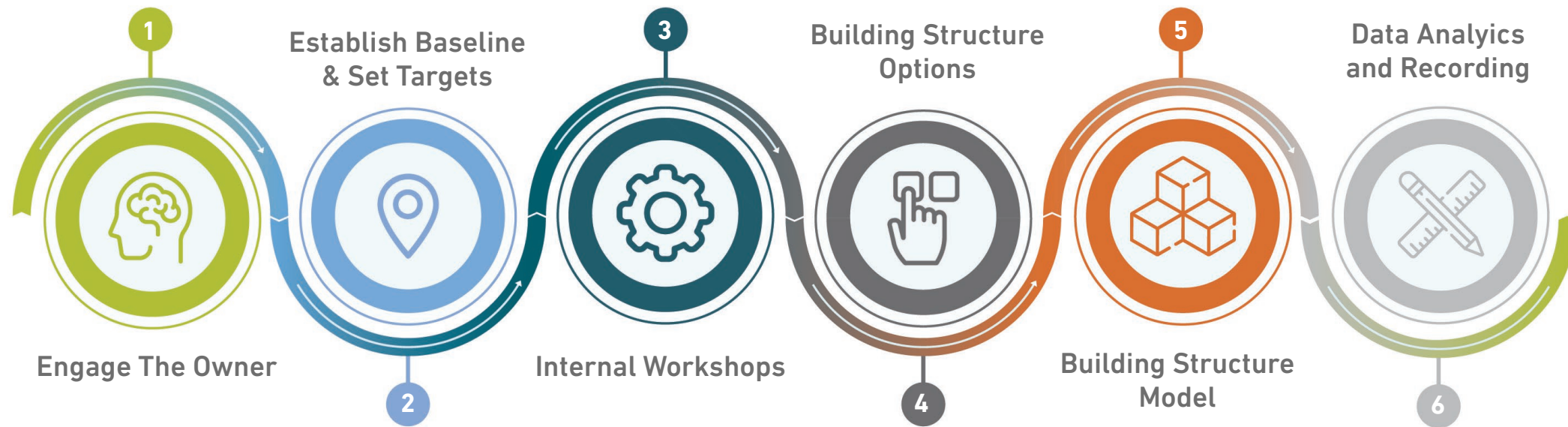
[Figure 1]  
Using our internally developed Sustainability Metrics Tracker, all employees are able to access and review sustainability performance metrics, which can be exported for SE2050 reporting at any design phase.

[Figures 2-3]  
Our Sustainability Report dashboard is accessible to all employees through our internal internet. Using this dashboard employees can see how other projects, and firm as a whole, are performing against various sustainability metrics including embodied carbon.





## EC Workflow



Evaluation of embodied carbon is part of SMRT's Integrated Design Process and is part of our internal and external design collaborations. The process always starts with engagement. Beginning with the client we work to understand their vision and goals for the project, we then share this information with the design team. Collectively, the team builds a set of guiding principles that will guide the decision-making process through design and construction. After these guiding principles and project scope are established, we define embodied carbon baselines and develop reduction targets in alignment with the goals of the project. Throughout the design process, teams continue to work to reach the embodied carbon targets through an iterative design process. This includes workshops, design option comparative modeling, and detailed structural modeling. Whole building analytical modeling is performed at key milestones during the design and tracked using our internal tracking system. This data is shared with the team to serve as a snap-shot and analyzed against the project goals to identify areas for improvement.

Ultimately, this data is reported to SE2050 and shared with the firm through performance metrics dashboards.

## Advocacy

At SMRT we have a commitment to quality that starts with creating a collective knowledge base that enhances our daily workflow. By sharing knowledge and data, we scale productivity, which in turn empowers our project teams to focus on designing better buildings, not searching for answers.

Our internal SharePoint site allows us to communicate with each other across four offices, sharing information and best practices of sustainable structural engineering. The SharePoint platform makes it possible to organize data in an accessible manner, providing a streamlined flow of information that can be accessed from our offices and mobile devices. We use SharePoint as a comprehensive management tool used for automating design processes, tracking progress on projects, and securely sharing information across departments and offices.

**1. Document Management** - allows us to share and store files and access documents quickly and securely.

**2. Knowledge Management** - enhances the efficiency of our decision-making ability. In making sure that all employees have access to the overall expertise held within the organization, a smarter workforce is built which allows for quick, informed decisions that benefit our projects.

**3. Content Management** - lets us create and publish policies, articles, details, and any other embodied carbon related information or news.

**4. Project Management** - provides a straightforward way to schedule project tasks, review process workflows, conduct QA/QC reviews, and determine project milestones.

Every client and project will have different sustainability goals, and SMRT has made a commitment to engage and educate our clients on the role of embodied carbon in the current climate emergency. By raising awareness about the importance of reducing embodied carbon and sharing best practice strategies and leadership examples of progress, we strive to encourage our clients to make informed decisions that focus on the whole lifecycle of the building. In addition to client education, advocacy efforts also include promoting the use of low-carbon alternatives, carbon sequestering materials, high recycled content materials, fewer finish materials, and overall waste reduction.





## Advocacy

SMRT is an active participant in the New England chapter of the Carbon Leadership Forum (CLF), providing an opportunity for us to collaborate with other structural engineers and design professionals on industry trends and developments. The CLF offers a wealth of information, from funded research studies to material base line reports, to information on State efforts in CA (and WA) on the “Buy Clean” initiative. The CLF provides webinars, events, and roundtable discussions to help us understand the full complexity of carbon related issues that our profession must tackle.

As a means to further in-house goals around career growth, training, and mentoring, structural engineers at SMRT regularly attend industry conferences and seminars on embodied carbon. The information from these conferences is typically disseminated in blog posts and posted to our intranet for the entire firm.

SMRT will continue to communicate with clients, manufacturers, contractors, policy makers, and fellow structural engineering professionals to build an understanding about embodied carbon and its impacts on the built environment. Knowledge and data sharing is imperative to accelerating adoption of industry wide efforts to eliminate embodied carbon, and we are committed to developing practical solutions grounded in science.

SMRT will revisit this Embodied Carbon Action Plan on an annual basis and will revise as necessary based on information and data that is available.





# SMRT Architects and Engineers

We're a team of architects, engineers, planners and professionals committed to solving problems through design and positioning our clients for success. We build lasting relationships and friendships with business partners because we consistently deliver positive results. Our clients come to us with big opportunities, first-of-a-kind challenges, hard deadlines and limited budgets. This is where we thrive. Resourceful and reliable. Practical and imaginative. Curious, knowledgeable and nice—you'll love how we work together.

Our fully integrated, 130-person team provides:



Architecture



Engineering



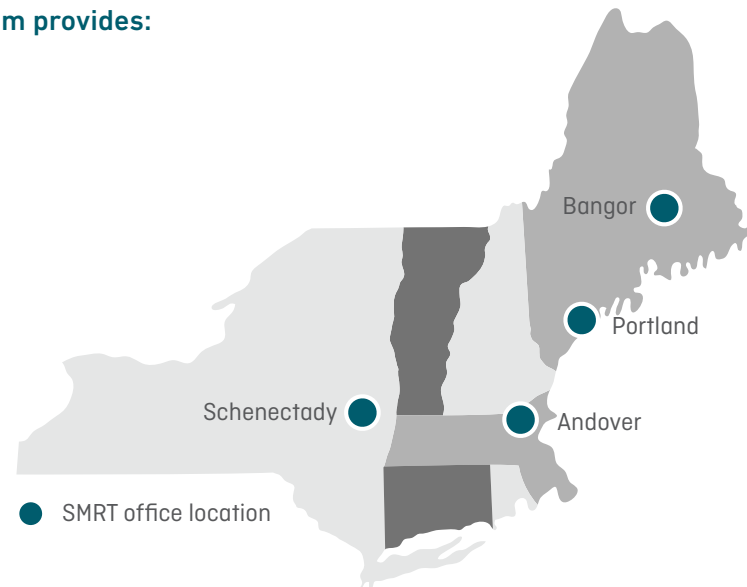
Planning



Interiors



Energy



## Get in touch.

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