



**STRUCTURAL  
ENGINEERS 2050  
COMMITMENT**

**EMBODIED  
CARBON  
ACTION  
PLAN**

**2023**

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## FOREWORD

Embodied carbon consists of the emissions generated when producing, transporting, installing, maintaining, and disposing of building materials used within design and construction processes. The Structural Engineers 2050 Challenge (SE 2050) was launched to inspire structural engineers to establish embodied carbon benchmarks and meet increasingly progressive reduction targets. With the goal of achieving net zero embodied carbon in structural designs by 2050, the design and planning industry is preparing for a non-polluted, carbon-positive future.

Since 2022, an unprecedented number of policies have been introduced across the United States and internationally, addressing embodied carbon reduction within building designs. As stewards of the built and natural environment through our chosen professions, we are aware of the responsibility we share through our industry's key role in successful climate action.

At STV, we see our SE 2050 commitment as an opportunity to collaboratively problem-solve for our collective well-being. We share our clients' goals of reducing embodied carbon, and we're challenging both ourselves and our peers to design more consciously. In this effort, strategies such as designing for circularity, optimizing material quantities, and investigating lower-carbon decisions for structural systems and material choices are crucial. Through this annual plan, STV is committing to adopt and innovate upon best design practices in alignment with SE 2050—for a more sustainable built environment that facilitates healthy, thriving communities.

*An interior view of the World Trade Center (WTC) Transportation Hub. STV performed architectural and multidisciplinary engineering design services.*

*Photos throughout this plan showcase previous STV achievements through successful LEED certifications and implementation of intensive sustainability standards. Future iterations of this report will be updated with examples specific to embodied carbon as we progress in our project tracking efforts.*

# EDUCATION INITIATIVES

We believe in the power of crowdsourcing our combined perspectives and expertise. To effectively tap into our collective ability to combat climate change, education and knowledge exchange are central steps.

## 1 Incorporate embodied carbon reduction strategies nationally.

Each STV structural engineering team will designate a local Embodied Carbon Champion. These individuals will quantify project data and track design decisions that reduce their embodied carbon footprints. Our champions will convene monthly as a national network to share progress on reduction efforts, with the goal of propelling the adoption of emerging strategies across various projects. The group will compile best practices and tools for efficient data collection and early analysis, as well as for effective communication with our clients.

## 3 Develop a digital library of embodied carbon resources for our team.

STV is growing our internal sustainability web page to host various resources, tools, and articles that are curated to aid our teams in applying embodied carbon reduction strategies.

## 2 Provide webinars focused on reducing embodied carbon.

Starting with the Boston Society of Architects' and AIA's *Embodied Carbon 101* webinar series, our team will ensure all project teams have access to educational embodied carbon materials through STV's internal sustainability page. Key sessions including Basic Literacy, Environmental Product Declarations (EPDs), Structure, and Carbon Accounting will be highlighted to guide embodied carbon reduction concepts as they pertain to each stage of the design process.

## Educate ourselves and our colleagues on embodied carbon concepts and skills.

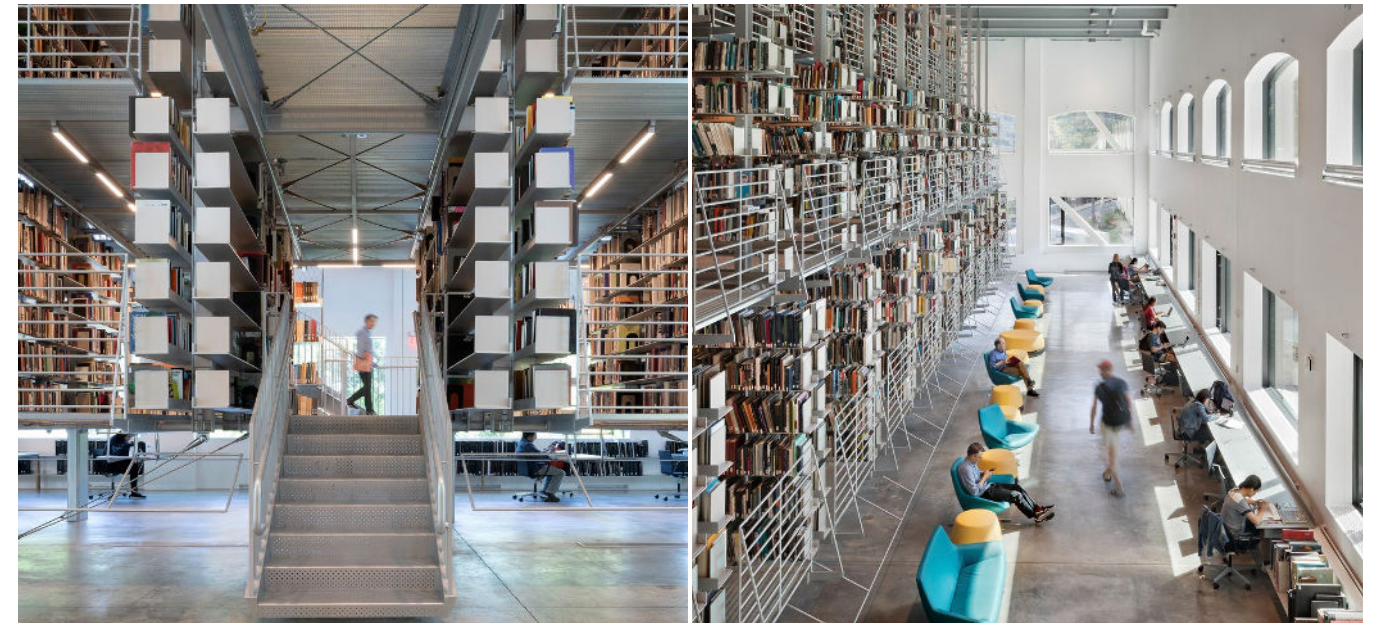
We are training our structural engineers to measure, reduce, and report embodied carbon. STV's Digital Advisory team has developed an in-house Carbon Dashboard that aligns our SE 2050 commitments and internal tracking efforts, enabling structural analysis across various metrics. Our structural engineering teams are piloting this tool as a major step towards embedding embodied carbon tracking within our design workflow.

*STV provided architectural, civil, structural, mechanical, electrical, and environmental services to renovate Building 4 at the New York State Office of General Services (NYSOGS) Harriman State Office Campus in Albany, NY. Notable improvements included a new energy-efficient curtain wall façade; new HVAC systems and distribution that enhance energy performance, user comfort and control; and high-performance lighting.*



# REPORTING APPROACH

Transparency around embodied carbon will drive continued innovation in our designs. We commit to reporting project data for at least five structural projects annually to SE 2050.



*Mui Ho Fine Arts Library, Cornell University, Ithaca, NY. STV served as Architect and Engineer of Record, designing high-performance building systems to help the project achieve LEED Gold Certification.*

## 1 Submit our projects to the SE 2050 database.

We commit to submitting embodied carbon data for five structural projects by early 2024. Our Embodied Carbon Champions will compile and analyze our project data to contribute to developing industry baselines.

## 2 Internally track and analyze embodied carbon across our project portfolio.

STV's in-house Carbon Dashboard will track the embodied carbon footprints of our structural designs. Our teams will analyze emissions across our portfolio in order to pinpoint embodied carbon "hot buttons" within different structural systems and material choices. Trends and best practices will be shared with our project teams nationally.

# REDUCTION STRATEGIES

STV teams are critically evaluating our project workflow to embed embodied carbon reduction within our design DNA. Our approach for integrating reduction strategies includes the following steps.



STV provided architectural and engineering services for New York City Transit's Mother Clara Hale Bus Depot. The LEED Gold-certified facility features low-emission boilers, heat-recovery air handling units, natural lighting, rainwater recycling, solar air pre-heating, and a green roof.

### 1 Participate in sustainability-focused design charettes.

STV currently investigates sustainable design considerations early in the design process and through our design charettes. We're taking this a step further by incorporating embodied carbon reduction strategies into charette discussions.

### 3 Update specifications.

Our project teams will consult SE 2050's specification guidance resources, which include whole building approaches, structural steel, cast-in-place concrete (CIP), wood and mass timber, and concrete masonry units (CMU). We will pilot updated specifications and share lessons learned with STV's structural engineers nationwide to increase adoption across projects.

### 5 Use biogenic materials.

We aim to work with at least one client to incorporate sustainably harvested biogenic materials into a project, evaluating opportunities to utilize mass timber, concrete sequestration, and other material technologies in the year 2023-2024.

### 2 Communicate embodied carbon impacts to clients.

Our structural engineers will leverage early-phase modeling tools to compare embodied carbon across different preliminary structural designs in the beginning phases of a project. This will allow our structural staff to understand viable options for reducing embodied carbon and effectively communicate design considerations to clients early-on.

### 4 Evaluate design options with embodied carbon as a key performance indicator.

Our project teams will share successful design decision lessons and opportunities for growth with our larger Embodied Carbon Champions network.

# ADVOCACY EFFORTS

We understand that achieving net zero embodied carbon across STV's projects (and the industry) is an ambitious objective requiring significant teamwork. STV seeks to continue partnering with others in the construction and infrastructure sectors, including fellow firms, clients, decision-makers, manufacturers, contractors, and academic institutions.

### 1 Proudly share our commitment to SE 2050.

We acknowledge the role that embodied carbon holds in decarbonization efforts, and understand that structural engineers have a critical part to play. We proudly step up to this challenge.

### 3 Externally present a project's success in reducing embodied carbon.

Following our progress in documenting sustainable practices and monitoring STV's embodied carbon reduction performance, our staff will communicate successful embodied carbon reduction case studies to our clients, such as at industry events or through educational outreach.

### 4 Engage with local material suppliers.

As part of our commitment, we aim to engage this year with nearby material suppliers on Environmental Product Declaration development, and collaboratively identify opportunities for low carbon specifications and material procurement.

### 2 Communicate the value of SE 2050 to our clients.

We have a responsibility to keep clients informed of SE 2050 and other emerging sustainable design initiatives, and to make embodied carbon reduction strategies accessible through effective communication. Our team will leverage our avenues for communication (e.g. external presentations, industry events, our online presence, and visualization tools), engage our partners in dialogue around embodied carbon reduction strategies, and identify feasible pathways to achieve decarbonization goals.

Newark Liberty International Airport Terminal A Redevelopment, for which STV served as Architect and Engineer of Record, is pending LEED Silver Certification.

