

**STRUCTURAL ENGINEERS  
2050 COMMITMENT**

# **EMBODIED CARBON ACTION PLAN**

**2024**

**stv**

# CONTENTS

<b>FOREWORD</b>	<b>3</b>
<b>LESSONS LEARNED</b>	<b>4</b>
<b>EDUCATION INITIATIVES</b>	<b>5</b>
<b>REPORTING APPROACH</b>	<b>6</b>
<b>REDUCTION STRATEGIES</b>	<b>7</b>
<b>ADVOCACY EFFORTS</b>	<b>8</b>

# 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 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.

*Newark Liberty Airport Terminal A Redevelopment, where STV served as the Architect and Engineer of Record for the Design-Build team. As a testament to its sustainable design, the terminal received LEED Gold Certification, featuring design elements such as efficient water fixtures, energy-efficient electrical and lighting systems, and mitigate the urban heat island effect.*



# LESSONS LEARNED

This past year marked a significant milestone for our team as we became signatories of SE 2050. After meaningfully reflecting on our invaluable lessons learned, we recognize the need to build upon this progress and propel ourselves towards continued innovation and growth. Our inaugural year expanded our collective knowledge of innovative embodied carbon reduction strategies surrounding low-carbon material choices, material quantity optimization efforts, and designing for circularity. Through this journey, we have also recognized the transformative power of collaboration and knowledge sharing, both within our organization and with industry peers.

---

## Education Initiatives

As we continue to implement embodied carbon reduction efforts nationally, we learned how crucial local Embodied Carbon Champions are. We will create a comprehensive guide that clearly defines the roles and responsibilities of our Champions, empowering them with the knowledge and support necessary to drive impactful change. This guide will also support our annual project data submission efforts, ensuring a smooth and accurate submission process.

## Reporting Approach

Tracking material quantity data has provided significant value to both our Structural and Sustainable Design teams, allowing us to streamline our workflow through our internal Carbon Dashboard. We understand the significance of material quantity accuracy to holistically analyze a structural system's embodied carbon footprint; we will enhance our Quality Control measures to ensure consistency and accuracy.

## Reduction Strategy

Our reduction efforts were more effectively implemented after differentiating between high and low-impact strategies and prioritizing those with the greatest holistic benefits. Our Carbon Dashboard will incorporate industry GWP intensity baselines and thresholds, enabling us to drive progress towards significant embodied carbon intensity reductions.

## Advocacy Efforts

The existing industry knowledge gaps surrounding low embodied carbon research and practices must be collectively strengthened; we will prioritize partnerships with academic institutions and support targeted research initiatives to address the gap. Through the development of educational resources, we aim to equip our future workforce with the knowledge and skills to champion a more sustainable built environment.

*\*Text indicates 2024 goals derived from the lesson learned in the past year.*

# 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.

*\*In 2024, the Embodied Carbon Champion role will be formalized with clear responsibilities, time commitments, and milestones to further empower our team to drive impactful analyses and reduction efforts.*

## 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.

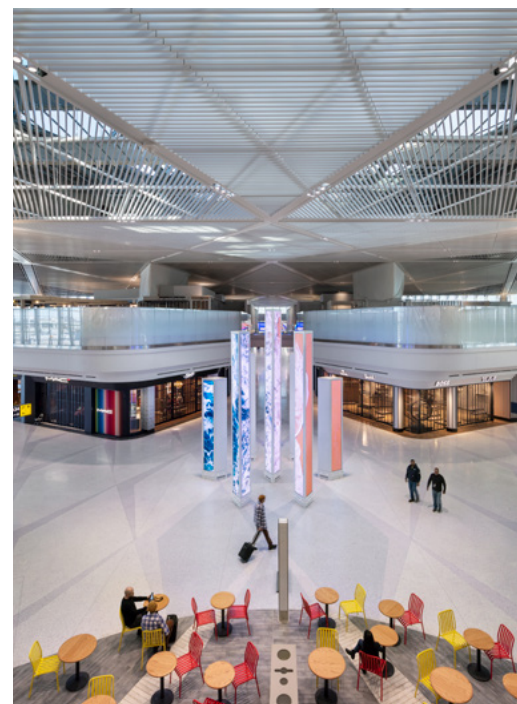
## 3. Develop a digital library of embodied carbon resources for our team.

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.

## 4. 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 analyses across various metrics. Our structural engineering teams are piloting this tool as a major step towards embedding embodied carbon tracking within our design workflow.

*Newark Liberty Airport Terminal A Redevelopment, where STV served as the Architect and Engineer of Record for the Design-Build team. As a testament to its sustainable design, the terminal received LEED Gold Certification, featuring design elements such as efficient water fixtures, energy-efficient electrical and lighting systems, and mitigate the urban heat island effect.*



# 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.

---

## **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.

*\*In 2024, we will collect all structural material quantity data across our reported projects to support the quality control and evaluation process.*

*Mui Ho Fine Arts Library, Cornell University, in Ithaca, NY. STV served as the Architect and Engineer of Record for the project. It achieved LEED Gold Certification, as well as received recognition from the American Council of Engineering Companies and Engineering News-Record.*



# REDUCTION STRATEGIES

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

## 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.

## 2. Communicate embodied carbon impacts to clients.

Our structural engineers will leverage earlyphase 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.

## 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.

## 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.

*\*In 2024, our Carbon Dashboard will incorporate industry GWP intensity baselines and thresholds, enabling us to drive progress towards significant reduction in embodied carbon intensity.*

## 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.

*Bronx Psychiatric Center Redevelopment and Adult Behavioral Healthcare Center. STV provided architectural and engineering design services, implementing the pioneering Buckling Restrained Braced Frame (BRBF) system, a first-of-its-kind solution in New York, to support the five-story steel structure. This significantly reduces the total steel quantity, thereby contributing to lower embodied emissions of the project.*



# 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.

## 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.

## 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.

## 5. Partner with academic institutions

*\*In 2024, we will prioritize partnerships with academic institutions and support targeted research initiatives to address the knowledge gap. Additionally, we will develop educational resources to equip the next generation with the knowledge and skills necessary to drive sustainable built environment practices, and promote advocacy and adoption of low carbon building strategies.*

*An interior view of Mui Ho Fine Arts Library, Cornell University, in Ithaca, NY. The four vertically stacked mezzanines of completely open book stacks hang suspended within a 40-foot-tall atrium, providing ample daylight and ventilation.*







With more than 55 other offices serving clients nationwide.  
[www.stvinc.com](http://www.stvinc.com)

