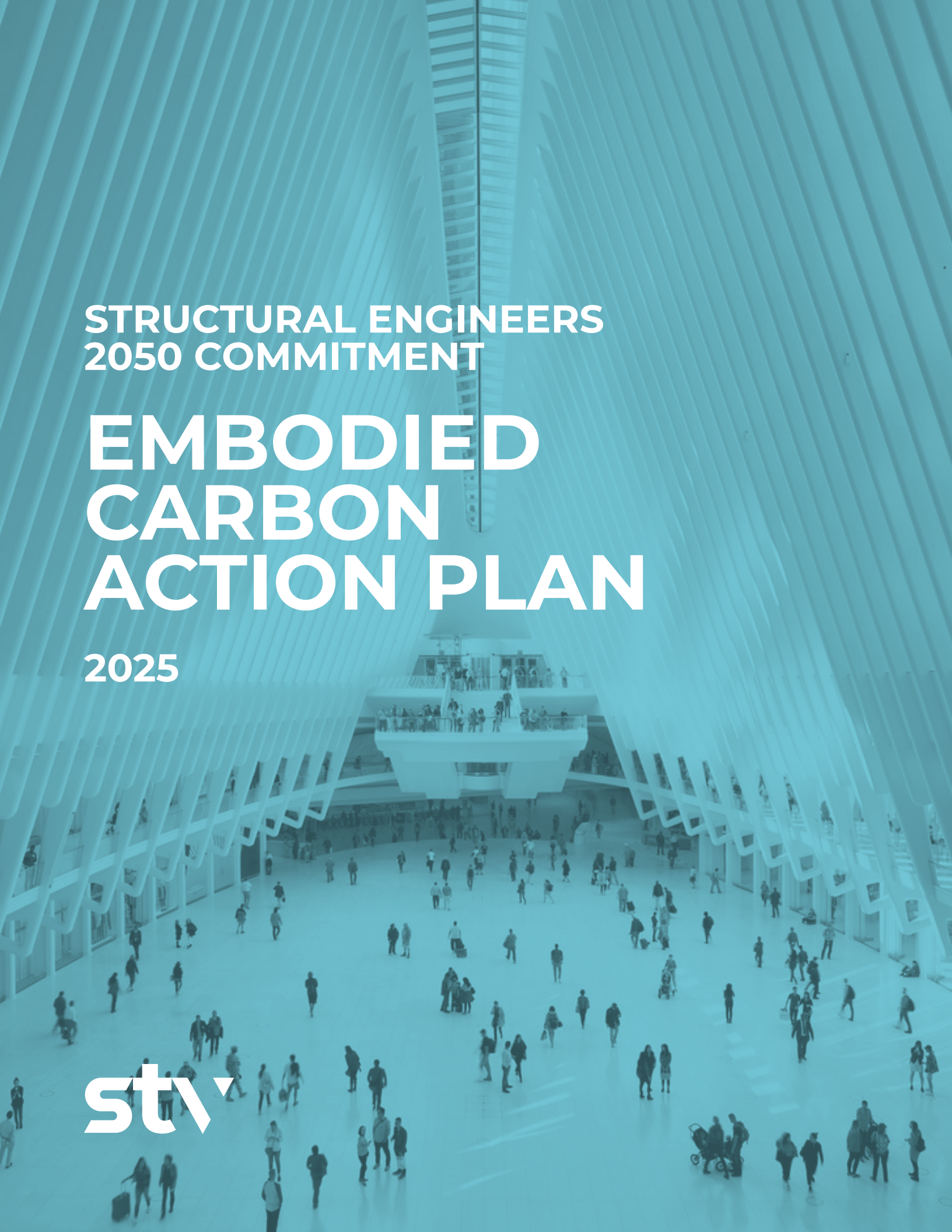

STRUCTURAL ENGINEERS
2050 COMMITMENT

EMBODIED CARBON ACTION PLAN

2025

stv

CONTENTS

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.

World Trade Center (WTC) Transportation Hub, New York, NY. STV provided the final architectural and engineering design services, including civil, structural, mechanical, electrical, and plumbing. The milestone effort was recognized at the regional, national and international levels, including the highest honors from the American Council of Engineering Companies (ACEC) in New York and New Jersey, a Grand Award from ACEC's national chapter, and a "Global Best Project" from Engineering News-Record.

LESSONS LEARNED

As we enter the third year of our SE 2050 Commitment, we have gained valuable insights into reducing embodied carbon. Reflecting on our progress, we recognize the need to build upon these lessons and drive continued innovation and growth. Over these past years, we have deepened our collective understanding of low-carbon material selection, material optimization strategies, and designing for circularity. Through this journey, we have also come to appreciate the transformative power of collaboration and knowledge sharing—both within our organization and across the industry—reinforcing our commitment to advancing sustainable solutions together.

1. Early client education.

Talking to clients about embodied carbon early in the design process is essential setting the stage for informed, cost-effective decisions.

2. Interdisciplinary communication.

Effective communication between all design disciplines can dramatically reduce a structure's embodied carbon.

3. Iterative data use.

Analyzing carbon data is a process. Start simple – by using spreadsheets and the Embodied Carbon Order of Magnitude (ECOM) tool – in early design. As the project develops, use more advanced tools that integrate with BIM and Revit, enabling streamlined and detailed analysis.

4. Growing interest while navigating challenges.

Clients are increasingly interested in reducing embodied emmisions reduction, but lack of familiarity, as well as perceived cost and schedule impacts can be barriers. Material availability in some regions is also an issue. Despite these challenges, momentum is building, with more and more of the industry focused on reducing embodied carbon each year.

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

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.

2. Provide webinars focused on reducing embodied carbon.

Leveraging resources including 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.

*In 2025, we aim to develop and present an Embodied Carbon Webinar tailored to our designers, ensuring increased collaboration between structural and sustainability teams to further understand embodied carbon targets.

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.

*In 2025, we aim to develop an Embodied Carbon 101: Fact Sheet for our colleagues and leadership. This guide will be incorporated into our digital library to explain fundamental concepts.

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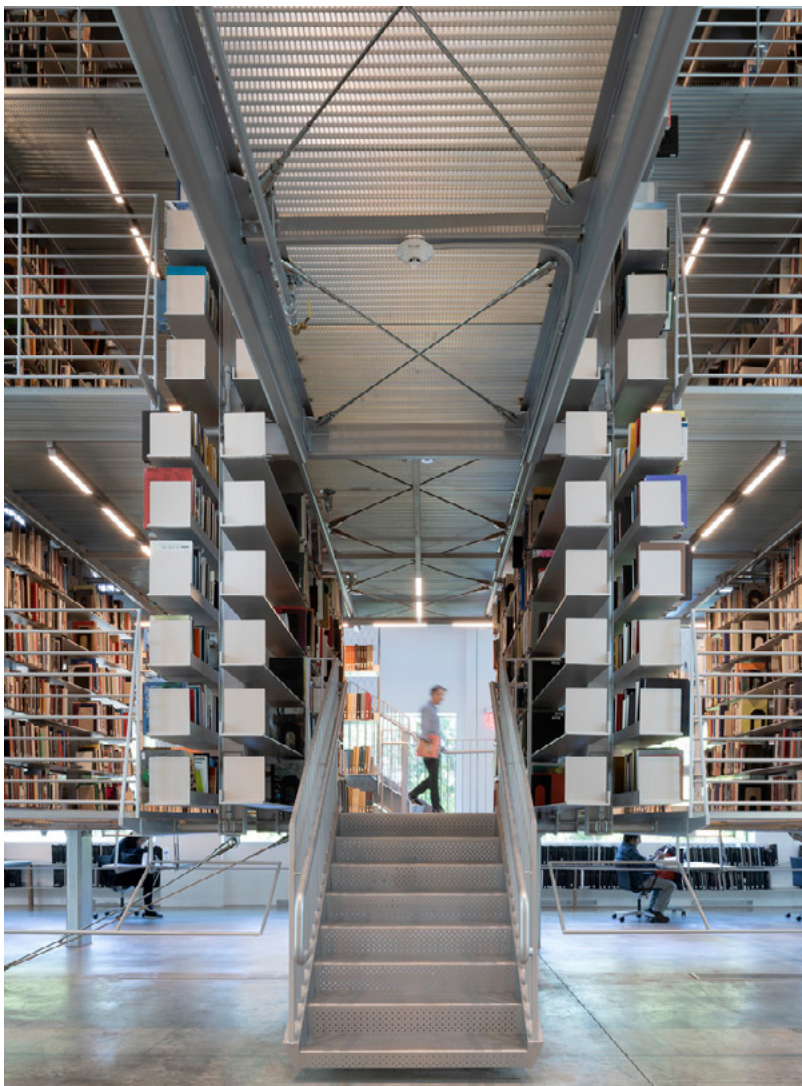

REPORTING APPROACH

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.

*In 2025, we aim to identify feasible embodied carbon projects early-on, integrating assessments at project inception. We will continue to collaborate across disciplines—as engineers, architects, and design specialists— to drive low-carbon design and material selection throughout the project life cycle.

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

STV's Carbon Dashboard will track the embodied carbon footprint 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 2025, we aim to monitor our projects across multiple disciplines, extending beyond structural to include architectural and MEP.

Mid-Hudson Forensic Psychiatric Center, New Hampton, New York. STV, in a joint venture with Architectural Resources, delivering comprehensive architectural and engineering design services that prioritize sustainability through features like optimized natural lighting and energy performance, a green roof, a simplified facade utilizing two prefabricated modular systems, and numerous construction efficiencies.

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. Collaborate across disciplines through in sustainability-focused design charettes.

STV investigates sustainable design considerations early in the design process and through our design charettes. Our team holistically evaluates opportunities for embodied carbon reduction, identifying high-impact strategies and ensuring embodied and operational emission reduction are considered together.

2. Communicate embodied carbon impacts to clients.

Our structural engineers will leverage early-stage 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 share successful design decision lessons with our larger Embodied Carbon Champions network.

*In 2025, we aim to increase number of whole building life cycle assessments performed to identify holistic, strategic reductions.

5. Supporting the development of codes and standards.

In 2025, we will support the development of codes and standards that will encourage or require of embodied carbon reduction efforts.

Newark Liberty Airport Terminal A Redevelopment, where STV served as the Architect and Engineer of Record for the Design-Build team. A testament to its commitment to sustainability, the terminal earned LEED Gold Certification, achieved through features like water-efficient fixtures, advanced energy and lighting systems, and strategies to mitigate the urban heat island effect.

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, and 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 with nearby material suppliers on Environmental Product Declaration development, and collaboratively identify opportunities for low carbon specifications and material procurement.

5. Industry Advocacy

STV is actively working with several professional organizations to advance the measurement and reduction of embodied carbon across various assets, including infrastructure systems. STV is spearheading ASCE Infrastructure 2050, a collaborative initiative following in the footsteps of SE 2050 and working in partnership with the ASCE Committee on Sustainability.

This graphic reflects the holistic embodied carbon ecosystem, consisting of stakeholders across governance, innovation and technology, the built environment industry, and academia and research, to accelerate widespread adoption of embodied carbon reduction efforts.

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