


Embodied Carbon Action Plan

2022

**We are compelled by
engineering possibilities.**

**We are open to new ideas
and not bound by the rote
application of rules.**

**We strive to bring our
inquisitiveness to each
project for the benefit of
our clients.**



Holmes is an international design firm with employees around the Pacific Rim and beyond.

We believe projects become great by what you put into them. With inspired practicality, we reconcile the complex, competing interests and constraints, providing not just engineering but optimal solutions. In this way, we create more meaningful, integrated designs as a collaborative process in the vital pursuit of building great things.

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1.0 Introduction

(Re)Committing to Net Zero

In our second year of SE 2050, we're laying the groundwork for big shifts toward sustainability. We're cultivating a greener mentality at Holmes rooted in our business plan. This extends to all practice areas: structural, fire, and product engineering. We have designated new leadership roles—Director of Strategic Initiatives and Mass Timber Design Director—to foster resilient growth. In tandem we have launched our Sustainability and Mass Timber Resource Initiatives. Associated committees meet regularly to track progress, upskill our team, and circulate resources across the international Holmes Group.

Externally, our clients are increasingly driven by ambitious sustainability benchmarks. With our industry partners, we're pushing building designs to new scales and contexts. Since issuing our last ECAP, milestones include:

- Completing the world's largest Living Building Challenge Materials Petal Certified renovation.
- Delivering some of the first mass timber apartments in the US (Chiles House, The Kind Project).
- Constructing our first mass timber single-family residence.
- Topping out low-carbon concrete at Intuit Bayshore—with a 45% reduction from the industry baseline.

As we take on more sustainable work, more of our people touch these projects and learn best practices for design and construction. We're growing a coalition of ambassadors who share this knowledge with industry peers—and we're just getting started. We look forward to carrying this momentum into another year of commitment to reducing our embodied carbon.



Google Campus Addition: the world's largest LBC Petal Certified renovation.

2.0 Education

Where Curriculum Meets Culture

Holmes is executing an Implementation Plan for 2022 aimed at upskilling our staff on embodied carbon technology and tools. With this plan, our objectives are to:

- Infuse sustainability into our company culture.
- Have all staff be able to speak to the topic of sustainability and our role in carbon reduction.
- Be paid to perform Life Cycle Analyses (LCAs) and bring in more sustainable projects based on our expertise.

In order to achieve this, we're providing presentations to staff on embodied carbon and are scheduling others focused on LCAs (with an upcoming demo of tool OneClick). We also have a companywide presentation scheduled that will take a broader look at sustainability and how it is applicable across our service lines and locations. We are organizing a sustainability library with technical resources, articles, presentations, and design guides in one place. We will roll this out to all staff by the year's end. In addition, our employees attend external education programs and report back to staff.

We discuss embodied carbon reduction tactics and push for lower Embodied Carbon (EC) materials and designs on our projects. Mass timber is a growing portion of our work, and some clients select timber for its assumed lesser carbon footprint. While LCA software can evaluate various designs using national average Environmental Product Declaration (EPDs) and other vetted life cycle inventories, we recognize that some clients seek to support forests that sustain the largest sinks of biogenic carbon. Our sustainability team sources and disseminates the latest understanding of the range of biogenic carbon across geographic boundaries, harvest regulations, forest landowners, and forest certification programs.



Healdsburg Residence: Holmes' first mass timber install for a single-family home.

3.0 Reporting

Evaluating EC in Key Submarkets

Holmes has reported embodied carbon data on four projects this year with a fifth coming soon. We deliberately chose projects that touch three of our largest submarkets in the US: existing buildings, single-family residential, and mass timber construction. While Holmes has a large and diverse portfolio of work, we anticipate that learnings from these examples will inform future submarket comparisons.

We did not limit our selection to projects that have completed design. Some clients have requested embodied carbon evaluations, in whole or in part, at the beginning of design. Three projects have clients who reviewed embodied carbon data. We are proud to include sustainability as a factor that informs the choice of structure.

We also recognize that the process of evaluating embodied carbon is imperfect and less accurate earlier in design. There are many unknowns and externalities when a project is just beginning to be designed. We aim to follow these young projects through future design phases to track their added embodied carbon scopes. Our aim is to estimate allowances for embodied carbon developed in future phases of design. We will evaluate how changes in embodied carbon are reflected in progressing levels of detail with various methods for collecting quantities.



Confidential Corporate Campus: Holmes' largest project to undergo an LCA.

Table 1: Embodied Carbon Data of 4 Holmes Projects

Project	Size	Usage	Phase LCA Evaluated	# of Stories	Vertical Gravity System	Total GWP
Confidential Office	250,000 SF	Office	Schematic Design	4	Wood: Mass Timber	2,470,000
Confidential Corporate Campus	540,000 SF	Office	Construction Documents	2	Wood: Mass Timber	17,179,000
Affordable Housing	126,500 SF	Multi-Family Residential	Design Development	7	Wood: Other	1,830,000
Washington St. Residence	11,000 SF	Single-Family Residential	Construction Documents	3	Wood: Light Frame	238,000

4.0 Reduction

Emphasizing Concrete's Capabilities

Holmes purposefully reduces embodied carbon on our projects through a variety of strategies, as summarized at a high level in our 2021-2022 ECAP. Below is a deeper dive into a few recent efforts towards our goal of embodied carbon reduction.

Low-Carbon Concrete

The Holmes General Notes Template is undergoing updates and will be revised in its entirety to implement embodied carbon reduction in all materials as a requirement—not a suggestion. We're currently focusing on concrete, as cement production alone accounts for ~8% of global greenhouse gas emissions. Not only has Holmes established a baseline cement replacement requirement: we have incorporated a matrix with options to comply with either cement volume limits or Global Warming Potential (GWP) limits. Our goal is to present criteria that is achievable by project teams of all scales with multiple paths to compliance. Looking forward, we plan to encourage the adoption of new alternatives to cement beyond Supplementary Cementitious Materials (SCMs) like slag and flyash as new technologies emerge.

Establishing a Baseline

To reduce, we need to establish a baseline for comparison. Holmes is in the early stages of developing in-house tracking tools that tabulate structural material quantities for quick input into different LCA software databases. These tools are meant to be user-friendly and quickly adopted by Holmes staff. During schematic design, we will have the capability to provide comparative alternates with carbon data. This will inform project team decisions early on and ultimately reduce a project's impact that would otherwise have had higher GWP.



Holmes team and interns explore Intuit Bayshore's low-carbon concrete structure.

5.0 Advocacy

Amplifying Our Voices

We continue to initiate climate-conscious conversations and advocate for carbon reduction—on project teams and within the broader AEC community. Informed by engineered solutions, we amplify our voices in protecting the planet through speaking opportunities, organizations, publications, and marketing.

Powering Up Project Teams

We're discussing carbon reduction strategies with our project teams earlier and earlier—even prior to project kickoff. The dial is shifting as clients target more ambitious and palpable sustainability goals. To meet this demand, we have updated our base contract to offer LCAs as a standard add service. Once engaged in a project's dialogue, we leverage the appropriate tools—typically our LCA trackers and mass timber optimizer—to sustainably source structures and reduce material quantities. It's worth noting that a growing portion of our work comprises structural kits of parts and product typologies for repeatable rollout. We examine these projects with a sustainable lens, aware of the potential for major carbon savings amassed over multiple sites.

Looking ahead, we will offer clients not just the predicted average amount of carbon sequestered in building forest products. We will also share the range of their potential, both positive and negative. We will empower our project teams to engage in carbon-smart sourcing and reward forest practices that build carbon stocks (rather than assume net neutral forest growth).

Spreading the Word

This year alone, we have had 20 Holmes speaker slots at industry events! Even more regularly, we present to current and prospective clients at informal roundtables/lunch and learns. Our team members also contribute to building codes, design guidelines, and research projects that expand possibilities for sustainable construction.

Simultaneously, we're building awareness of our capabilities through marketing content. We reference our SE 2050 commitment, applicable tools, and case studies in base proposal materials. Online, we interlink topical perspectives ([Taking a Stance on Carbon Neutral Design](#); [Mass Timber's Rise in Construction](#)) throughout [our website](#). We also post regularly on [LinkedIn](#)/social media regarding speaking engagements and project milestones to spread the word.

INDUSTRY EVENTS

We attend events near and far, often presenting on our role in carbon reduction:

- Advancing Mass Timber Construction Conference****
- AIA Los Angeles: 1.5°C Symposium on Climate Change*
- AIA Seattle Climate Leadership Summit
- Carbon Leadership Forum Webinar*
- Greenbuild International Conference & Expo*
- International Mass Timber Conference***
- NCSEA Structural Engineering Summit & Education Portal*
- SEAOSC Technical Summit**
- SEI Structures Congress****
- STUDIOS Architecture – Fireside Chat Roundtable: Mass Timber***

*Indicates Holmes speaker(s).

PROFESSIONAL COMMITTEES

We participate in local and national chapters to keep a pulse on the latest sustainable practices:

- Carbon Leadership Forum
- NCSEA Sustainable Design Committee
- SEI Sustainability Committee
- SEI SE 2050 Committee
- SEO Code Advisory Committee (Mass Timber)
- SEAOC Sustainable Design Committee
- SEAONC Board of Directors (President), Sustainable Design Committee
- SEAOSC Sustainable Design Committee
- SEAW Sustainable Design Committee
- USGBC - California Council of Experts & Los Angeles Chapter

CODE & DESIGN DEVELOPMENT

We collaborate and advance pathways for greener buildings with contributions to:

- Marin County: Low-Carbon Concrete Code (first in the nation)
- CLT Diaphragm Design for Wind and Seismic Resistance
- US Mass Timber Floor Vibration Design Guide
- Nail-Laminated Timber Design & Construction Guides - US & Canada
- NHERI TallWood-Research

Speaker Snapshots

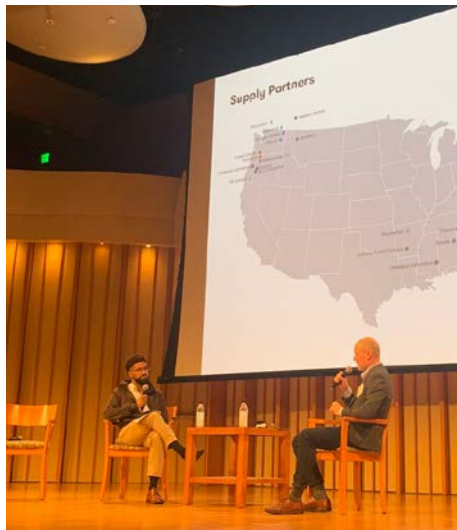
A glimpse of Holmes' speakers at sustainably-gearred conferences:



Structures Congress, 2022.



SEAOC Convention, 2021.



1.5°C Symposium, 2022.



Intl. Mass Timber Conference, 2022.



SEAOSC Technical Summit, 2022.



SEAOSC Technical Summit, 2022.

We're All in on Net Zero.

