

SE 2050

# EMBODIED CARBON ACTION PLAN

LeMessurier

2025



# INTRODUCTION



View from Boston University, Center for Computing & Data Sciences  
COVER: Avalon North Station, Boston, MA

**Every project needs a sustainability champion.**  
**At LeMessurier, we believe every team member should be a sustainability champion.**



**Suzanne Robinson, P.E., LEED AP**  
Director of Sustainability

A holistic approach to sustainable construction in today's world will require a new level of participation and expertise from the structural engineer. Our approach to embodied carbon reduction at LeMessurier is to equip all our engineers to be sustainable design leaders. Our Director of Sustainability, Suzanne Robinson, acts as our embodied carbon champion. She works behind the scenes to integrate sustainability into the engineer's daily practice.

At LeMessurier, our approach is to find solutions. We go beyond analysis and optimizing designs. We work with the project design and construction teams, local suppliers, and manufacturers to remove obstacles and change what is considered "business as usual."





# EDUCATION

## Engineers that speak the language of sustainability.

At LeMessurier, education is a critical step towards our goal of having every engineer speak the language of sustainability. Going beyond answering questions to evaluating design and material options to proposing ideas, engineers are at the forefront of integrating embodied carbon reduction strategies throughout the project. The following are core education approaches carried out throughout the company reaching all engineers.

### INTERNAL CONTINUING EDUCATION SESSIONS.

We have integrated sustainability sessions into our weekly continuing education and lunch & learns for the entire company. Sessions are recorded and available on our internal wiki. For 2024, we had a series focused on low carbon concrete, in addition to other sessions:

- + Unpacking Low Carbon Concrete (LeM - Concrete Tech Review Group)
- + Low-Carbon Concrete (Guest - Ready Mix Supplier)
- + Supplemental Cementitious Material (Guest - New Tech)
- + Designers Roundtable - Deflection Study (LeM)
- + Sustainability Projects/Internal Studies (LeM)

**ANNUAL SUSTAINABILITY STATE OF THE UNION.** Starting in 2022, we've provided an internal presentation that takes a look back at what we've accomplished, a look forward at our sustainability goals for the year and how they fit into our SE 2050 Commitment and long term goals to integrate sustainability into our daily practice and projects. We also take a look at new sustainability topics and upcoming policy that is on the horizon.

**SUSTAINABILITY WIKI.** We have set up a sustainability section in our internal wiki that is continuously added to and curated. It includes resources, presentations/recordings, analysis tools, and posts. Highlights include:

- + Did You Know Series – aims to present the most critical information around embodied carbon in bite size chunks so that engineers can speak confidently with the project team and client.
- + 12 Days of Sustainability – a year-end refresher with a new post each day leading up to Christmas in 2024

**ENGAGE WITH SUSTAINABILITY GROUPS.** We are active in national and regional organizations that work towards market transformations:

- + Carbon Leadership Forum
- + SE 2050
- + CLF Boston/New England Hub
- + CLF Boston Low-Carbon Concrete Group
- + CLF Boston/New England Reuse Subcommittee
- + Built Environment Plus Carbon & Energy Roundtable





REDUCTION

## Net zero carbon requires a holistic approach to sustainable construction.

Fenway Center, Boston MA

As we work towards the SE 2050 Challenge of eliminating embodied carbon on our projects by 2050, we recognize we will not achieve this goal without collaboration with others in the AEC industry and suppliers. Our goal this year is to continue to collaborate with adjacent professions that affect this goal which include: architects, MEP engineers, contractors, sub-contractors, suppliers, manufacturers, and owners.

- + **Low-Carbon Concrete Tech Review Group.** An internal initiative started in 2023 that researches new to market products that contribute to low-carbon concrete. Looking at strategies that reduce, readjust, reformulate and innovate concrete production that has scalability potential.

- + **Early-Stage Analysis.** We continue to evaluate embodied carbon alongside different design options at the start of a project, exploring different structural framing and material options.
- + **Mass Timber.** We consistently use mass timber on projects and are exploring mass timber on more projects each year.
- + **Green Building Certification.** We participate in numerous LEED and ILFI Core project design charrettes and suggest embodied carbon reduction strategies.
- + **Material Specification.** We've updated our specifications to request EPDs and target lower embodied carbon materials that are available to the project.



LeMessurier.



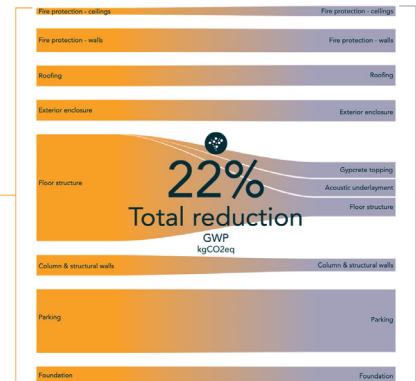
# KNOWLEDGE SHARING



Denver case study  
IBC 2024 TYPE IV-B



17,622,000  
kgCO<sub>2</sub>e  
Cast-in-place  
concrete  
PARTIAL EMISSIONS  
& CARBON STORAGE  
TOTAL OF IBC 2024 TYPE IV-B



13,800,000  
kgCO<sub>2</sub>e  
Mass  
timber  
PARTIAL EMISSIONS  
& CARBON STORAGE  
TOTAL OF IBC 2024 TYPE IV-B

## MASS TIMBER MULTIFAMILY: CARBON, COST, AND CONSTRUCTABILITY

LeMessurier participated in a two-year project led by Olifant, “Advancing mass timber as a climate solution in three U.S. cities to scale up its use and encourage long-term investment in new domestic manufacturing,” with support from the US Forest Service. We redesigned buildings in Minneapolis, Denver, and Atlanta; revealing cost differences, schedule savings, global warming potential savings, and design considerations of each. Building studies were complemented by comprehensive mapping of the mass timber supply chain, with a focus on its potential impact on forests in the United States.

A three-part series was developed and hosted by **Architecture 2030**. The study and the recordings are shared publicly, intended for download, and used by owners/developers, architects, engineers, construction managers, city planners, and others to advance mass timber.

[www.olifant.org/three-regions](http://www.olifant.org/three-regions)  
[www.olifant.org/mass-timber-webinar](http://www.olifant.org/mass-timber-webinar)

## MASS TIMBER CONSTRUCTION: An Economic Study of Supply, Best Use, and Implementation in Three North American Regions





# REPORTING

## Engineers that perform the LCA on their project themselves.

Measuring the embodied carbon on projects is the first step to meeting the SE 2050 Commitment goals of embodied carbon reduction. LeMessurier uses the SE 2050 project reporting for two purposes:

**EMBODIED CARBON DATABASE.** As an industry we have very little project data for structural embodied carbon which is needed to set benchmarks. We are committed to contributing alongside other firms to the SE 2050 database. Each year, LeMessurier is committed to submitting at least five projects to the SE 2050 Database.

**LCA TRAINING.** Our goal is to have every engineer be proficient in performing LCA on our projects. We believe that the professional performing the design should perform the analysis so they have a direct feedback loop in understanding the impact of design decisions on embodied carbon emissions. As part of the SE 2050 reporting, each cycle of reporting we have a new group of engineers perform a Life Cycle Assessment (LCA) on a current project.


To inform concept/schematic design decisions we use an early-stage analysis tool we developed in-house (A1-A3 scope) and are exploring other tools shared by our peers. For our projects that have a developed Revit model, we use Tally which is a software tool that performs a full building LCA (A-D scope). We have included EPD requests in our specifications.

We target two cycles of SE 2050 reporting and training each year, with a new group of engineers who contribute and build upon our best practices. We have developed the following resources/processes:

- + **INTRO TO TALLY TRAINING.** Each cycle of reporting, an engineer from the previous cycle provides a demonstration of Tally and the process of performing an LCA, sharing their main takeaways.
- + **TALLY BEST PRACTICES.** We have developed a resource to provide guidance and best practices when using Tally. Each cycle of reporting, we add new information from our lessons learned.
- + **PROJECT STANDARDS.** We have updated our Revit project standards to make performing LCAs using Tally more efficient and accurate.
- + **COMPARATIVE STUDY.** We have several projects each year where we compare independent LCAs done by different individuals. This includes internal staff working in parallel or comparing our LCA with an LCA performed by another company. We explore the differences and add the discoveries to our best practices.
- + **BUILDING OUR UNDERSTANDING/INTUITION.** After each cycle of LCAs, as a group, we review the results of the projects compared to the current SE 2050 database and discuss what parts of the design contributed to an increase or decrease in embodied carbon relative to industry benchmarks.







Reaching beyond any single project, making meaningful contributions to our profession and continuing our growth as a team is central to our mission. We build upon the creativity, expertise, and initiative of individual team members past and present.





SEI: TOWARDS ZERO CARBON, July 2024

We recognize that meeting the climate goals of different institutions, companies, and professional organizations, including SE 2050, requires dialogue, collaboration and information sharing. We continually educate the owners, AEC community, and students about what the SE 2050 Commitment is and the significance of structural engineering in finding solutions for climate change. We proudly share we are a member of the SE 2050 Commitment on our website.

**"All structural engineers shall understand, reduce and ultimately eliminate embodied carbon in their projects by 2050."**

**- SE 2050 CHALLENGE**



Adams House Renovation, Harvard University

## ROADMAP TOWARDS ZERO CARBON

In 2024 LeMessurier sponsored and several staff participated in a two-day workshop to develop a roadmap towards a zero-carbon future. "Towards Zero Carbon: Developing a Roadmap for the Structural Engineering Profession and the Structural Engineering Institute, ASCE" was hosted at Northeastern University in July. The workshop sessions focused on identifying top priorities for a zero-carbon roadmap. One of the most popular solutions involved collaboration among people and companies that LeMessurier plans to use in developing initiatives in 2025.

Learn more: [www.asce.org/communities/institutes-and-technical-groups/structural-engineering-institute/news/towards-zero-carbon-sei-is-leading-the-way-for-carbon-reductions-for-the-profession](https://www.asce.org/communities/institutes-and-technical-groups/structural-engineering-institute/news/towards-zero-carbon-sei-is-leading-the-way-for-carbon-reductions-for-the-profession)

## SUSTAINABILITY IN UNIVERSITY CURRICULUM

An initiative started in 2022, the young engineers at LeMessurier continue to advocate for the acceleration of embodied carbon into the core curriculum for structural engineering at their alma maters. For 2025, we plan to write up case studies for several of the schools we've been working with, so their work can be shared with the larger academic community.



## Complex problems inspire ingenious solutions.

Northeastern University, Interdisciplinary Science and Engineering Complex

As engineers we appreciate a good challenge. At LeMessurier, we foster a culture of collaboration and as a result have a long legacy of innovation. As we work towards meeting the SE 2050 Challenge, it is even more vital to expand collaboration to all players of the AEC industry.

- + **Learning a New Language.** As structural engineers learn the language of sustainability, there are new concepts, terminology and products. We've found the most effective approach is repetition of information in different formats and finding active ways to apply the new knowledge.
- + **Early EPD Requests.** Due to the nature of project schedules, specifying EPDs is not enough. For example, suppliers don't always have the EPDs for the low-carbon concrete mixes on file and there isn't enough time prior to concrete placement for the proper testing. Reaching out to the regional suppliers early (before they are on the team) helps the success rate of building with low-carbon concrete and provides a signal boost to the industry. Early engagement is critical and we've found appreciated by the suppliers.
- + **Maximizing BIM Workflows.** There is a gap in conventional modeling practices and what is needed for LCAs. Spending time up front on better Revit modeling best practices improves efficiency and in turn allows more time for further analysis on projects to inform design.
- + **Functional Equivalency Beyond Borders.** When we evaluate different material options, we need to recognize functional equivalency may go beyond our scope of the structure. For example, with mass timber, the acoustic performance of the floor needs to be taken into account when making comparisons with a concrete or steel structure, which includes architectural components.
- + **Support Organizations Accelerating Transformation.** We recognize that achieving the SE 2050 Challenge relies on the work that goes beyond individual companies. We financially support our local sustainability organization, Built Environment Plus (BE+) and nationally, Carbon Leadership Forum (CLF).



View from base of stairs of  
Interdisciplinary Science and Engineering  
Complex, Northeastern University



BOSTON. PORTLAND. PHILADELPHIA.

LeMessurier.