



LeMessurier.

EMBODIED  
CARBON  
ACTION  
PLAN

2021



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# INTRODUCTION

LeMessurier formally committed to the SE 2050 Commitment Program in April 2021. The Program's purpose - a coordinated effort to respond to the SE 2050 Challenge and achieve net zero embodied carbon structures by 2050 - aligns with our firm's mission to find innovative ways to reduce the environmental impacts of our structural systems. Though the environmental impacts of buildings can be immense, with a thoughtful approach to engineering and industry leadership we as a profession can meet the goals of the SE 2050 Challenge. LeMessurier pledges to take the important and necessary collective steps as an organization to make this possible.

This Embodied Carbon Action Plan (ECAP) outlines what we are committing to as a firm to work towards the goal of designing net zero embodied carbon structures by 2050. It outlines what we will be doing in the four strategy areas designated by SE 2050: education, reporting, reduction, and advocacy. As this is our first ECAP, the strategy includes items that we have implemented over the last several years as well as items that we plan to implement within the next year and beyond. This document will be updated on a yearly basis to reflect progress we have made and areas in which we fell short, and to provide enhancements to our embodied carbon reduction strategies over time.

We are proud to be one of the many firms that have committed to SE 2050 and hope that by working together, sharing knowledge, and communally demanding a higher standard for structures, we will effect positive change in the built environment.

**Massachusetts Clean Energy Center**  
Wind Technology Testing Center



# TEAM



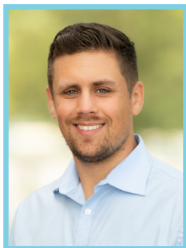
**Michael Gryniuk, P.E.**  
Principal

## EMBODIED CARBON CHAMPION

LeMessurier's embodied carbon champion is Mike Gryniuk. Mike is a Principal at LeMessurier and enthusiastically leads our sustainability team. As a leader of our sustainability efforts and Chair of the SE 2050 Commitment Program, Mike's pursuit of innovative ways to reduce the embodied carbon of structural and enclosure systems is recognized both locally and nationally.

## SUSTAINABILITY GROUP

The sustainability team at LeMessurier is comprised of a group of engineers, BIM professionals, and firm leadership who are passionate about understanding, measuring, and ultimately reducing embodied carbon. The team meets regularly to plan, strategize, debate, and advance the topic within the firm and with our clients. The team works on items such as low carbon specifications and material procurement, life cycle assessments, project workflow, structural material quantity tracking, framing optimization for minimum material use, and others. The goal is to make designing low carbon structures and tracking embodied carbon on projects more accessible to all.



**Nicholas Cordio**  
Structural EIT



**Priya Dewan**  
Structural EIT



**Eric Johnson, P.E.**  
Engineer



**Tao Li**  
BIM Modeler



**Mithila Madhavan**  
Structural EIT



**Nathan Nickerson**  
Structural Designer



**Greg Norton**  
Enclosure



**Chad Pecsek, P.E.**  
Associate Principal



**Emma Rubin, P.E.**  
Engineer



**Neil Spazzarini**  
Structural EIT



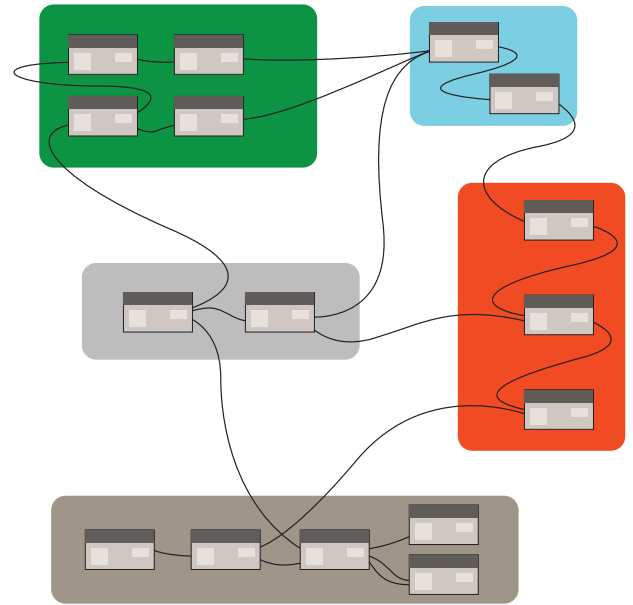
**Sebastián Torrente**  
Structural EIT



**Belinda Xian**  
Structural EIT

# EDUCATION

Education is a critical part of the SE 2050 mission to ensure that all employees understand embodied carbon and to remain at the forefront of the advancing of embodied carbon understanding in our industry. Our sustainability team provides resources and presentations to engage the entire staff and continuously seeks out learning opportunities to further our understanding of embodied carbon. As a firm, we promote and encourage embodied carbon education and devote time and resources accordingly. LeMessurier leverages our established culture of knowledge sharing and will continue to put more focus on embodied carbon.

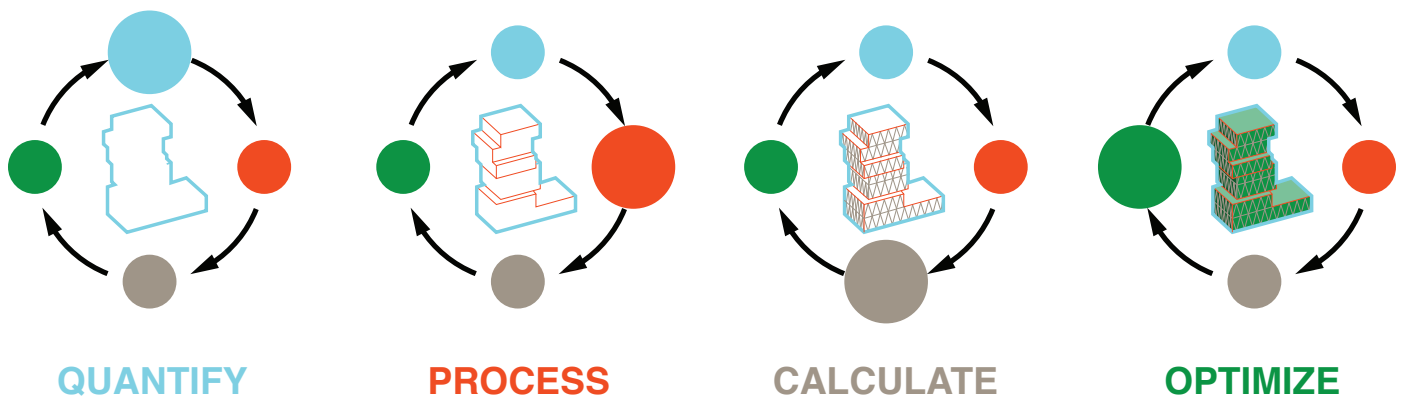


## WHAT WE ARE DOING

- We will distribute this ECAP via email immediately after uploading to the SE 2050 website.
- We have presented and made available the webinar 'Embodied Carbon 101' to all staff.
- We share the SE 2050 library of resources with all technical staff.
- We conduct firm-wide presentations discussing embodied carbon reduction strategies as outlined in the document "Top 10 Carbon Reducing Actions for Structural Engineers" produced by SE 2050. These presentations are stored locally for availability to all staff members.
- Currently one person in each office (Boston, MA and Portland, ME) participates in a CLF group. Mike Gryniuk, based in our Boston office, chairs the low carbon concrete working group for the CLF Boston.
- We will conduct a minimum (2) firm-wide presentations per year on the topic of embodied carbon. LeMessurier has regular meetings with all staff for internal education and at least every 6 months this meeting will be a presentation related to embodied carbon by a member of the sustainability team.
- The document "How to calculate embodied carbon" will be distributed to all staff via email and reviewed during an internal education presentation.
- We plan to include embodied carbon education for all new hires. The onboarding process will include a review of the embodied carbon education documents listed above, and a primer on LeMessurier's embodied carbon reduction and reporting process on projects.

# REPORTING

LeMessurier is committed to uploading structural embodied carbon data from our projects to the SE 2050 database. We recognize the urgent need to collect more data so that we can understand industry trends and establish embodied carbon benchmarks for structures. Initially, we will submit structural embodied carbon data on a limited number of projects but aim to submit data on the majority of projects in future years. For reporting to the SE 2050 database, we will perform a full building life cycle assessment (A-D scope) on the structure using the software Tally in conjunction with our BIM models.



## WHAT WE ARE DOING

- We will submit at least five projects to the SE 2050 database this year.
- We participate in, and sometimes initiate, sustainability kick-off meetings for projects and help establish sustainability goals related to structure and enclosure with the Owner. We will submit at least one of these projects to the database.
- We will aim to have each firm leadership-level member have at least one of the projects annually submitted to the SE 2050 database to encourage all levels to understand and become engaged in the SE 2050 goals.
- We will share where the projects that we have conducted LCAs on land on the SE 2050 scatter plot with the entire staff and discuss why certain projects over- or underperformed in terms of embodied carbon.

# REDUCTION

We believe a project-by-project approach is the only way to realistically achieve net zero embodied carbon globally, applying the experience gained on each project to our approach on the next. We have listed the reduction strategies below as part of our SE 2050 commitment but will aim to employ strategies beyond this list in the coming year. Our reduction in embodied carbon on projects will go hand in hand with education as our entire staff learns how to lower embodied carbon.



**Norwell Public Library**  
Glulam connection detailing

## WHAT WE ARE DOING

- We have communicated the embodied carbon impacts of different design options to clients with creative data visualization. See elective documentation for an example.
- We will share a project case study with embodied carbon reduction successes and lessons learned. A case study for the Boston University Center for Computing and Data Sciences will be published in STRUCTURE magazine in mid-2022.
- We have completed an embodied carbon comparison study during the project concept phase. See elective documentation for an example.
- We will participate in a LEED, ILFI Zero carbon, or similar project design charrette and speak to potential design considerations impacting embodied carbon. As an office we consistently ask to be invited to sustainability design charrettes to advise on structural options for embodied carbon reductions. We have also initiated low-carbon structural material kickoff calls this year and will continue both in the future.
- We are in the process of updating our standard specifications to include embodied carbon performance considerations on projects. When appropriate, we implement more stringent embodied carbon performance requirements as they relate the project's sustainability goals.
- We are in regular communication with concrete suppliers in our local area to stay up to date on the most effective methods for reducing embodied carbon in mixes. We strive to work with local concrete suppliers wherever our projects are located.
- We have worked with contractors during material procurement to meet an embodied carbon performance criteria.
- We consistently use timber on projects and will continue to advocate for biogenic materials wherever appropriate.



# ADVOCACY

LeMessurier believes that it behooves both the structural engineering profession and the broader building industry to understand the environmental impact structures have on the environment if we are to realize the goals of SE 2050. Of possibly greater importance is the education through advocacy that none of the functionality of structural systems would be diminished in this effort; in fact, we believe a focus on embodied carbon will ultimately produce a better performing system. Success relies on a joint effort amongst policymakers, engineers, owners, architects, and contractors. We are always looking for opportunities to advocate for the SE 2050 objectives. Our embodied carbon champion, Mike Gryniuk, regularly gives presentations on embodied carbon and advocates for an industry-wide reduction and we plan to have other team members join in this effort in 2022.



**Boston University**  
Center for Computing and Data Sciences

## WHAT WE ARE DOING

- We describe the value of SE 2050 to clients so that our design teams collaborate to reduce embodied carbon.
- We are developing standard proposal language to address embodied carbon including a description of our commitment to SE 2050
- We will be sharing our commitment to SE 2050 on the company website after uploading this ECAP.
- We have given presentations to four external clients that describe embodied carbon successes and lessons learned on specific projects.
- We will work with the owner or client on projects to get product-specific EPDs that meet embodied carbon requirements for the structural materials. We have requested and received these for projects in the past.
- We offer accredited presentations to clients on embodied carbon and will continue to do so in 2022.
- We are actively promoting the use of low carbon concrete, timber, and low carbon steel options on our projects, especially early in the design process. Where we've seen progress, we are publicizing these projects on our website and social media as examples of success.



# ELECTIVE DOCUMENTATION

Part of LeMessurier's research and documentation approach regarding embodied carbon is presenting data in a straightforward and succinct way, so that there is clear understanding between the design team and client as to how design decisions can limit embodied carbon expenditure.

For the Boston University Center for Computing and Data Sciences, LeMessurier specified a concrete mix with the highest portland cement replacement rate ever used in Boston at 63%. LeMessurier initiated the dialogue around finding reductions in embodied carbon for the entire project. Our approach was 'how low can we go?' regardless of the sustainability goals of the project. The University was on board with this approach and allowed us to explore all possible options.

## WHAT WE ARE DOING

- Collaborating with the entire project team to find the best solutions to lowered embodied carbon solutions, within the design parameters of the project.
- Creating tables of concrete components and corresponding durability exposure classes, to better understand upper and lower bounds of mixes to achieve desired embodied carbon reductions.
- Studying how we can apply mass timber to lab buildings with varying vibration limits
- Conceptualizing embodied carbon "budgets" over the schematic design phase to help create an embodied carbon target for the project.

