

## Embodied Carbon Action Plan

This action plan is our firm-wide strategy for exceling in the best practices of sustainable design and providing industry leadership in the reduction of embodied carbon. This document will guide us to remain focused on the evolution, adaptation, and improvement of our embodied carbon reduction strategies. We will learn, develop and apply the latest knowledge to our projects, leading to the least carbon intensive structures possible.

## Our Pledge

*Carbon emissions caused by human activities significantly contribute to the rapid change of our planet's climate. We recognize the urgency to address this issue and the large impact we can have by reducing the impact of the construction industry.*

*At Fast+Epp we are dedicated to learning, implementing, and sharing the best design practices to reduce the carbon emissions associated with buildings. We commit to measure and reduce the structural embodied carbon in our designs and contribute to the industry's ultimate goal of achieving net zero embodied carbon buildings by 2050.*



## 1. Education

### Professional development program

For F+E staff wishing to learn more about embodied carbon and associated reductions strategies than our introductory materials provide, we have created educational materials to provide a more advanced understanding of the conceptual foundations for our reduction strategies. These materials are readily available on our web-based resource library along with previously recorded presentations.

### Internal Embodied Carbon Estimation

In order to continuously reduce embodied carbon emissions, Fast+Epp has created a system to track sustainability through the phases of a project. This includes education of each project manager on the importance of carbon reduction and information on different strategies that may help to reduce the global warming effects. In this system, each engineer and project manager will have embodied carbon training. This training is also part of any new employee onboarding, as sustainability control is a part of each project's deliverables.

### Research

Embodied carbon is an emerging science with data and technologies being constantly updated. Our internal specialists stay up to date with new information released around the globe. Information on global warming is continuously updated in our internal resource library as well as our general notes on each drawing set.

### Public support for carbon reduction initiatives

We feature information on our website stating our involvement in SE2050, explaining how it fits into our overarching sustainability goals as a firm.

## 2. Reporting Plan

### Carbon calculation process

Our internal tool has been developed so that currently, it is able to extract carbon values from the majority of projects. These calculated values are recorded in our own internal spreadsheet and have been transcribed to comply with SE2050 standards. Over 10 projects have been submitted to participate in the SE2050 database and thus our contribution to the industry. The Fast+Epp internal tool is available for all of the North-American offices and applicable to both American and Canadian projects.

The Fast+Epp internal tool calculates the embodied carbon using industry average EPDs, unless a manufacturer's is available, and this process is executed at the end of the design development phase and a second calculation is executed at the end of the contract document phase. This is done in order to create potential options to reduce carbon emissions. Within each project, a member from the sustainability technical group is assigned as a sustainability lead to each project. Their role is to assist the project manager and inform on ways to reduce global warming potential. The sustainability lead is also involved in the internal crit sessions, hosted by the project design team. They also are required to have a one-on-one meeting with the project manager and walk them through a checklist. This discussion occurs early in the schematic design phase, so that the project manager is aware of the possible reduction strategies for their project.

### EPD selection

Our current Excel spreadsheet method for calculating structural embodied carbon does not use product specific EPDs, it instead relies on using CLF baseline values or industry average EPDs for most materials. For concrete we have modified the typical industry average EPDs to match the maximum GWP we allow in our specifications. We continue to update these values as necessary to keep up with updated baseline values and are continuing to evaluate software that would permit more accurate modelling of embodied carbon.

### 3. Reduction Strategy

#### Reduction Targets

Fast+Epp is driven to reduce carbon emissions and commit to measure and reduce the structural embodied carbon in our designs and contribute to the industry's ultimate goal of achieving net zero embodied carbon buildings by 2050. Within the next year, Fast+Epp is dedicated to use the new carbon calculation system in place and continue to add to the internal database in order to create a baseline. Within the next five years, Fast+Epp expects to create an internal baseline that new projects will be compared to. This will drive the embodied carbon down and create strategies to reduce carbon more effectively.

#### Sustainable specifications

Our general notes and specifications are continuously updated in order to promote the usage of materials with the lowest carbon footprint possible. We will encourage wood products from responsibly managed forests, steel with high recycled content, and concrete with high percentage of supplementary cementitious materials (SCM). In the general notes, Fast+Epp states an embodied carbon goal for each concrete strength and application.

#### Material reuse

On our projects we always look for opportunities to reuse existing materials. Reinforced with embodied carbon reduction mentality, we will continue seeking and prioritizing new applications for existing structural elements. Where new materials must be fabricated, we will seek to incorporate recycled materials to reduce the carbon footprint of the production process.

### 4. Advocacy

#### Life Cycle Analysis (LCA)

We will continue to inform clients of our sustainability services and promote our advocacy to SE2050. Fast+Epp will continue to assist clients to make informed sustainable choices throughout the design process by providing LCA services. Results of our LCA studies will provide insight into material and system environmental impacts, confirm compliance of buildings' environmental performance with respect to local regulations, and assist in achieving green building rating points.

#### Internal sustainable design group

Our internal Sustainable Design Technical Development Group will consist of embodied carbon specialists who are responsible for being up to date with the latest knowledge, keeping the rest of our firm informed, setting up access to resources, developing useful tools, managing the embodied carbon database and guiding application of sustainable design principles to our projects. Members of the technical group will reach out to internal projects and educate all employees of the benefits of carbon reduction.

#### Carbon efficient design

We are committed to implementing design strategies that lead to low carbon buildings. It is a core tenant of our identity to design highly efficient structures. Our carbon efficient design guide will support engineers in designing with embodied carbon reduction in mind. In addition, our sustainability specialists will participate in internal critical design review sessions and provide feedback on sustainable design principles.

#### Embodied carbon tool development

In recognition of the fact that the further a structural design progresses the harder it is to make major changes to reduce carbon, we want to identify carbon reduction strategies early on. To accomplish this, we will develop a web-based application to estimate the embodied carbon of early project designs based on estimated material quantities. We will make this application available to the public and share with our clients and partners to help advance awareness of the embodied carbon impacts different structural concepts would have.

#### Industry events

We will continue to attend CLF regional hub meetings and other similar events held on topics related to sustainability to learn best practices and continuously adapt our carbon reduction strategies as well as attend webinars and share within the company internally of any new and industry progression.

## 5. Lessons Learned

### **Consistent reporting**

As we complete more detailed structural embodied carbon assessments for projects with varying requirements and complexities, we have encountered the need to collect and aggregate that information in a clearer and more comprehensive manner. Standardizing our data collection and storage methods will allow us to draw conclusions based on real patterns across our projects helping us identify successful reduction strategies and areas of continuing concern.

### **Clear actionable strategies**

Although we strive to integrate sustainability best practices into our projects by default, adoption has been uneven depending on structural material as some of our engineers do not have an in depth understanding of sustainable design principles. We will continue to provide education to our engineers to promote sustainable design principles. We will also develop a menu of carbon reduction strategies engineers can select from as they progress through the design process.