

# SE 2050

## EMBODIED CARBON ACTION PLAN



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# 1. INTRODUCTION

At Blackwell, we engineer structures for a diverse range of clients. We've worked hard to develop a company culture of deep engagement with the values that drive our clients' projects forward. In practice, however, this results in projects that occupy the full spectrum in terms of carbon intensity. While it can be gratifying to focus on our mass timber, straw bale and rammed earth structures, our goal is to progressively reduce the embodied carbon on all our projects, with a particular focus on projects with high carbon density.

We recognize that the construction industry is a primary contributor to the climate crisis. It is estimated that 6%<sup>1</sup> of the carbon emissions in the atmosphere are attributable to the construction of buildings; at least half of that comes directly from structural components of the build. In joining the SE2050 Commitment, Blackwell is bringing an explicit focus to understanding, evolving and executing carbon reduction strategies across the breadth of our portfolio.

We are committed to measuring and reducing the embodied carbon associated with our work. Our goal is to assimilate current best practices from our industry and to focus our engineering insight and energy on developing design and documentation standards that result in highly carbon-efficient structures, with the ultimate end of achieving net zero structures by 2050.

## 1.1 SE 2050 COMMITMENT

In February 2023, Blackwell's CEO Brooke Guzar internally announced our commitment to the SE 2050 program.

Simon Rayment was named Blackwell's internal embodied carbon champion.

# Blackwell

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### LETTER OF COMMITMENT TO THE SE 2050 PROGRAM

DATE: 2023-02-10  
TO: Laura Champion, Director, Structural Engineering Institute  
FROM: Brooke Guzar, P.Eng., CEO, Blackwell  
SUBJECT: Letter of Commitment to the SE 2050 Program

Dear Laura:

Blackwell, a 60-person Canadian firm with offices in Toronto, Waterloo, Victoria and Halifax, Canada, is hereby signing on to the SE 2050 Commitment Program. We support the vision that all structural engineers shall understand, reduce, and ultimately eliminate embodied carbon in their projects by 2050.

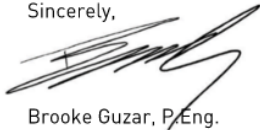
At Blackwell we are responsible for finding innovative ways to bring sustainable practices into all that we do. We have an incredible opportunity and are well positioned to drive proactive sustainable contributions to projects. We recognize that we have a direct impact on the built world, and we are compelled to strengthen and broaden our education, conserve and preserve natural resources, advocate for the environment as a capital asset, create enduring effective partnerships that embody sustainable practices, and be stewards of sustainable design at every opportunity for years to come.

We therefore commit Blackwell to take the following steps which are part of the SE 2050 Commitment Program:

- Within six months and annually henceforth, we commit to reporting an Embodied Carbon Action Plan (ECAP) and permit the ECAP document or form be made public on the SE 2050 website.
- Within one year and annually henceforth, we commit to submit data to the SE 2050 project database in a collaborative effort to understand embodied carbon in structural engineering projects and to set attainable targets for future projects.

We look forward to joining this coalition and industry effort to achieve the goals of the SE 2050 Program.

Sincerely,



Brooke Guzar, P.Eng.  
CEO

**Blackwell**



## 2. EDUCATION PLAN

Our internal plan will initially focus on establishing a nuanced understanding of the climate crisis and the contributions attributable to embodied carbon in building structures. In pursuit of this understanding, we have identified several external study resources for our staff to review, which will be followed up with internal discussion sessions. This endeavor is funded through our professional development budget.

A working group has been initiated that is developing expertise on embodied carbon accounting and reduction strategies associated with concrete, masonry, steel, and timber. This group will provide regular internal seminars to communicate best practices in terms of measurement, design strategies, and documentation leading to the reduction of embodied carbon in our structures. These strategies will be formalized into white papers that will be refined as more information is assimilated.

## 3. KNOWLEDGE SHARING

Blackwell partners with architects on multiple projects pursuing CGBC Zero Carbon, Passive House and LEED certifications each year. Our pledge is to provide embodied carbon analysis relating to assessment stages A1-A3 for concrete, structural steel, timber, and other major structural material scopes for these projects.

Blackwell is developing tools to provide embodied carbon metrics of structural elements at different stages of design. For each project, an initial analysis will accompany the schematic design deliverables and subsequent analyses will follow with increasing refinement to accompany each formal construction cost estimate. Our findings will be discussed with our clients and Contractors at all relevant opportunities.

Blackwell has presented embodied carbon analysis relating to our concrete and structural steel design approach and specifications to Architects and Municipal Owners. We regularly consult on structural design Architecture programs at universities throughout Canada. We will continue to pursue these opportunities in order to expand our knowledge and share the results of our learning with current and upcoming generations of designers.

## 4. REDUCTION STRATEGY

Our initial focus is to develop a set of tools to reliably and efficiently quantify primary structural scope and the embodied carbon associated with these elements. Our approach will use a set of internal tools embedded in our BIM models and relate these to a library of Type III EPDs that are confirmed to be accessible in our project's markets.

The expectation is that, based on our initial studies and with access to the SE2050 database, we will be positioned to set baseline carbon intensity values for the primary project types that we design. Initially we will focus on civic recreation centres, high performance office spaces, and custom single-family residences.

Fundamental to our carbon reduction strategy is the evolution of our specifications to target GWP limits associated with structural concrete and steel components. This work will be communicated with a series of policy papers so that uniform and consistent take-up is encouraged across the office. These policies will also be shared with our clients so that the initiative is coordinated with the project's broader goals.

A lessons-learned register will be established that notes key takeaways from our initial comparative schematic studies as well as the results of our LCA analyses. This register will form the basis of a carbon-efficient design strategy document that will aid our engineers in advancing our sustainability goals.



## 5. REPORTING PLAN

We will quantify the embodied carbon of structural components through simplified excel based tools for the early stages of project development to more refined project BIM tools for the later stages of design. Our modeling practice is explicit and detailed and incorporates concrete mix designs for each class of concrete elements along with all structural steel components and plate fabrications. Structural scope will be associated with Type III EPDs depending on the project's overall goals as captured in our specifications. Accessibility of products associated with the EPDs will be verified through Contractor contacts within the project's regional market.

Our analysis will be limited to LCA stages A1-A3 and will focus exclusively on concrete, concrete reinforcement, structural steel and metal deck, and structural timber and wood deck. For current projects, we will do embodied carbon analysis to accompany each costing report. In this initial year, we will do an analysis on recently tendered projects. Our intent is to reach out to Contractors to request summaries of material provided at project close-out and use this data to calibrate our design-phase embodied carbon estimates.

## 6. ELECTIVE DOCUMENTATION

### Education

- Include embodied carbon related training as part of our new employee onboarding process.
- Arrange firm wide tech talks and informational seminars on topics related to embodied carbon.

### Reporting

- Complete the aforementioned embodied carbon project reports on all eligible and appropriate projects.
- Internally compare various embodied carbon reports from different project types to gain insights and benchmarks.

### Reduction

- Use our embodied carbon analysis tools to help inform our practice and to positively effect more sustainable projects in the built environment.

### Advocacy

- Share our commitments and involvements with the SE2050 initiative through a variety of communication channels including social media, website, and newsletters.
- Communicate with our clients and industry peers about the SE2050 initiative and the importance of embodied carbon reduction. Become involved within our industry and in broader contexts to advocate for more sustainable practices.



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