

# Property & Buildings Structures

Decarbonization Practice Team  
*In-House Initiative Technical Award*  
Nomination Package

WSP

# Structures Decarbonization Practice: Who We Are

## Our Purpose

We exist to *build a future* where generations to come can continue to thrive on a planet that we know & love today.

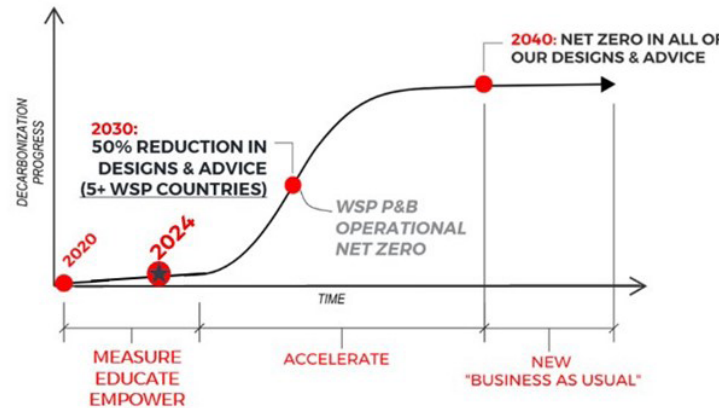
## Our Values



## Who We Are

We're a team of passionate structural engineers taking a holistic, multi-faceted approach to evolving our structural design practice towards a new decarbonized normal.

Our decarbonization roadmap begins with understanding our current state of industry through measurement and benchmarking our own designs, developing our team's knowledge and understanding of decarbonization issues, innovating design tools that pushes the industry in the right direction, collaborating with our peers to challenge current construction practices, and engaging in industry-wide change in the way we build.



Our Decarbonization Roadmap

## How It Will Help Others

We hope by sharing our journey with CCE, all the lessons learned, expertise, and innovative design tools we've developed over the past few years can raise the tide for all of our peers in the AEC community who are also integral to the success of our decarbonized future.

In this package, we'll share our journey on:

1. Benchmarking & Measuring Projects
2. Developing & Disseminating Knowledge
3. Design Innovation: Carbon Optimization Tool
4. Construction Practices
5. Industry Change

# Benchmarking & Measuring Our Projects

## What We are Doing

Recognizing the critical role of benchmarking as the first step in lowering embodied carbon, the team embarked on an extensive benchmarking initiative in 2022 that involved meticulous material takeoffs for +150 past projects.

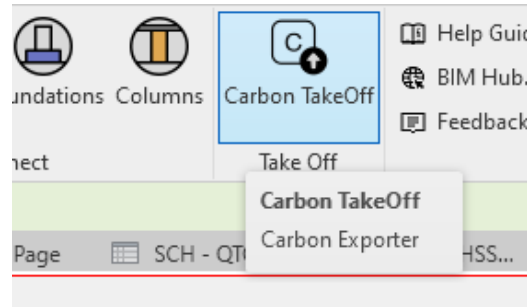
In 2023 the team developed a Revit plug-in (see below) to automate embodied carbon measurements (modules A1-A5) for current design projects. This plug-in has been designed in a way that's tailored to the way we set up our structural Revit models and thereby streamlines our benchmarking exercise.

As a result, embodied carbon measurements are now mandated for **ALL** projects when they are issued for construction, ensuring accountability and progress tracking.

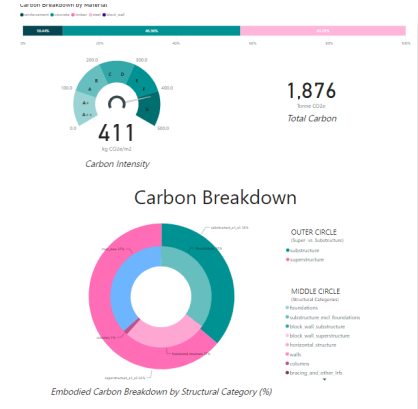
## How It Will Help Others

Now we are in the process of sharing this benchmark data with various industry bodies to help move the needle together.

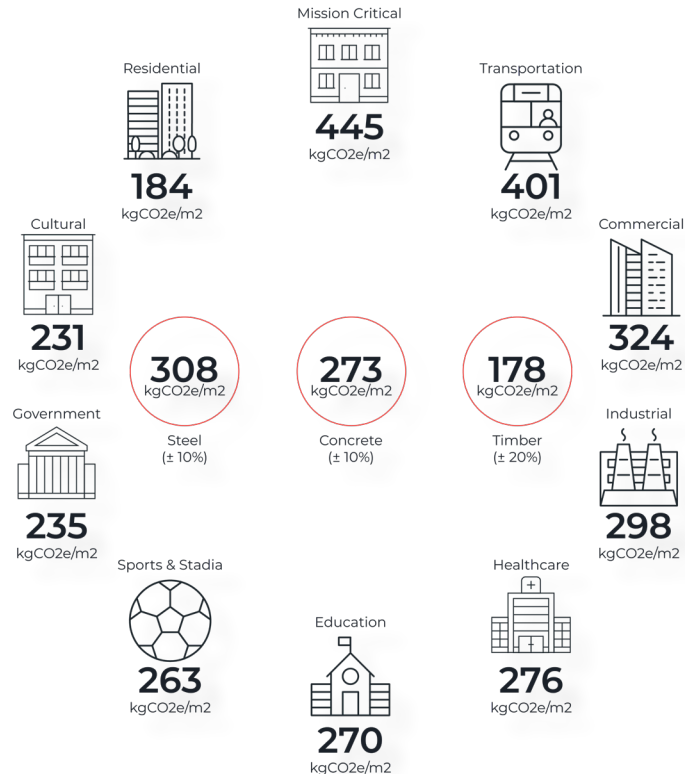
### 1. Grab Quantities From Revit



### 2. Do a Carbon Takeoff For All Projects



### 3. Establish the Benchmarks



# Developing and Disseminating Knowledge

Enhancing our structural engineering team's fluency in embodied carbon

## What We Are Doing

### A. Basic Carbon Literacy

To improve the national structures group's awareness around embodied carbon, the decarbonization practice team hosted a monthly "Carbon Quiz" which fostered a culture of continuous learning and accountability. The quizzes covered the various "one-pagers" that were developed in-house to summarize key information and help structural engineers understand the problem in the context of their own work.

### B. Small Group Learning

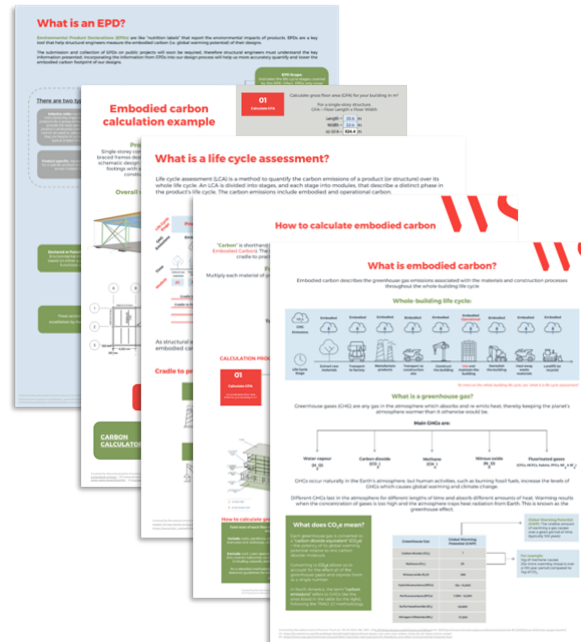
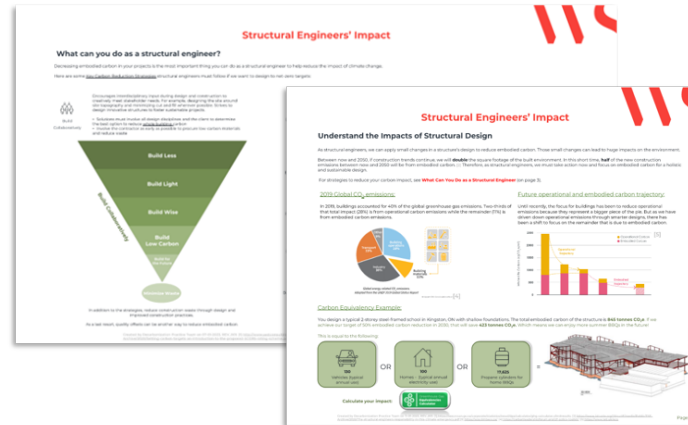
The practice team also hosted small group learning sessions to roll out the key information and permit two-way interaction and greater understanding by our full National Structures team (+ 200 ppl).

### C. Technical Excellence

On top of basic embodied carbon literacy, the decarbonization team took on the effort to develop engineering studies on how to best improve the carbon performance of various structural systems. For example, we've developed technical guidance around when to use high strength steel for both material and carbon savings.

## How It Will Help Others

We are now in the process of collaborating with two industry partners to publish our holistic, whole-building guidance material to the public.



Timber



Concrete



Steel



Adaptive Reuse



System Optimization

# Design Innovation: Carbon Optimization Tool

An industry-first, rapid optioneering web application for low-carbon structural solutions

## What We Are Doing

We've developed an industry-first web app that educates and empowers users to select the most carbon-efficient structural systems during early design stages when the cost to change is low.

## Why We Are Doing It

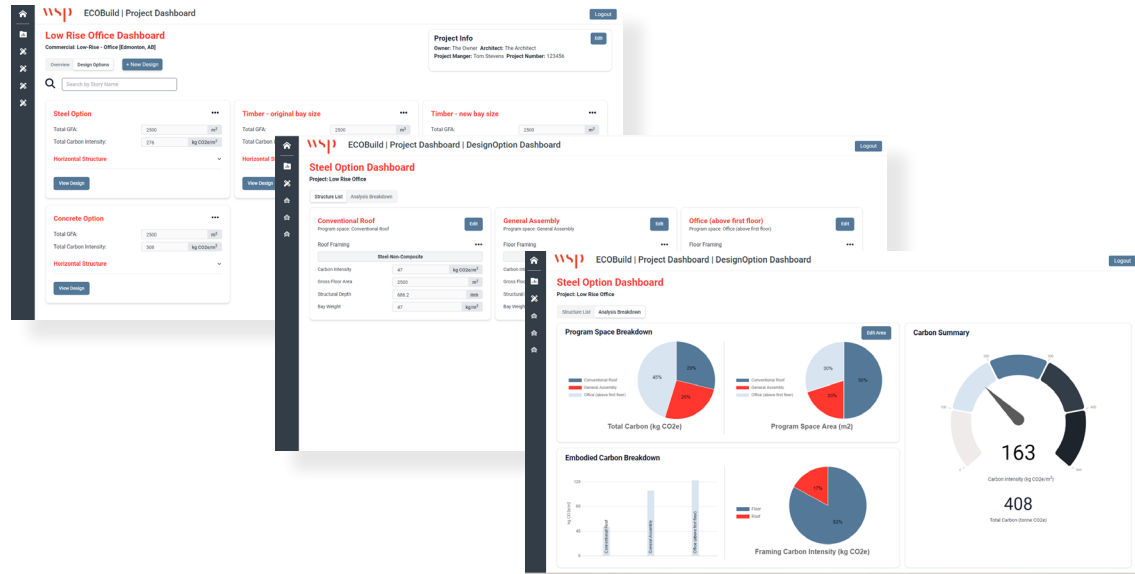
We want to have key embodied carbon & structural metrics at our fingertips when workshoping framing options with clients during the early design stages. We can also compare the expected embodied carbon performance to internal benchmarking and external targets.

## How It Will Help Others

Driven by our commitment to lead by example, this tool enables us to start the embodied carbon conversation as early as possible with clients.

Future iterations will include adding more structural systems, an improved optimization algorithm, and possible AI-integration.

Currently an in-house release, a public version of this tool will eventually be released to enable the entire AEC community to join the movement.



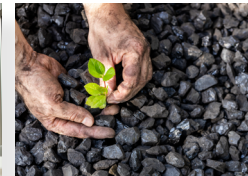
### Leading by Example

Demonstrate that digitization and decarbonization go hand-in-hand



### Talent Retention

Attract and retain top talent who are seeking meaningful career paths



### Reach Our Carbon Goals

Reduce the embodied carbon of buildings and tracks our progress year over year so we can measure progress



### Grow Our Data Set

Saving projects to a database allows us to leverage our experience for future generative design



### Win Meaningful Work

Attract projects and clients for whom reducing embodied carbon is priority

# Construction Practices

## What We Are Doing

Recognizing that optimizing our designs is only the first step in the process of reducing our embodied carbon, this practice team conducted an overhaul of our material specifications to find opportunities to drive accountability throughout construction.

Further, in collaboration with our sustainability group, they started developing ways our specifications can empower owners to set ambitious carbon targets and support innovation in construction practices.

Such effort has accumulated to ensuring that our designs translate into sustainable solutions & tangible reductions in embodied carbon during construction.

## Timber



Efforts include:

- Updated specification language around the submission of EPDs
- Ensuring Certified Sustainable Timber is specified on all projects
- Identifying suppliers with “chain of custody” certification across the country to better inform clients of regional availability

## Concrete



Efforts include:

- Updating specification language around EPDs & establishing a template for implementing low-carbon concreting
- Identifying real industry baseline targets for common concrete mixes
- Working with WSP materials experts & concrete suppliers in producing a case-study for low-carbon concrete

## Steel



Efforts include:

- Updating specification language around the submission of EPDs
- Developing specification language for steel reuse

# Industry Change: Steel Reuse

## What We Are Doing

Going beyond internal initiatives, the decarbonization team spearheaded efforts to drive industry-wide change.

### Steel Reuse Industry Night

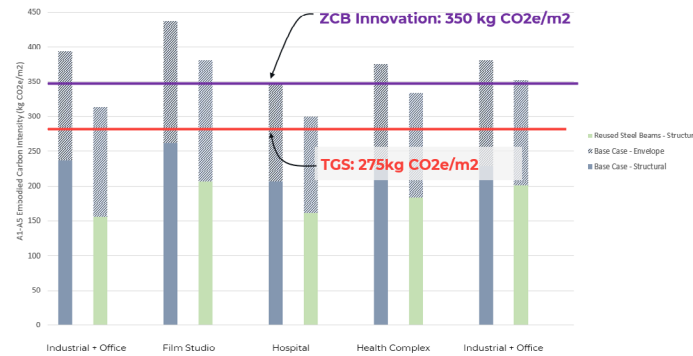
Expanding on an project innovation which proposes to use reclaim steel from a donor building in new construction, the team challenged the industry to find practical ways to integrate reused steel in new construction as part of a new normal.

They did this by organizing an industry night at WSP's Toronto office to facilitate a panel discussion featuring demolition experts, steel fabricators, and designers.

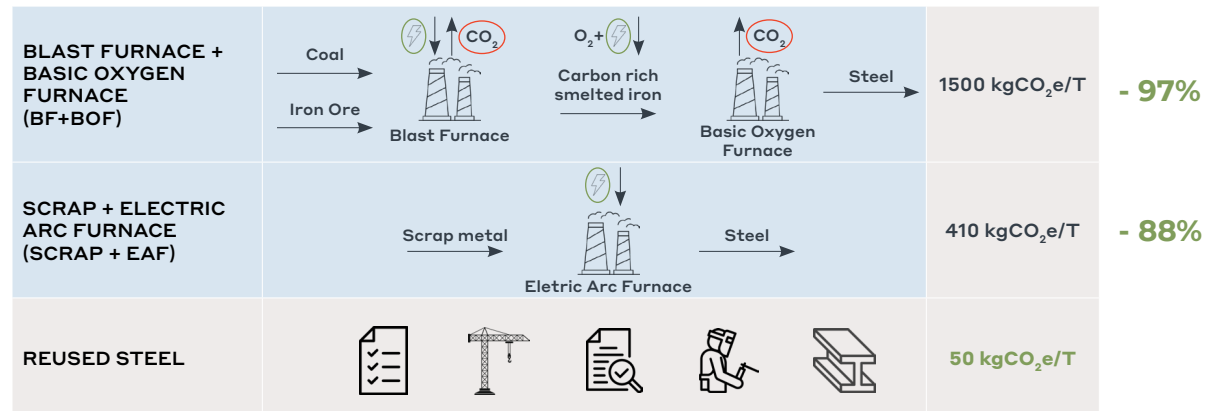
The success of these efforts is evident in the formation of a breakout think tank and plans for future industry nights in collaboration with CAGBC (BLC June 2024) and CLF Toronto (May 30th, 2024).



## Case Studies of Past Projects: What If We Replaced Conventional Steel Beams with Reused Steel?



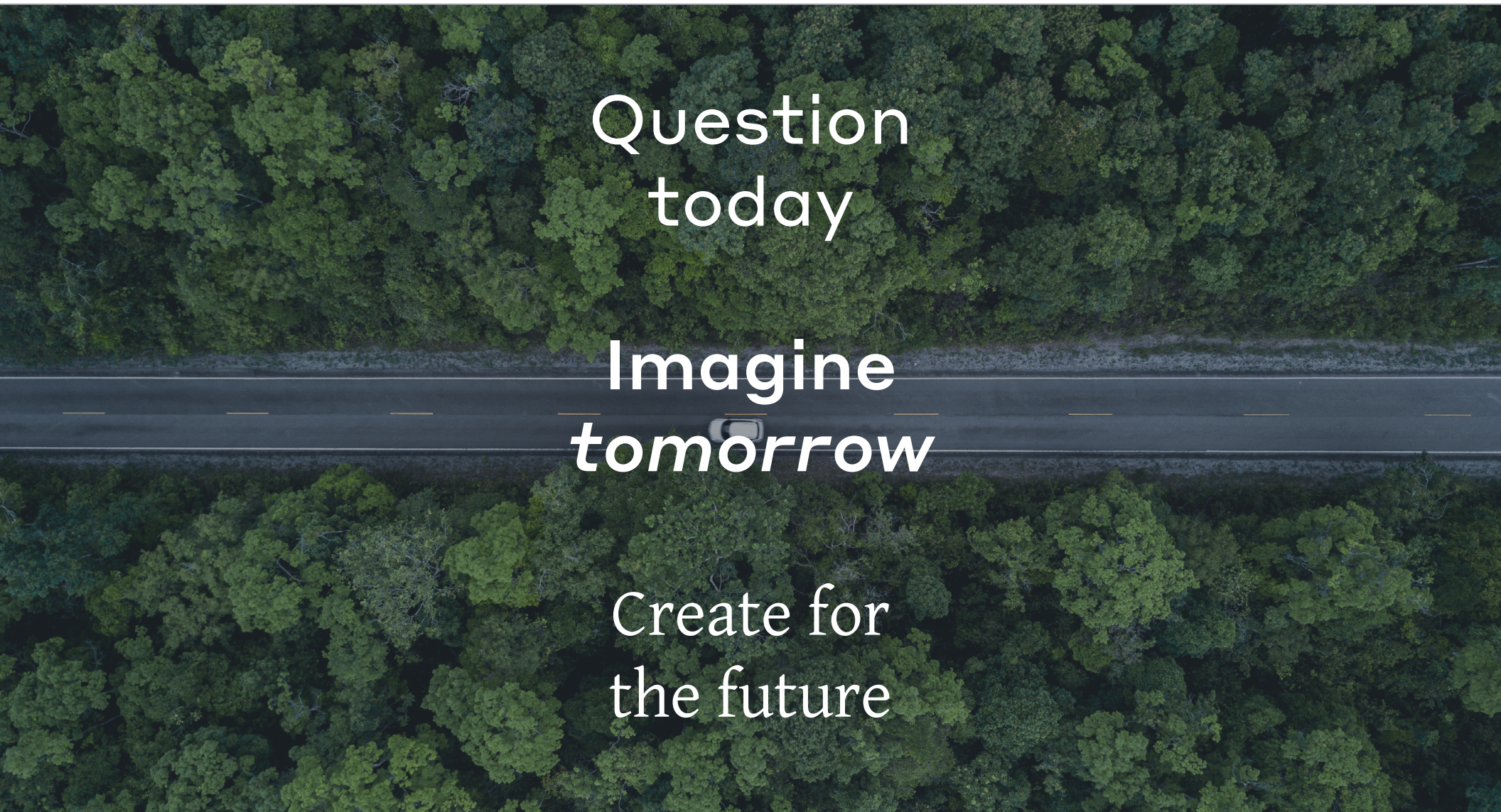
## % Reduction If Reusing Steel



## Conclusion

The Structural Decarbonization Team exemplifies our company's core values and guiding principles through their exceptional contributions to sustainability and environmental stewardship.

Their leadership, innovative thinking, and collaborative approach have laid the foundation for a more sustainable future. We are proud to nominate them for the In-House Initiative award and believe that their efforts deserve the highest recognition.

An aerial photograph of a two-lane asphalt road cutting through a dense, lush green forest. The road has yellow dashed lines on the sides. A small white car is visible in the distance on the road. The text is overlaid on the image in white.

Question  
today

Imagine  
*tomorrow*

Create for  
the future