GLOTMAN | SIMPSON
ESTABLISHED IN 1964

EMBODIED CARBON ACTION PLAN

2025-2026

Founded on the west coast, Glotman•Simpson has fully embraced the innovative side of sustainable building design.

GLOTMAN | SIMPSON
ESTABLISHED IN 1964

VANCOUVER | VICTORIA | CALGARY | KELOWNA | TORONTO | LOS ANGELES

2025-2026 SUSTAINABILITY COMMITTEE

Rory Roberts, Director of Sustainability
Harrison Glotman, Principal

Aniket Tolani
Bia Jacob
Georgia Rea
Marcus Monk
Miguel Bilotta
Omar AlHarras
Parsa Taghvaei
Ryan Nikiforuk

To the SE 2050 team and signatory firms,

2025 marked a turning point. For the first time, embodied carbon was not a separate conversation—it was simply part of how we design.

Since becoming an early signatory to SE2050 in 2021, we've spent the past several years building the tools, knowledge, and internal alignment needed to meaningfully reduce embodied carbon in our projects. This year, that foundation translated into action. The integration felt natural, and the outcomes more consistent.

Whether driven by evolving regulations or a broader sense of responsibility to the public, the industry is clearly reaching a point of readiness. The question is no longer if we act, but how well we do it.

We're proud of the progress we've made as a firm and of the systems now in place to support continued improvement. Our hope is that this ECAP offers practical insight—something others can build on as we move forward together.

RORY ROBERTS
Director of Sustainability

FEATURED IMAGES: TITLE PAGE - ST. GEORGE'S SENIOR SCHOOL (VANCOUVER, BC);
LEFT PAGE - PROTOTYPE (VANCOUVER, BC)

PROGRESS OVER THE YEARS

2021

2021 marked Glotman Simpson's commitment to the SE2050 movement, reinforcing our commitment to lowering embodied emissions in buildings.

SE2050 COMMITTING TO NET ZERO

2022

We summarized our milestones in the firm's first full ECAP year. We also started using Tally to track embodied carbon in select projects.

2023

We launched OnTrack, an educational blog series featuring research topics and case studies that highlight our firm's commitment to building decarbonization, while also updating all of our internal structural design tools to report embodied carbon.

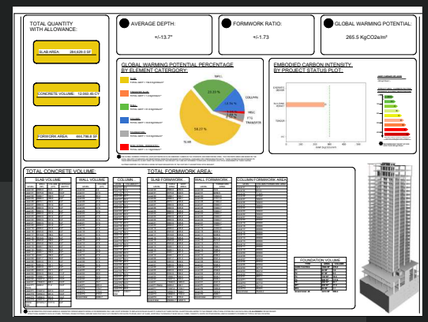
Highlighted Blogs:
https://glotmansimpson.com/on-track-glotman-simpsons-journey-to-net-zero/

2024

We formalized the Sustainability Committee as part of the Engineering Standards Group within the firm. We also updated our general notes to include sustainability metrics by default. We developed a coversheet on all of our drawings and a plug-in that calculates and reports embodied carbon on all of our projects.

WHERE WE ARE:

2025



We released our internal Life cycle assessment (LCA) tool for concrete and steel buildings. We measured the ECI for projects issued for construction as 380kgCO_2e/m^2 based on the VBBL methodology, and 242kgCO_2e/m^2 based on the SCORS methodology.

2026

We plan to expand our LCA tool to cover all forms of timber construction too.

We are developing our standard workflow to include embodied carbon considerations on all projects form the outset.

2030

To hit net zero by 2050, GS expects to achieve a minimum of 20% reduction from the 2025 benchmark every 5 years.

The 2030 target for GS' projects is:
304kgCO_2e/m^2 (VBBL)
194 kgCO_2e/m^2 (SCORS).

2050

Along with all other signatory firms, we plan to achieve the globally stated goal of net zero carbon by 2050.

TABLE OF CONTENTS

Glotman•Simpson has provided structural engineering consulting services for 60+ years.

With over 5,000 projects completed to date in the areas of residential, commercial, industrial and institutional buildings.

For 60 years, Glotman•Simpson has engineered some of North America's most iconic structures. We believe that exceeding client expectations begins and ends with superior service. Our commitment to creative thinking and sustainable structural design is representative of our dedication to creating value for our clients. and future generations.

Our firm currently retains a staff of 100 including 50 engineers, who are part of the creative engineering behind some of the most iconic structures in Vancouver, across Canada and throughout North America.

IMAGE: 843 N SPRING STREET (LOS ANGELES, LA - USA)

2025 IN REVIEW

At Glotman•Simpson, sustainability is a mission that drives every facet of our work, with embodied carbon reduction in building design at the forefront of our priorities. Through our Sustainability Committee, we have cultivated a dedicated group of individuals passionate about fostering a culture of innovation, education, and advocacy, through data-driven application of initiatives to make a positive impact on the built environment.

1. We released monthly GS On Track blog posts, an educational compilation of research topics, providing insights into our firm's dedication to building decarbonization and furthering the SE 2050 movement. This series serves as a platform for sharing updates on sustainability design trends, policy changes, observations from our design work, and introductions to the innovative automation tools and BIM plug-ins we've developed.

2. We expanded the use of our BIM-integrated LCA Tools, designed to automate the tracking of embodied carbon throughout a project's lifespan. ultimately creating diagrams to provide a clear visualization of the carbon intensity of different structural elements. Our staff now completes an LCA on all concrete and steel projects when they are issued for construction.

3. We calculated an internal embodied carbon intensity benchmark based on 26 projects that were completed in 2025. We will now be able to check our progress towards net zero moving forward, measuring improvements in both structural efficiency and material carbon intensity.

4. We analyzed 26 LCAs to assess different projects against embodied carbon intensity, releasing the findings to the wider public and forming a strong base for future work.

5. We collaborated with many other initiatives (CLF, Woodworks, AHJs) to further the development of low-carbon policy and educational tools.

6. We have developed relationships with major materials suppliers in the markets we operate, ensuring we are aware of low-carbon material offerings, and we contribute to works that furthers the integration between suppliers and designers.

Needless to say, Glotman•Simpson remains strongly committed to the SE 2050 movement.

IMAGE: SOLO (SOO VALLEY, BC - CANADA)

EDUCATION

Our journey towards sustainable practices begins with knowledge, and we firmly believe that knowledge should be shared.

Our journey towards sustainable practices starts with knowledge, and we firmly believe in sharing this knowledge openly. This belief has inspired the continuation of our "OnTrack" blog series, a comprehensive educational resource covering various research topics. Through this series, we offer insights into our firm's unwavering commitment to decarbonization and advancing the SE 2050 movement. Serving as a platform for dialogue, the series shares updates on sustainability design trends, interpretations of policy changes, observations from our design projects, and showcases the innovative automation tools and BIM plug-ins we've developed. Internally, our Sustainability Committee convenes monthly, collaborating closely with our Automation Team to develop internal tools for tracking and reducing embodied carbon. Moreover, the Sustainability Committee actively engages with suppliers and vendors of sustainable building materials, ensuring our entire team remains well-informed about the latest technologies for reducing embodied carbon.

WITHIN OUR COMPANY

CHANGE STARTS FROM WITHIN. In 2025, engagement within the firm remained strong. Sustainability-focused webinars attracted high attendance and participation across the company, while the sustainability committee continued advancing its work, developing updated tools and guidance to help our engineers integrate sustainability into their designs effectively..

KEEPING UP WITH BUILDING MATERIALS

WE TAKE PROACTIVE STEPS TO FOSTER PARTNERSHIPS WITH SUPPLIERS AND VENDORS SPECIALIZING IN SUSTAINABLE BUILDING MATERIALS. Through these engagements, we ensure that our entire team remains updated of the latest advancements and innovations in technologies aimed at reducing embodied carbon in our projects. By staying connected with industry leaders and staying informed about emerging trends, we empower our team to make informed decisions that align with our commitment to sustainability.

2025 ELECTIVES

1. **Engineer Engagement** The Sustainability Committee welcomes staff from all offices to join and participate. We actively share resources, presentations, and insights to ensure equal access to educational opportunities for everyone.

2. **Resource Sharing** We presented multiple webinars on embodied carbon and made our recordings available to all staff. Webinars were either developed internally, sourced externally with permission, or accessed from public sources. Some examples include:

Automation Info Forum
(Internal)
March 19, 2025

Engineering Info Forum
(Internal)
December 12, 2025

Heidelberg materials low carbon concrete offering
(External)
March 18, 2025

3. **Staff Onboarding** Our onboarding process includes a dedicated module on Embodied Carbon, using resources such as the Embodied Carbon Video Training Series provided by the Carbon Leadership Forum (CLF). This ensures that all staff—technical and non-technical—develop a baseline understanding of embodied carbon from the start. By integrating this training, we reinforce our firm's commitment to reducing embodied carbon and embedding sustainability into our culture from day one.

4. **Staff Training** Regular training sessions, led by both internal and external experts, ensure continuous professional development. Processes and guides are consistently reviewed and updated to support best practices and operational excellence.

5. **Embodied Carbon Interest Group** Our Sustainability Committee prioritizes embodied carbon reduction in all aspects of its work. Every meeting, initiative, and research effort considers embodied carbon reduction and its integration into our projects and practices.

6. **Internal Resource Hub** We have an intranet that has all of our existing resources for all of our staff. Within this intra-net we have a dedicated sustainability section which contains all tools and guides.

7. **CLF Regional Hub** Our team actively participates in CLF Regional Hub activities, including attending presentations and working sessions and sharing insights with the firm. We have also contributed to the broader conversation by sharing a case study with the CLF BC chapter, fostering knowledge exchange within the industry.

IMAGE: SOLO (SOO VALLEY, BC - CANADA)

REPORTING

We utiilize technology to report on key data, influence industry standards, and drive continuous improvements in engineering and sustainability practices.

Our commitment to automation goes beyond improving internal efficiency, aiming to set a new industry standard. This vision is reflected in our in-house LCA tools, which deliver embodied carbon data quickly and effectively. By combining innovation with a commitment to sharing tools and knowledge, we support broader decarbonization goals and promote more sustainable practices across the construction and design sectors.

SCHEMATIC DESIGN EMBODIED CARBON TOOL

To leverage early design decisions, our SD tool allows accurate material quantity estimation and LCA statistics based on approximate building areas and typical structural assemblies. We use this to take the guess work out of early decisions and ensure projects start on the right track.

GS' STRUCTURAL ENGINEER'S LCA TOOL

With direct links to our Revit models, we can turn precise quantity data into structural LCA outputs in minutes. delineating LCA outputs by structural element creates an environment for much more detailed understanding of carbon sources in our projects. Compiling all of this data allows analyses across a broad range of projects with similar characteristics to find low-carbon trends.

STEVIE: FOR EMBODIED CARBON VISUALIZATION

STEVIE, OR THE SUSTAINABLE TECH TOOL FOR EMBODIED CARBON VISUALIZATION OF INTEGRATED EFFICIENCY, IS A BIM-INTEGRATED TOOL DESIGNED TO AUTOMATE THE TRACKING OF EMBODIED CARBON THROUGHOUT A PROJECT'S LIFESPAN. STEVIE pulls real-time life cycle assessment (LCA) data, material quantities and construction document graphics showing the project's GWP intensity and contributions from various elements. This process is repeated at key milestones, with an embodied carbon tracker and charts to visualize the carbon intensity of different structural elements, enabling targeted reduction strategies.

DESIGN SPREADSHEETS

OUR IN-HOUSE DESIGN TOOLS INCLUDE A GWP CALCULATOR. Designers can use it in real time to assess the embodied carbon impact of their ongoing designs. This transforms the tool into a powerful resource, enabling comparisons between lower-carbon alternatives and different options for clients. Ultimately, it empowers our designers to suggest low-carbon design solutions and clearly communicate their environmental impact.

2025 ELECTIVES

1. **Data Reporting** We have submitted project data to the SE 2050 Database and continually collect data throughout the year for ongoing uploads.

# OF PROJECTS SUBMITTED IN 2025:	TTOTAL AREA OF PROJECTS SUBMITTED:	GS SUBMISSIONS GWP INTENSITY (A1-A3):
26	11,365,456 SF	193kgCO_2e/m^2

2. **Responsible Buildings Pact** In addition to SE2050, our firm is active in the Climate Smart Buildings Alliance (CSBA) Responsible Building Pact (RBP). This voluntary agreement promotes the consistent use of lower carbon materials when appropriate, helping to bring more low-carbon options online and accelerate the shift toward sustainable building practices. Through the Pact, we aim to de-risk sustainable actions, foster shared accountability for material decisions, and raise professional standards across the industry. Our Director of Sustainability is also part of the steering committee for the Pact.

# OF SUBMITTED PILOT PROJECTS THROUGH RBP:	ESTIMATED EMBODIED CARBON REDUCTIONS AS A RESULT OF THE LOW CARBON CONSIDERATION PROCESS
3	1,800 tCO_2e

3. **Embodied Carbon Project Comparison** By following standardized procedures, we have been able to collect and compare our LCA data across various metrics.The following page spread showcases some of our conclusions.

4. **Structural Material Quantities** We are including all structural material quantities in our submissions to the SE2050 database. We are submitting IFT or IFC projects for this purpose.

5. **Company-Wide Measuring Standard** We have developed internal guides to ensure each engineer is following the same procedures and selecting appropriate regional data. We have also completed internal webinar-based training and provide hand-on guidance when requested.

IMAGE: TELUS GARDEN (VANCOUVER, BC - CANADA)

LCA INSIGHTS

The key benefit of collecting LCA data through standardized methodology is that it enables comparison. Alongside the standard ECI data, we have been recording project characteristics and detailed element-by-element ECI data.

26
PROJECTS SUBMITTED

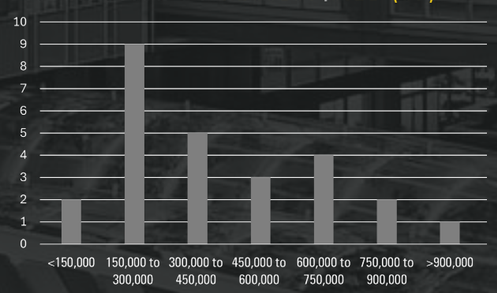
TOTAL AREA OF PROJECTS SUBMITTED:
11,365,456 SF

GS SUBMISSIONS GWP INTENSITY (AI-A3):
193kgCO_2e/m^2

DISTRIBUTION BY USAGE

- **20** MULTI-FAMILY
- **2** HEALTHCARE
- **2** OFFICE
- **2** LODGING

DISTRIBUTION BY PROJECT SIZE (SF)



DISTRIBUTION BY FOUNDATION TYPE

FOUNDATION	COUNT
Shallow Conventional Foundations	22
Shallow Raft	3
Shallow Piled	1

DISTRIBUTION BY STRUCTURAL SYSTEM

PRIMARY HORIZONTAL GRAVITY SYSTEM	PRIMARY VERTICAL GRAVITY SYSTEM	PRIMARY LATERAL SYSTEM	COUNT
Concrete: Non-PT Framing	Concrete: CIP	Concrete: Shear Walls	23
Concrete: PT Framing	Concrete: CIP	Concrete: Shear Walls	1
Steel: Frame + Concrete on Metal Deck	Steel: Columns	Concrete: Shear Walls	1
Wood: Engineered Panels	Steel: Columns	Concrete: Shear Walls	1

STUDY 1: BASEMENT SIZE

With many of our projects in the Vancouver area, we have found ourselves assisting in LCAs for permit applications. The City of Vancouver (CoV) mandates the GFA only include above-grade interior areas, as that relates to the primary functional use. As a result, there is a clear alignment between large parkades and higher embodied carbon intensity (ECI). Thus, we recommend discussions with the project team to:

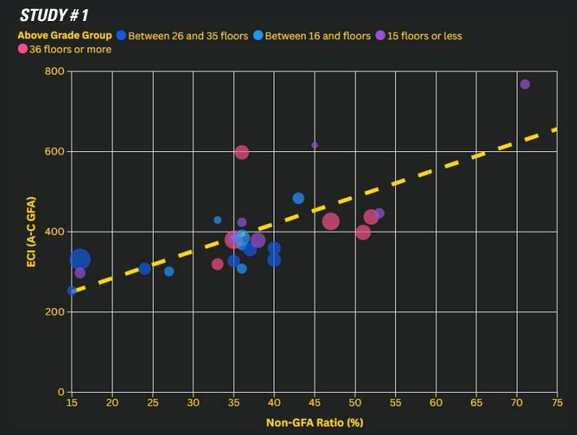
- Consider the parking needs for the project to reduce the large amount of material required for basement structures.
- Consider the massing of the project to maximize the gross floor area over the basement below to avoid large roof areas over parking and podium structures.

STUDY 2: BUILDING HEIGHT

We are fortunate to have a significant amount of our data from a similar typology of building with 23 concrete high rise projects in Vancouver's lower mainland. With all of these projects designed under the same design codes and assessed the same way we are able to review the effect of building height on ECI with less noise in the data. One of the most interesting results from this data set was the suggestion that there may be an optimal building height between 25 and 35 above-grade levels (approximately 260' to 380' tall). We have three main theories that we are exploring as we continue research in this area:

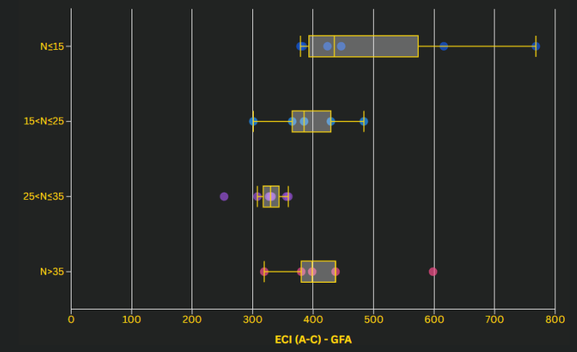
1. These types of structures often end up with efficient 3-bay elevator cores, the plan dimensions of these circulation cores balance the seismic strength and stiffness demands efficiently, reducing the ECI associated with the LFRS.
2. In BC, this height of building balances the wind and seismic forces effectively which leads to less material associated with the shear walls and foundations. Shorter buildings can be more stiff and can attract a larger proportion of their mass in an earthquake. Taller buildings must manage accelerations under wind effects to make sure the occupant is comfortable.
3. ECI for shorter buildings (<15 floors) can be significantly skewed by changes in the GFA ratio mentioned earlier, poor ground conditions, or inefficiencies in the lateral system.

STUDY # 1

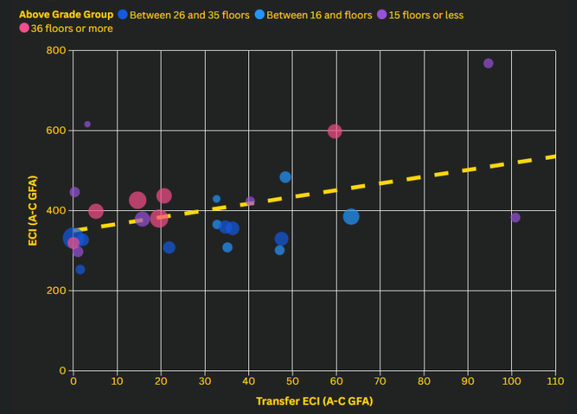


STUDY # 2

ECI of concrete towers by number of levels



STUDY # 3



STUDY 3: BUILDING TRANSFERS

When building usages result in column grids not being able to stack, we must design structural transfer elements to move column loads between these mismatched columns. As these often occur near the base of the building (e.g. where residential column layouts do not suit commercial or parking layouts), these can be very significant.

It is evident that the additional transfer ECI results in a higher overall project ECI. This is not only due to the inherent ECI in the transfer structure, but also the knock-on effects from the increased mass at that level (larger shear walls, columns, and foundations).

This reinforces the importance of initial engineering input early in an a project, particularly focusing around minimizing transfers to save money and help maintain the construction schedule. Now, we can also show that there is a significant embodied carbon premium reduction too – somewhere in the range of 20-60 kgCO2e/m2 or 5-10% of the project's ECI.

IMAGE: TELUS GARDEN (VANCOUVER, BC - CANADA)

EMBODIED CARBON REDUCTION STRATEGIES

We are committed to integrating embodied carbon reduction into our design practices and service offerings through in-house tools, GWP calculators, education, and industry collaboration.

As embodied carbon policies continue to develop across North America, the construction and engineering sectors are facing a significant challenge to adapt their methods to meet new policy and permitting requirements. For our firm, the core of this transformation lies in integrating a comprehensive embodied carbon reduction plan into both our design practices and service offerings. Through in-house technology tools, integrated GWP calculators, ongoing education seminars, and continuous collaboration within the design community, we are committed to consistently reducing embodied carbon in our design.

EMBODIED CARBON REDUCTION PLAN SERVICES (ECRP)

As structural engineers, we can have a much larger impact on embodied carbon if we start discussions at the earliest stages of design. Our ECRP service follows the hierarchy principles of build less, build clever, build efficiently. We start by collaborating with the client and consultant team in the early stages of project massing to discuss efficient programming stacks and structural strategies that will lead to lower material quantities long before layouts are formalized – we are not yet bound by specific outlines that can lock in inefficient structural strategies such as transfers or excessive spans. We then develop a sustainability basis-of-design that serves as a guiding framework for making low-carbon design decisions throughout the remainder of the project. This includes tracking embodied carbon at regular intervals and providing carbon budgets to material suppliers to ensure conformance to the project goals.

2025 ELECTIVES

1. **Company Goals** In 2025. GS overhauled and standardized our embodied carbon measurement methodology. As mentioned in the previous section, we have recalculated our ECI benchmark as 380kgCO_2e/m² based on the VBBL methodology, and 242kgCO_2e/m² Embodied Carbon Intensit(ECI) based on the SCORS methodology. To achieve net zero 2050, we must reduce our company average ECI by a minimum of 20% every 5 years. We have publicly committed to this in our OnTrack blog series and our 2030 ECI targets are:304kgCO_2e/m²(VBBL)194 kgCO_2e/m² (SCORS).

2. **Circular Economy** Designing for deconstruction and reuse is a key pillar of the "build nothing, build less, build efficient" philosophy. GS believes designing efficient buildings in steel and timber suit the circular economy, allowing for bolted disassembly of regular sized structural materials. Similarly, when new material is specified, a high proportion of recycled material is required for steel products, and recycled concrete aggregate is encouraged.

3. **Early Stage Workflow** We have integrated specific sustainability kick-off meetings and LCA requirements into our workflow to enable early design decisions on embodied carbon, these early choices—such as material selection and structural design—have the greatest impact on the overall carbon footprint. By addressing embodied carbon at this stage, we can explore low-carbon alternatives and optimize design strategies before the design becomes fixed. We have developed a simplified LCA tool that can be used with basic building information to provide quantity, cost, and carbon data in the early project stages to inform decisions creating a Revit model, ensuring that sustainable decisions are made as early as possible in the project.

4. **Comparing design options and communicating embodied carbon impact** Findings in the schematic design phase must be communicated effectively to key stakeholders (architects and developers for example). The best way to encourage changes that increase structural efficiency and lower embodied carbon is to present clear graphics. We have spent significant effort developing standardized reporting and graphics that explain the distribution of embodied carbon by structural element. We pair this with material quantities to allow costing discussions alongside embodied carbon reduction.

5. **Specifications Update** We continue to develop our specifications as the industry shifts towards sustainable construction treating each project as a case study where we can identify areas to improve.

6. **LEED and ILFI Zero Carbon Participation** We enjoy working on a diverse range of projects and constantly challenge ourselves to meet the specific sustainability standards required, whether it's LEED certification, a target for embodied carbon reduction, or other project-specific goals.

7. **Collaborating with concrete supplier** The key consideration for effective collaboration whit all material suppliers is clear requirements and minimal restrictions. When considering concrete, GS will only provide a single carbon budget for all concrete while encouraging the use of SCMs and GUL cement where appropriate. This provides the most freedom to the mix designers to be aggressive with carbon reductions while ensuring project schedules and costs aren't effective. In projects to date, we have found this dialogue very effective.

8. **Measuring Concrete Carbon Intensity** On a recent healthcare project, we worked directly with concrete suppliers in a rural area providing them with the appropriate properties and considerations to create EPDs while meeting embodied carbon targets for LEED accreditation. Discussing the critical elements, which were footings and shear walls, early was key to ensuring we set achievable targets.

9. **Sustainably Harvested Biogenic Materials** We work on a variety of wood-frame and mass timber projects and specify sustainable harvesting practices in our general notes to ensure the materials used are responsibly sourced.

IMAGE: MOUNT CARMEL SPIRTIUALITY CENTRE (CALGARY, AB - CANADA)

KNOWLEDGE SHARING NARRATIVE

We communicate our embodied carbon reduction efforts externally by sharing our successes, lessons learned, and strategies with the design community and the public.

At the core of our firm is a strong belief in the power of knowledge sharing and building community to inspire and drive sustainable change. Our impact reaches beyond our projects, influencing the communities and industries we serve. Whether through digital platforms, client presentations, or collaborative efforts, our aim is to spark and sustain a shared vision for a lower-carbon future.

ONLINE PLATFORMS

CHAMPIONING SE 2050 IN ONLINE. We actively support the SE 2050 movement by sharing embodied carbon reduction messaging on our online platforms. Through consistent updates on our website and social media, we emphasize the importance of SE 2050 and offer educational resources to increase awareness and promote understanding within our digital community.

CLIENTS

TARGETED PRESENTATIONS, TAILORED FOR OUR CLIENTELE. We engage with our clients through targeted presentations, demonstrating the feasibility and potential embodied carbon reductions that can be achieved through early design decisions. Whether it's reusing materials like existing steel beams or optimizing structural layouts and systems, we consistently advocate for embodied carbon reductions in line with SE 2050's core principles. By sharing these insights, we enable our clients to make informed choices that help reduce embodied carbon in their projects.

COMMUNITY

SHAPING THE COMMUNITIES WE SERVE WITH SUSTAINABILITY-DRIVEN COLLABORATIONS. Beyond our client relationships, our firm is deeply engaged in local communities, particularly in Vancouver and Los Angeles. In Vancouver, we actively collaborate with the CLF BC, contributing to community-driven initiatives that promote sustainable practices. we also have been lucky enough to be invited to provide advice and guidance to other regulatory and municipal bodies, helping to further the future of embodied carbon legislation.

2025 ELECTIVES

1. **Showcasing SE 2050 Value** As part of our commitment to spreading the word about SE2050, we ensure that both existing and potential clients are aware of our involvement in the initiative. We emphasize our pledge in all our proposals, with the hope that by seeing it regularly, clients will be reminded of the importance of embodied carbon reduction and encouraged to give it greater consideration for their projects.

2. **2050 Pledge Declaration** We are proud to be members of the SE2050 initiative and actively share our commitment through various external channels, including our presentations, online presence (social media and website), as well as our proposals.

3. **External Presentations** We enjoy leveraging our industry relationships to organize regular lunch and learns with developers, architects, and municipalities. We are able to share case studies from successful projects, general EC reduction strategies, and project workflows that will ensure future projects can maximize their embodied carbon reduction potential. In 2025, we presented to 8 separate companies on embodied carbon measurement and reduction strategies.

4. **Mentorship** GS welcomes the opportunity to workshop embodied carbon strategies and share out knowledge with others. We find our guidance is most helpful in identifying appropriate EPD selections, and providing narratives on baseline buildings where required for different structural systems.

5. **Engaging with Supplier** We often see a knowledge gap between design LCAs and construction practices. One of our angles of research involves collaborating with material suppliers to explain how construction practices affect material carbon intensities. We are excited to share a case study for concrete in 2026 that will enable earlier discussion of the implications with developers before contracts are signed and as early as schematic design.

6. **Government Engagement** Several members of our team engaged with local, state, and federal governments to emphasize the importance of low embodied carbon procurement and construction policies. They participated in City of Vancouver presentations on the VBBL guidelines and provided feedback on their implementation.

IMAGE: 365 RAILWAY (VANCOUVER, BC - CANADA)

ON TRACK

JOURNEY TO NET ZERO AND HOW WE PLAN TO STAY

Our On Track series explores what levers we can pull to reduce the environmental impact of building structures. The need to accelerate climate action in the form of innovative solutions that minimize both operational and embodied carbon is imperative and represents a critical part of a low-carbon future.

JANUARY 2025

We're doubling down on embodied carbon reduction by expanding our LCA tools and strengthening how we track progress. This sets a clear foundation for how sustainability shows up in our work throughout 2025.

MARCH 2025

On a recent university project, strategic structural decisions significantly reduced embodied carbon. Smarter system choices in towers and podiums made a measurable difference.

MAY 2025

Overlooked elements can drive real carbon impact. Partition choices alone can shift embodied carbon by up to 70 percent, reinforcing the importance of material selection at every level.

JULY 2025

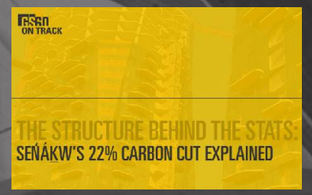
At a recent technical retreat, Glotman Simpson explored how engineering innovation can cut embodied carbon at its source.

FEBRUARY 2025

We're rethinking concrete specifications to reduce environmental impact without adding cost or complexity. The focus is on practical changes that fit seamlessly into real projects.

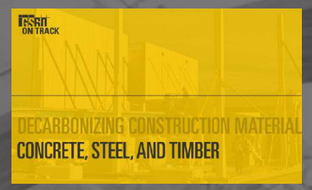
APRIL 2025

Carbon tracking is now embedded in our design process. By linking LCA tools with BIM, we can identify high-impact decisions early and optimize structures in real time.



JUNE 2025

At Senákw Phase 1 in Vancouver, targeted structural decisions reduced carbon while improving efficiency. Optimizing parking, concrete, and column systems eliminated over 7,800 tonnes of embodied carbon.



AUGUST 2025

We're seeing steady reductions in the carbon footprint of concrete, steel, and timber. Advances in materials and processes are starting to translate into real project outcomes.

SEPTEMBER 2025

Higher rebar density doesn't always mean inefficient design, especially when concrete volumes are low. Looking at metrics like rebar per unit area can provide a more accurate picture of performance.

NOVEMBER 2025

What if there were an even smarter way to tame wind and earthquakes, one that goes beyond the conventional design playbook? This article introduces the next step in that evolution: Performance-Based Design (PBD).

OCTOBER 2025

Viscous damping devices are becoming part of our core innovation toolkit. We're integrating them into upcoming tall buildings to reduce structural demand while improving overall efficiency.

DECEMBER 2025

In 2025, we analyzed twenty-six projects across a wide range of scales to measure embodied carbon intensity. The results provide a clearer benchmark for where we are and where we need to go.

PHOTO: TELUS GARDEN (VANCOUVER, BC)

CASE STUDY -SENÁKW PHASE 1

PROJECT OVERVIEW

OWNER	Nch'kay West (Nch'kay Development Corporation and Westbank Projects Corp)
ARCHITECT	Revery Architecture
STRUCTURAL ENGINEER	Glotman Simpson Consulting Engineers
BUILDING TYPE	Residential (Multi - Family)
GFA	93,781 m2 (1,009,450 SF)
LOCATION	Vancouver, BC
PROJECT STAGE	Under Construction
ASSESSMENT PERIOD	60 Years

A landmark Indigenous-led development by the Squamish Nation, Senákw is located at the south end of Vancouver's Burrard Bridge. Delivering 6,000 rental units over 11 towers across four phases, it is one of Canada's largest urban Indigenous housing projects. Designed to be car-light and carbon-conscious, Senákw emphasizes high-density housing, extensive cycling infrastructure, and a transit hub—making it a model for sustainable, self-determined development on Indigenous land.

We respectfully acknowledge that the Sen á w development is located on the unceded territory of the Skwxwú7mesh Úxwumixw (Squamish Nation), who lead this project with vision and sovereignty. We also recognize that our work is conducted on the traditional, ancestral, and unceded territories of the Skwxwú7mesh (Squamish), S l ilw ta / Selilwitulh (Tsleil-Waututh), and xwm kw y m (Musqueam) Peoples. We are committed to ongoing learning, reconciliation, and partnership in all that we do.

OBJECTIVE

Glotman Simpson conducted this embodied carbon study at the request of the City of Vancouver to provide technical insight and performance commentary on how the Senákw development would fare under the embodied carbon requirements in the 2025 Vancouver Building By-law (VBBL) – with a reduction 'f' factor of 0.9, i.e. a 10% reduction.

CATEGORIZING THE FUNCTIONALLY EQUIVALENT BASELINE BUILDING:

Per the proposed VBBL requirements, it is assumed that 0.54 stalls per rental unit will be provided in the baseline building. This would result in an additional 760 parking stalls – an additional three levels of below-grade parking. In addition to this, a typical car-focused parking structure would typically be optimized for three parking stalls between columns. This grid would not align with typical unit layouts, resulting in a transfer structure above the parkade. This would be a significant volume of concrete for towers of this height.

Outside these characteristics, it is assumed that the structural system is similar, and the same concrete strengths would be required. In the baseline categorization, it is also assumed that all concrete mixes are at 28-day strength per the CONCRETE BC industry average EPDs.

OVERALL RESULT

TARGET	RESULT
487 $kgCO_2e/m^2$ (10 % reduction)	423 $kgCO_2e/m^2$ (22 % reduction)
REDUCTION vs BASELINES	
↓22,000 yd^3 CONCRETE	↓2,670 t REINFORCING

$12.0M COSTS SAVED

11,040 tCO2e CARBON SAVED

REDUCTION STRATEGY # 1

REDUCE FLOOR AREA OF BELOW-GRADE CONSTRUCTION

This project's key strategy for reducing embodied carbon aligns with other environmental strategies,removing the focus on personal vehicle infrastructure. Providing only 106 vehicle stalls across the site removed three below-grade levels from the extensive site footprint. The project replaced the parking stalls with much more efficient bicycle storage and a transit hub adjacent to Burrard Street.

RESULT

3 parking levels removed
18,000 yd^3 of concrete saved
2,100t reinforcing bar saved
↓ 7,800 tCO_2e
↓ $9.5 million

REDUCTION STRATEGY # 2

DESIGN STRUCTURE FOR MATERIAL EFFICIENCY

Early choices to slope the columns and align them to the below-grade structure enabled GS to design the building without transfers. A typical baseline building would have required an extensive transfer at L2 to suit the parking layout below. These transfer structures would have been 52", 72", and 84" deep, respectively, across the three towers. This simple change resulted in 4% savings in embodied carbon across the project, when only contributing 1.5% of the building slab area.

RESULT

L2 transfer slabs 95% removed
4,000 yd3 of concrete saved
570t reinforcing bar saved
↓ 1,800 tCO_2e
↓ $2.5 million

REDUCTION STRATEGY # 3

SELECT LOWER-CARBON STRUCTURAL AND ENCLOSURE MATERIALS AND ASSEMBLIES

Vertical building elements do not see full design loads until months after they are constructed. We specified 56 or 91-day strengths for this reason, allowing lower overall cement paste, while also encouraging higher SCM usage. The carbon intensity of these mixes can be approximated by the GUL 40SCM mix GWP intensities provided by CONCRETE BC and has no cost premium due to the lower overall cement content.The concrete BC baseline mix GWP intensities, set in 2018, are no longer representative of typical supply in Metro Vancouver. The concrete supplier confirmed that the carbon intensities attributed to the GUL 15SCM mixes are appropriate for the current material supply, again at no cost premium.

It is recommended to never mandate a specific SCM percentage in concrete mixes, as this can often result in cost premiums. It is best to simply specify the total concrete carbon budget for the project. This will allow the supplier the most flexibility to meet the project goals via the multitude of mix design options. Smart and appropriate specifications will not result in cost premiums and ensure the project schedule is not affected.

RESULT

Delayed strength in vertical structure
↓ 1,000 tCO_2e
Use of GUL cement ↓ 440 tCO_2e
Overall savings ↓ 1,440 tCO_2e
= No cost premium/ potential cost savings

CONCLUSION

This project shows considerable cost (30%) and carbon (22%) savings when compared to a baseline building. This is the key result of driving carbon savings through early structural efficiency savings as opposed to late-stage material optimizations, which come at a premium.

Design Smart, Reduce Materials and Costs: Targeting building efficiencies early in the design timeline, in combination with lower-carbon materials where appropriate, will enable overall material reductions and cost savings.

This case study is based on content from the Carbon Leadership Forum British Columbia (CLF BC): "Senakw - Phase 1: Embodied Carbon Study."

Read the full case study on here.

IMAGE: SENAKW (VANCOUVER, BC - CANADA)

2025 LESSONS & 2026 GOALS

In 2025, we uncovered key lessons that will strengthen how we approach embodied carbon moving forward.

2025 marked a pivotal year in advancing our approach to embodied carbon. Through applied work, internal initiatives, and collaboration, we identified clear opportunities to refine our tools and strengthen early-stage decision-making. These key learnings will guide how we continue to evolve our strategy moving forward.

1. Traction is built through reposting and sharing across personal social media accounts. While company channels may have larger followings, it's personal networks that spark conversation, drive engagement, and extend reach in a more meaningful way.

2. Our internal LCA tool has proven effective for concrete and steel buildings, particularly in assessing A1–A3 emissions. As we expand into timber, the next step is to establish a reliable workflow for generating material quantities. This will allow us to confidently extend our LCA efforts to timber projects and maintain consistency across all structural systems.

3. Knowledge-sharing presentations and workshops continue to be well received by architects and building owners. Framing material efficiency and savings as the primary strategy for reducing embodied carbon makes the conversation more accessible to project teams, while naturally aligning with core priorities like cost and schedule.

4. Material suppliers are responding well, with most major markets now offering both Environmental Product Declarations (EPDs) and a growing range of low-carbon products. Many are also providing accessible training and education, helping project teams better understand and integrate these options into their work.

5. Engineers can begin contributing without full project-wide buy-in by using streamlined tools to track structural efficiency. Benchmarking projects against a broader database of past LCAs introduces a level of peer comparison that encourages more efficient design, all within the constraints of the project.

In 2026, we're making bold strides in sustainability as we pass the halfway point between 2000 and 2050.

As we pass the midpoint between 2000 and the critical 2050 decarbonization target, 2026 marks a turning point for sustainability at GS. It sets the stage for the next phase of progress. Establishing an embodied carbon benchmark based on a full year of issued-for-construction projects (excluding light-frame timber) marks a significant milestone for our firm. It reflects several years of focused learning and development, and provides a clear foundation for continued progress.

We remain committed to advancing this work, with key 2026 targets outlined below.

1. Deepen industry engagement through more personal interactions. This includes expanding knowledge sharing efforts by hosting more presentations and workshops for developers, architects, and contractors.

2. Apply insights from our 2025 LCA studies directly into our design workflows. Given the multi-year nature of our projects, we expect to see a gradual reduction in reported GWP intensities over time.

3. Continue to advance and apply our LCA tool across projects. Measure, report, and compare 2026 results against 2025 to track progress and inform ongoing improvements.

4. Develop and integrate low-carbon considerations into our project workflows, enabling engineers to lead structured, informed discussions with project teams.

5. Release a minimum of two case studies in partnership with industry collaborators, continuing our involvement with organizations furthering embodied carbon reductions.

IMAGE: RICHMOND OLYMPIC OVAL (RICHMOND, BC - CANADA)

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