



Embodied Carbon Action Plan 2023

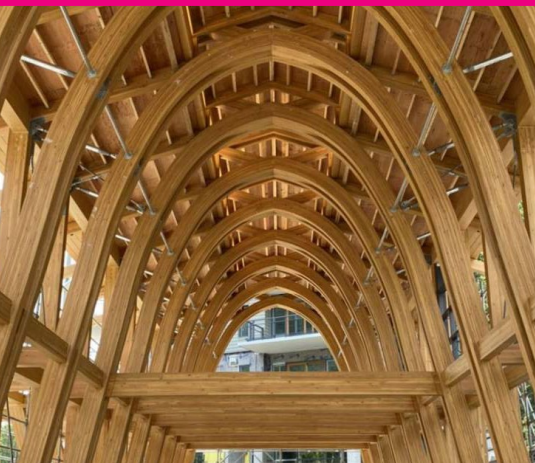




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About ASPECT

ASPECT was founded to be the next generation of structural engineering: mixing innovative strategies with experience, technical expertise and modern project delivery methods.

We are thinkers, tinkerers, listeners and doers. ASPECT Structural Engineers is a full-service structural engineering firm well versed in the design of a broad range of building types and structural systems. Founded as ACC Structural Engineers in 2014, we are now a cohesive team of 40+ engineers, technicians and support staff.

Our principals and staff bring diverse skills, engineering backgrounds and project portfolios, ranging from custom homes to athletic facilities, community centers, multi-family

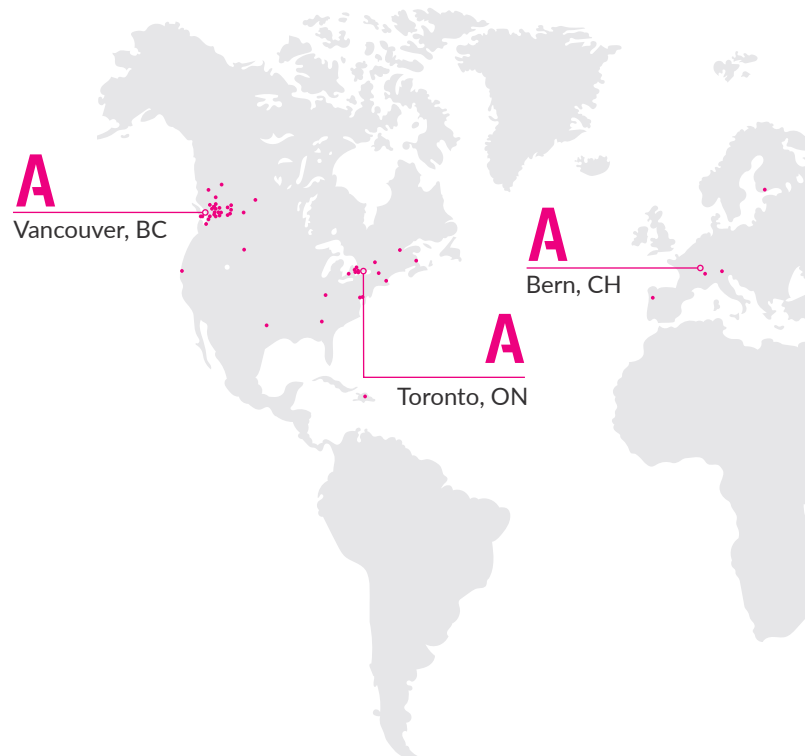
residences, schools, and theatres. Our firm specializes in architecturally expressive and complex structural design. We provide innovative solutions in all building materials, including concrete, steel, light wood frame, with particular expertise in mass timber. As a group, we have extensive experience with design solutions that complement the architectural intent, while always keeping constructability, budget and schedule paramount.

Our Commitment to SE2050

Accountability is one of Aspect's core values. Not only does this include accountability to all those with whom we work, but also to the environment. We must do our part to ensure that our planet is healthy and habitable for generations to come.

Buildings and construction account for around 40% of energy related carbon dioxide emissions. For typical buildings, the majority of this has historically come from the operational energy (heating, cooling, electricity for appliances etc.). However, with modern efficiencies in mechanical and electrical equipment, as well as better insulation methods and thermal envelope design, the proportion of embodied to operational carbon is increasing. By 2030 it is estimated that embodied carbon will account for 50% of the total carbon emissions over a building's life – making it the clear target towards reaching our carbon goals.

Aspect joined the SE2050 commitment in 2021, to ultimately eliminate embodied carbon in our projects by 2050. Through the SE2050 program, we will be able to track the embodied carbon impacts of our structural systems, assess the trends for various systems and establish achievable reduction targets over time.



Education

It is important to understand that in our line of work, our daily design decisions have a significant impact on sustainability. Therefore, we have assembled a team consisting of a lead at each of our three offices that has made it a priority to educate all employees about embodied carbon and encourage firm-wide engagement. Our goal is for all team members to consciously make decisions to reduce impacts where possible across all active and future projects. To do so, we host internal presentations and seminars, make resources available on the firm's intranet, and encourage informal firm-wide discussions on sustainability.

Electives

Provide a narrative of how the Embodied Carbon Reduction Champion will engage embodied carbon reduction at each office

- In addition to the ongoing work in our head office in Vancouver, the aim for previous years was to get someone in our Toronto and Switzerland office up to speed with the action plan and embodied carbon calculation so they can champion the East coast and Europe. This has now been achieved and they are driving the sustainability engagement in their respective locations.
- Employees in the Vancouver office are encouraged to read the Engineers and Geoscientists BC (EGBC) sustainability guidelines and implement carbon reduction strategies.
- The Toronto office has assigned an Embodied Carbon Calculation champion whose role is to support ECC calculations for every project and train others as needed.

Present at least (1) webinar focused on embodied carbon and make a recording available to employees

- Sustainability seminars have been prepared and presented to all 3 offices annually. The previous years' presentation topics, recordings of which are available on the firm's intranet, have been Introduction to the Embodied Carbon Calculation Tool and Concrete General Notes and Other Updates. This year's presentation topic is on circular design and the economy. The presentation will be held prior to the end of the fiscal year.

Incorporate embodied carbon education in your onboarding process for all new employees

- Since May 2022, all new employees are required to watch the recorded Sustainability Internal Education Seminars as part of the onboarding process.

Create an Embodied Carbon digital resource wiki and/or forum on your firm's internal website for staff to create, share, and discuss Embodied Carbon educational resources

- A Sustainability page has been created on our company's internal website where employees can view our ECAPs, various guidelines, past presentations and seminars, and resources among other things. This page is periodically updated to reflect current events and changes.

Provide narrative outlining plans for minimum (2) firm-wide presentations per year on the topic of embodied carbon

- Q3 2023 – Presentation on external local and global sustainability achievements for buildings
- Q4 2023 – Presentation on the Low Carbon Now initiative with BDP Quadrangle

Nominate an Embodied Carbon Reduction Champion for your firm

- Our Embodied Carbon Reduction Champion is Rachel Kazaka, based at our Vancouver office.

Reduction

Aspect recognizes that reducing the embodied carbon in our design solutions is key to meeting our goals. As we continue to collect data related to embodied carbon emissions and life cycle analysis, we plan to build a results database to compile all information that will allow us to draw conclusions and plan actions accordingly. In the future, we look to create an Embodied Carbon Calculation tool for US-based projects, and include the ECC requirement on internal project start-up/building permit/independent review design checklists.

Electives

Update your specifications to incorporate embodied carbon performance

- We have implemented a GWP rate to our concrete specifications.
- We are collaborating with a client, who we have a large portfolio of projects with, on how to legitimately accomplish a lower GWP on concrete supply. This involves Aspect being more involved in the tender process and a recognition that choosing the lowest priced tender will not likely be the answer.
- Additionally, we have had discussions with the President of Concrete Ontario on ways to progress the use of low GWP concrete in the local market.

Communicate the embodied carbon impacts of different design options to clients with creative and effective data visualization

- The results from the Embodied Carbon Calculation Tool can be used can be issued externally to clients in report form. The ECC report explains the entire process and why it is being done. It is also where comparisons can be made between schemes, material types, locations etc.
- An extract of the infographic from the Low Carbon Now initiative with BDP Quadrangle is presented to developers primarily for them to use as a guide for building net-zero multi-unit residential buildings. The Engineering study was led by Entuitive and supported by Aspect.

Participate in a LEED project design charrette

- Rachel Kazaka participated in a LEED project design charrette for an industrial-type project in Richmond, BC. One of the strategies discussed that impacts embodied carbon was the addition of a green roof, which would sequester carbon and significantly reduce energy consumption. However, as this meeting was held at a relatively late stage in the design phase of the project, the owner deemed the addition undesirable. As a result, it has been noted that LEED discussions should be held at an earlier design phase.

Incorporate sustainably harvested biogenic materials on at least one project

- As of 2021, the majority of our projects include wood products, so we're doing good there!



Reporting

Since committing to SE2050, Aspect has performed Embodied Carbon Calculations on several projects varying in size, location, and building material. We have a live internal ECC spreadsheet tool that can be used on any project. It analyses the Product stage (A1-A3) and the Construction Process stage (A4-A5) of a building's life cycle.

In order to accurately calculate the embodied carbon, the ECC spreadsheet draws data from the latest Environmental Product Declarations (EPDs) produced by governing bodies that preside over building materials.

If the project has been modelled in 3D (Revit) then the material quantities can be obtained easily through a schedule included in every new project. If not 3D, then hand calculations (aided by spreadsheets) can determine material quantities.

The results from the tool can be used internally or can be issued externally in report form. The ECC report explains the entire process and why it is being done. It is also where comparisons can be made between schemes, material types, locations etc. Results are then collected, and batch uploaded to the SE2050 Database.

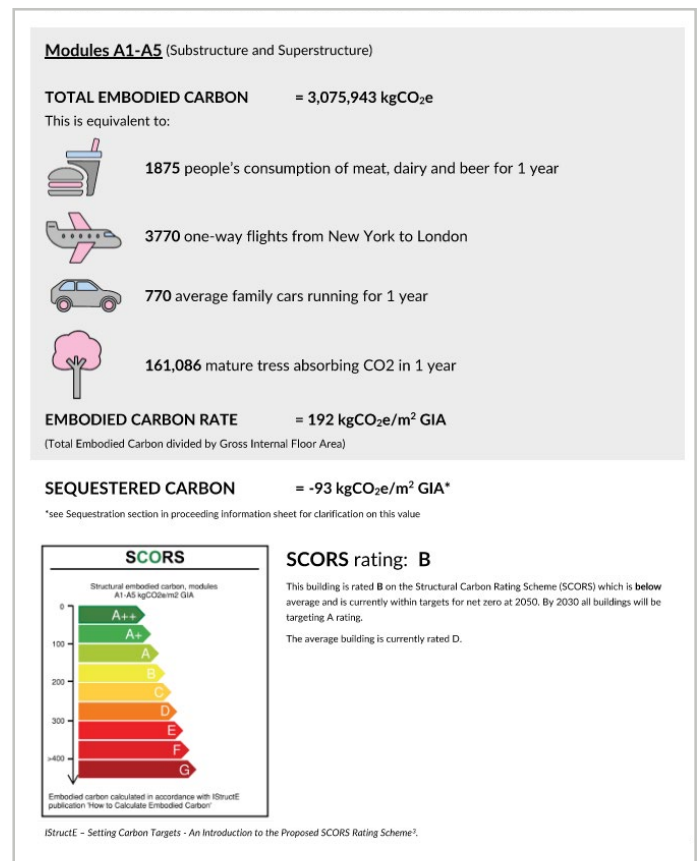
Electives

Submit a minimum of (2) projects with structural engineering services to the SE2050 Database

- We will submit data from the 2023 fiscal year to the database by March 2024.

For multi-office firms, describe how each office is measuring and reporting embodied carbon

- In addition to the above, we are working with The University of Toronto to help put together a large database of building material use. This involves sending multiple projects to the university for them to conduct their own quantity calculations and embodied carbon calculations.



Advocacy

While Aspect makes the push internally to bring sustainability to the forefront, we also recognize that industry-wide collaboration is needed to achieve our goals.

As of 2023, our firm has started publishing articles on our website where we explore methods to reduce the embodied carbon in buildings and steps towards sustainability. We touch on how we account for carbon and our approach to addressing the need for low carbon construction. In addition to publishing this information on the company's website, it is made public on social media platforms such as LinkedIn and Instagram.

Embodied carbon success stories related to our project work are proudly shared on the firm's LinkedIn page. Here, we see positive engagement from clients, industry members and the public.

We have also established regular meetings with other SE2050 committed firms to discuss efforts, explore strategies and share lessons learned.

Electives

Describe the value of SE2050 to clients

- We include a section on collaboration and data sharing within the ECC report which is issued to clients. This talks about our commitment to SE2050 and has direct links to SE2050.org.

Publicly declare your firm as a member of the SE2050 Commitment

- This is included in our proposals and will be added to our website.

Engage with structural material suppliers in your region to communicate the importance of Environmental Product Declarations (EPDs) and low-carbon material options

- As mentioned above, we are collaborating with a client, who we have a large portfolio of projects with, on how to legitimately accomplish a lower GWP on concrete supply. Additionally, we have had discussions with the President of Concrete Ontario on ways to progress the use of low GWP concrete in the local market.



Lessons Learned

Since our commitment to SE2050, we have learned some key takeaways from the calculations, studies, seminars, and community discussions:

Building Materials

- Concrete is a major issue and should be tackled by reducing its use in buildings as much as possible, then by reviewing the material specification.
- Lightwood frame buildings perform extremely well in terms of embodied carbon. We should be encouraging their use as much as possible over mass timber.

Limiting Concrete GWP

- We have implemented a GWP rate to our concrete specifications, however this is not being reviewed properly and consistently by contractors or concrete suppliers yet. We are actively pursuing this further on select projects and anticipate doing so at every opportunity going forward.

Early Project Engagement

- Early engagement in projects has proven to be beneficial. We had input on a project prior to re-zoning which meant we could help determine the building shape and basic massing, eliminating some transfer elements and reducing overall concrete volume.

Community Feedback

- We see positive feedback and engagement from clients, the structural engineering community, and the public when we post about our embodied carbon reduction work on our social media platforms.



Close Out

Time is of the essence and the construction industry needs to do more. We are actively trying to push our peers and the industry in the right direction, adding embodied carbon accounting requirements to building standards, advising on new guidance documents, and promoting the use of embodied carbon calculations. Aspect is active through industry collaborations, round tables, webinars, etc. As we work towards our commitment to SE2050, we hope to see further movement towards low-carbon construction, and we look optimistically towards positive results for the planet.



This **Embodied Carbon Action Plan** has been compiled in accordance with the SE2050 guidance. This is the third version. This document will be updated annually to reflect targets achieved, changes to plans and lessons learned.

The results from embodied carbon calculations in the period August 2022 – August 2023 will be uploaded to the SE2050 database in Q3 and Q4 of 2023. Following training of engineers, we anticipate that the entire company will be able to carry out calculations and we will be able to produce results more consistently in 2024 and onwards.