

2023



NORR

EMBODIED CARBON ACTION PLAN

SE 2050 Commitment Program

Year-2 Reporting Update

April 18, 2023



THE STRUCTURAL COMPONENTS OF A BUILDING ACCOUNT FOR ALMOST 50% OF THE TOTAL BUILDING'S EMBODIED CARBON

Our team is working collaboratively to transform and implement carbon reduction strategies through our stated actions in the NORR SE 2050 Embodied Carbon Action Plan (ECAP) that includes education and literacy, lifecycle tools and analysis, and measurement and reporting. Our Plan is critical to an achievable path to net zero embodied carbon structures.

INTRODUCTION

This document outlines NORR's Embodied Carbon Action Plan (ECAP) created in response to the Structural Engineers 2050 (SE 2050) Commitment Program. This commitment will contribute towards achieving carbon neutral structural engineering practices by 2050 in effort to combat climate change.

This initiative focuses primarily on the climatic impact associated with structural design and seeks to disseminate the tools, methodologies, and data provided by participating organizations to reduce or offset the embodied carbon (EC) inherent to the built environment. While recognizing the impact of the construction industry on greenhouse gas emissions worldwide, NORR is committed to reducing EC in its practices and emerging as an industry leader in sustainable structural design.

This Action Plan will provide an overview of the SE 2050 Commitment Program, then establish NORR's goals for achieving a reduction in embodied carbon for the 2022-2023 period.

This iteration of the ECAP will also outline the internal documents developed by NORR to assist in achieving the embodied carbon reduction strategies described herein. Ultimately, this document will outline and update the actionable steps NORR will take to develop, implement, and execute embodied carbon reduction strategies in its procedures. This report is the second ECAP submission as part of NORR's SE 2050 Commitment Program and therefore will reflect on progress made in the 2021-2022 program period, while reaffirming our commitment to the SE 2050 program requirements and beyond. With this Action Plan, NORR hopes to engage its employees even further beyond the scope of the SE 2050 Commitment Program and to help develop sustainable engineering practices as well as a better tomorrow.

SE 2050 COMMITMENT PROGRAM

The Structural Engineers 2050 (SE 2050) Commitment Program was created by the Carbon Leadership Forum (CLF) and is hosted by the Sustainability Committee of the Structural Engineering Institute (SEI) of the American Society of Civil Engineers (ASCE). The main challenge to be addressed by this effort is, as stated by the CLF, that “All structural engineers shall understand, reduce, and ultimately eliminate embodied carbon in their projects by 2050.”

THE FOUR AREAS OF FOCUS OF THE SE 2050 COMMITMENT PROGRAM



EDUCATION

Educating employees and enhancing professional development on topics related to reducing embodied carbon in design.



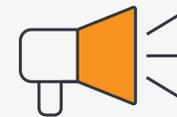
REPORTING

Measurement, tracking and reporting embodied carbon data and comparing determined EC values to predefined targets.



EMBODIED CARBON REDUCTION STRATEGIES

Reduce embodied carbon, document lessons learned in pursuing reduced-carbon designs and set embodied carbon goals for projects in design.



ADVOCACY

Share the goals of the SE 2050 Commitment Program and enhance outreach on the important topic of embodied carbon.



NORR EMBODIED CARBON ACTION PLAN

NORR's internal outcomes to be met by this Embodied Carbon Action Plan (ECAP) are presented in four categories and are ultimately achieved through the actionable steps presented herein. These outcomes form the base doctrine of NORR's environmental commitment and serve to direct this Action Plan.

ECAP VISION

“To establish NORR as an industry leader in embodied carbon best practices in structural engineering and ultimately assist in achieving industry carbon-neutrality.”

Through this vision and the implementation of the ECAP, NORR will affirm itself as a front runner in sustainable structural design. Within this vision, four primary missions will be accomplished through the ECAP.

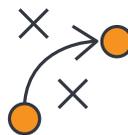
ECAP MISSION

Together, these four missions will establish the groundwork for the goals and strategies which will ultimately uphold NORR's vision and establish it as a hub for embodied carbon research, education, dissemination and execution.



1. MEET AND EXCEED REQUIREMENTS

The SE 2050 Commitment Program requirements will be met and exceeded through unique solutions that develop NORR's expertise in the field. While the SE 2050 guidelines provide a minimum standard to be met, in order to develop excellence in sustainable design and play a significant role in the health of the environment, this standard will be exceeded to achieve the objective by, or before, 2050.



2. IMPLEMENT NEW DESIGN STRATEGIES

New structural design strategies will be implemented to enable better assessment and reduction of embodied carbon. As the consideration of embodied carbon is an emerging and growing field, new tools and methodologies will be adopted to effectively achieve the overall vision.



3. FACILITATE CARBON REDUCTION GOALS

Property owners' own carbon reduction goals will be facilitated through NORR's proficiency. To elicit the greatest consideration of embodied carbon, the carbon goals of property owners will be achievable to encourage further carbon reduction and to promote industry-wide change.



4. CARBON REDUCTION EDUCATION

Finally, technical staff will be inspired and educated towards carbon reduction strategies as those are developed internally. Some of NORR's strongest elements are its multi-disciplinary, in-house, design teams which exist beyond the structural engineering sphere. Those disciplines will be engaged through company-wide knowledge dissemination.

GOALS

The following list of goals addresses the critical topics of education, reporting, embodied carbon reduction and advocacy that are essential to an effective carbon reduction plan.

1. Identify and refine structural design processes within the scope of NORR's current procedures that can yield improvements to embodied carbon totals.
Action: EC comparative studies included as part of design process.



2. Establish embodied carbon as an additional criterion to monitor, on all major structural design projects.
Action: EC implemented as an on-going check in design.



3. Work with clients to set embodied carbon reduction targets for significant projects. **Action:** Reduction targets established at kick-off for selected projects.



4. Influence other disciplines' consideration of embodied carbon through advocacy and resource sharing.
Action: NORR Architectural teams have committed to AIA 2030. Multidisciplinary EC and operating carbon presentations are held.



5. Advocate multi-disciplinary sustainability studies of embodied and operational carbon to arrive at the most environmentally conscious solutions.
Action: On-going for select prototypical projects.



6. Ensure NORR applies state-of-the-art tools and methods to achieve a reduction in embodied carbon annually.
Action: One-click LCA has been vetted and implemented company-wide.



7. Improve upon available embodied carbon reduction tools for structural designs and identify knowledge gaps following their adoption. **Action:** Lessons learned while using EC tools relayed to internal team to improve procedures.



8. Engage NORR's multi-disciplinary technical staff to encourage feedback and facilitate discussion towards embodied carbon goals on a semi-annual basis.
Action: NORR's first Director, Sustainability was hired October 2022 to facilitate multi-disciplinary EC goals.



STRATEGIES

The following strategies outline the means through which the goals will be achieved and inform the actionable tasks presented subsequently.

1. Examine in-house tools for potential add-ins to facilitate embodied carbon consideration.

Actions:

2. Develop procedures for optimizing embodied carbon reduction over the course of a project.

Actions:

3. Conduct estimates of embodied carbon in on-going projects using life-cycle analyses (LCAs) of building materials following a year of commitment.

Actions:

4. Engage clients and architects to optimize the use of structural materials and suggest lower-carbon alternatives when available.

Actions:

5. Host discussions with other disciplinary teams to increase engagement and assist in determining areas of potential embodied carbon reduction.

Actions:

6. Identify and acquire necessary software for monitoring embodied carbon throughout a project.

Actions:

7. Review available embodied carbon data analysis tools and develop a standardize method of reporting project data.

Actions:

8. Schedule semi-annual meetings to update the firm on the EC reduction implementation progress and ongoing tasks.

Actions:

9. Engage NORR's Global Marketing and HR to help establish the SE 2050 campaign and make the initiative more well-known.

Actions:

ACTIONS

This section presents the list of actionable steps to be taken to ultimately meet NORR's carbon reduction vision and goals. The tasks are divided into the four critical components identified by the SE 2050 guidance: education, reporting, EC reduction, and advocacy and include the responsible NORR team member.

In this report we reaffirm NORR's commitment to the SE 2050, we have provided updates about our actions and how we are continuing our forward progress. The following tables reference each action's key performance indicator for the 2022 and 2023 commitment years with mapped reference to the internal EC documents in development by NORR.



EDUCATION

SE 2050 COMMITMENT ITEM	TARGET ACTION 2022	STATUS	TARGET ACTION 2023	COMMENT/REFERENCE
1.01 Distribute firm-wide announcement of firm's commitment to SE 2050; annually share previous ECAP after 1st year.	Announcement is made and previous reports are distributed annually.	Announcement is completed, reports to be distributed annually.	ECAP report to be distributed annually.	Document Map: Annual ECAP
1.02 Provide a narrative describing how NORR is promoting firm-wide education for EC & the SE 2050 Commitment Program.	Firm-wide Action Plan is developed and announced within a year.	Action plan shared and presented with structural engineering team.	Action plan will be continually updated and redistributed to all disciplines.	Click to view NORR's Commitment to Sustainable Design Document Map: EC Education Plan
1.03 Nominate an EC Reduction Champion. Include profile in ECAP.	EC champion is selected.	EC champion has been selected.	EC Champion to continue development of internal and external documents and procedures.	Click to view our EC Champion profile
1.04 Select a date to present an EC 101 Webinar to the firm. Can use own or existing.	EC 101 is presented.	EC 101 presented on June 5, 2022	New webinars on EC topics to be shared regularly as outlined in the internal Education Plan.	Document Map: EC Education Plan
1.05 Have a representative attend quarterly external education programs via SE 2050.	Firm representatives attended external education programs quarterly.	Quarterly SE 2050 discussions have been attended in addition to other external presentations. NORR Structural delivered a presentation on NORR's EC progress to CLF Toronto on April 19, 2022.	External programs continue to be attended quarterly.	External learning opportunities are continually sought after and shared with structural engineering team members.

CONTINUED

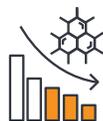
EDUCATION (CONTINUED)

SE 2050 COMMITMENT ITEM	TARGET ACTION 2022	STATUS	TARGET ACTION 2023	COMMENT/REFERENCE
1.06 Share the SE 2050 resources library with staff.	SE 2050 resources shared with staff.	SE 2050 resources shared with staff.	NORR internal EC library continues to be developed and regularly shared with new and existing staff.	Updates to the EC resource library are shared with structural team members. New members are on-boarded with the latest EC resources. Document Map: EC Education Plan
1.07 Share EC reduction strategies document with staff.	EC Reduction strategies will be shared with staff.	EC Reduction Strategies presented to structural engineering staff.	New EC documents continue to be shared with structural engineering staff, with presentations given for key contributions.	Document Map: EC Education Plan
1.08 Provide outlining plans for a minimum of one firm-wide presentation per year on EC.	Create EC presentation outline plans for an annual presentation.	EC presentation outline has been developed and shared within the EC Education Plan.	2023 Presentation Outline to be developed and shared internally.	NORR's multi-disciplinary Earth Day presentation to be held April 21st, 2023. Document Map: EC Presentation Outline Schedule
1.09 Present "How to Calculate Embodied Carbon" to all technical staff.	Document is presented to staff within one year of commitment.	How to Calculate Embodied Carbon presented June 5, 2022.	Developments to internal EC calculation procedures to be shared quarterly in Internal EC Training Document.	Discussions related to EC calculations are on-going between structural engineering staff. Document Map: EC Presentation Outline Schedule EC Education Plan
1.10 Attend a presentation of an LCA tool for calculating EC.	Technical staff attends LCA presentation.	Multiple staff attended LCA presentations in 2022. Both Beacon and One-Click LCA have been vetted by NORR IT.	LCA methods and software training to be included in an Internal EC Training Document, with specific focus given to company-wide adoption of One-Click LCA.	One-click LCA training and resources to be distributed and collected within the EC Education Plan document. Document Map: EC Education Plan



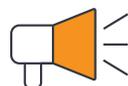
REPORTING

SE 2050 COMMITMENT ITEM	TARGET ACTION 2022	STATUS	TARGET ACTION 2023	COMMENT/REFERENCE
2.01 Provide a narrative describing plans to measure, track and report EC.	Outlining plans are made for EC calculations, EPD access, LCA methodologies, material data extraction.	EC procedures document has been developed and presented to structural engineering staff. Templates for data collection are under development.	Procedures for EC calculations, including EPD access, LCA methodologies, and material quantification are included in Internal EC Training Document for user reference. Templated calculations and data outputs to be developed and distributed before May 2023.	Document Map: EC Data Recording Template EC Education Plan
2.02 Describe the internal training procedure for EC you will provide.	Internal training procedure for EC is presented.	The internal training procedure has been outlined in the Internal EC Training Document which has been presented to structural engineering staff.	The Internal EC Training Document continues to be developed, with updates being distributed to structural engineering staff quarterly.	Document Map: EC Presentation Outline Schedule EC Education Plan
2.03 Submit two or more projects annually to the SE 2050 database.	Greater than three EC projects are submitted following the first year of commitment.	One project has been submitted within the first year of commitment.	Three or more projects are targeted for EC data recording, with more at least two being submitted before April 30th.	Click for a sample case study of a project submitted to the SE 2050 database.
2.04 Discuss sustainability goals with the owner and architect for projects to be submitted.	EC kickoff meetings held throughout project duration and notes are reported.	EC kickoff meetings have been held for select projects to engage architects.	Architects and clients continue to be engaged near project kickoff for more selected projects.	The EC impact of design decisions is discussed to inform project direction.
2.05 Meet your target EC reduction from the previous year.	Set and meet EC reduction goals for projects following the first year of commitment.	EC reductions goals to be set and distributed within the NORR EC Calculation templates.	EC goals for 2023 to be set and updated within EC templates for staff reference.	Document Map: EC Data Recording Template EC Education Plan



EC REDUCTION STRATEGIES

SE 2050 COMMITMENT ITEM	TARGET ACTION 2022	STATUS	TARGET ACTION 2023	COMMENT/REFERENCE
3.01 Set EC educational goals for first year.	Education goals are identified and curriculum is outlined.	Education goals have been defined and distributed to structural engineering staff within the Internal EC Education Plan.	Education goals are identified for 2023 and updates are made to the EC Education Plan.	Document Map: EC Education Plan
3.02 Provide lessons learned and feedback to the program for second year and beyond.	Record and report successes and failures in program implementation following first year of commitment.	Lessons learned and program feedback has been recorded as EC efforts progress.	Lessons-learned case studies to be developed for each EC project selected for data collection. Case-studies to be collected and summarized for 2024 ECAP and beyond.	Click for a sample case study of a project submitted to the SE 2050 database. Document Map EC Education Plan ECAP
3.03 Provide a lessons learned case study in the ECAP.	Develop and submit an EC lessons learned case study following the first year of commitment.	EC case study development is underway and will be submitted upon completion.	EC lessons-learned case study for selected project to be reformatted for SE 2050 submission. Template for case study development to be distributed for future EC projects.	Click for a sample case study of a project submitted to the SE 2050 database. Document Map: EC Education Plan ECAP
3.04 Create a project-specific EC reduction plan.	Project-specific EC reduction plan is developed and submitted.	EC reduction plan has been developed for selected EC projects.	EC reduction plan developed into a standardized EC reduction workflow for future EC projects.	EC reduction opportunities are conveyed to the project architect and seized when possible. Document Map: EC Data Recording Template
3.05 Complete and EC comparison project in project conception phase.	EC comparison is completed and submitted to client/architect when applicable.	EC comparison has been completed for sample project and shared with the architecture team to inform design options.	EC comparisons to be a part of standard EC calculation protocol for every EC project.	Click for a sample case study of a project submitted to the SE 2050 database.



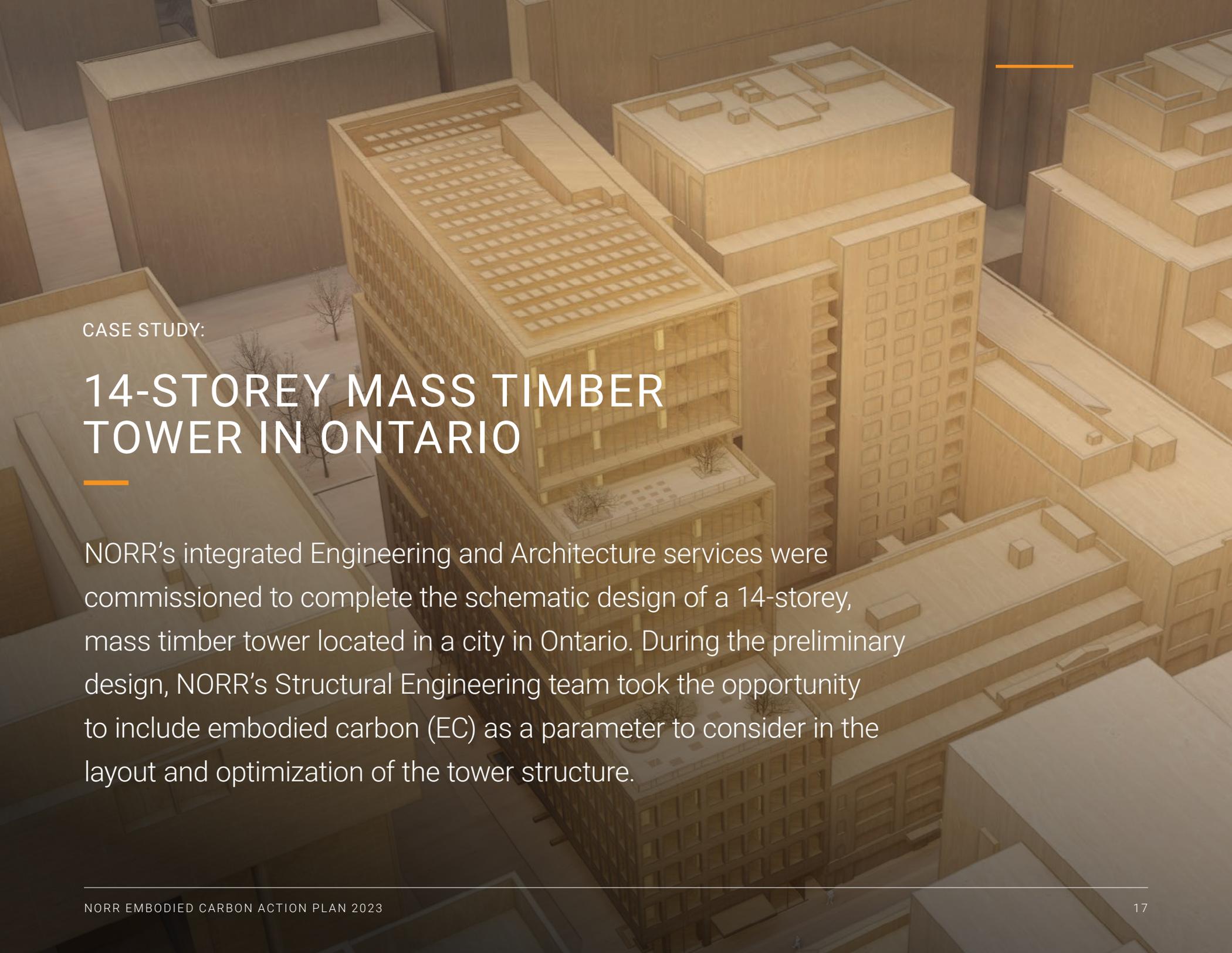
ADVOCACY

SE 2050 COMMITMENT ITEM	TARGET ACTION 2022	STATUS	TARGET ACTION 2023	COMMENT/REFERENCE
4.01 Provide a narrative about knowledge/data sharing plans.	Develop and report data sharing plans within a year of commitment and as needed.	Data sharing plans outlined in Internal EC Templates for calculation and data collection.	Internal EC Templates to be continually updated and shared with structural engineering staff for data collection.	Document Map: EC Education Plan
4.02 Describe the value of SE 2050 to clients (Including marketing materials).	Informational materials are developed and presented to clients to discuss EC goals.	NORR Marketing has been engaged to disseminate EC Goals through SE 2050. In October 2022, NORR hired a Director of Sustainability to lead EC efforts across disciplines.	Informational materials continue to be developed for client reference.	EC reduction and the goals of SE 2050 are conveyed when possible to architects and clients. Refer to norr.com for more information and materials.
4.03 Declare SE 2050 membership on boilerplate proposal language.	SE 2050 membership included on NORR proposals and other boilerplate within a year of commitment.	SE 2050 Membership information to be included in boilerplate text.	SE 2050 Membership text to be added to general notes and specs.	EC reduction and the goals of SE 2050 are conveyed when possible to architects and clients. Refer to norr.com for more information and materials.
4.04 Share SE 2050 details on company website.	SE 2050 Commitment Program shared on website.	Completed in 2022.	Internal EC efforts to be shared on NORR website.	EC reduction and the goals of SE 2050 are conveyed when possible to architects and clients. Refer to norr.com for more information and materials.
4.05 Share education opportunities with clients.	EC education opportunities are forwarded to clients.	Clients to be engaged to join EC education opportunities.	Clients to be engaged to join EC education opportunities.	NORR regularly hosts NORR ed sessions where many topics, including EC and sustainability efforts, are presented.

FINAL REMARKS

This document represents NORR's second annual Embodied Carbon Action Plan as inspired by the SE 2050 Commitment Program as well as NORR's dedication to environmental stewardship. The framework presented herein outlines the company's vision, goals, strategies, and immediate tasks to implement the means to create a reduction in embodied carbon through structural design.

Action items are divided into educational, EC reduction, reporting and advocacy subtasks which will form the structure for NORR's embodied carbon response for the next 30 years and beyond. In general, this Action Plan will enable NORR to emerge as a front runner in sustainable structural engineering practice through internal embodied carbon education, advanced carbon-conscious design procedures, superior sustainability coordination with clients, and a uniquely inspired employee environment. Together, these components will develop continuously in the mid-term future and ultimately contribute to achieving net-zero structural engineering practices by 2050. NORR is committed to reducing embodied carbon in its projects and incorporating this important metric across all of its actions.

An aerial, isometric view of a city model. The central focus is a 14-storey mass timber tower with a grid-like facade and a flat roof. The surrounding buildings are also rendered in a light wood tone, creating a cohesive architectural style. The scene is set against a light, hazy background, suggesting a bright, clear day. A thin orange horizontal line is visible in the upper right corner of the image.

CASE STUDY:

14-STOREY MASS TIMBER TOWER IN ONTARIO

NORR's integrated Engineering and Architecture services were commissioned to complete the schematic design of a 14-storey, mass timber tower located in a city in Ontario. During the preliminary design, NORR's Structural Engineering team took the opportunity to include embodied carbon (EC) as a parameter to consider in the layout and optimization of the tower structure.



While balancing a number of factors such as cost, structural efficiency, architectural planning, M&E services, practicality, and client considerations, a grid spacing analysis was conducted and presented to inform the optimum design choice moving forward. Single and double-beam options were also considered to achieve architecturally desired floor-soffit heights (see Figure 1).

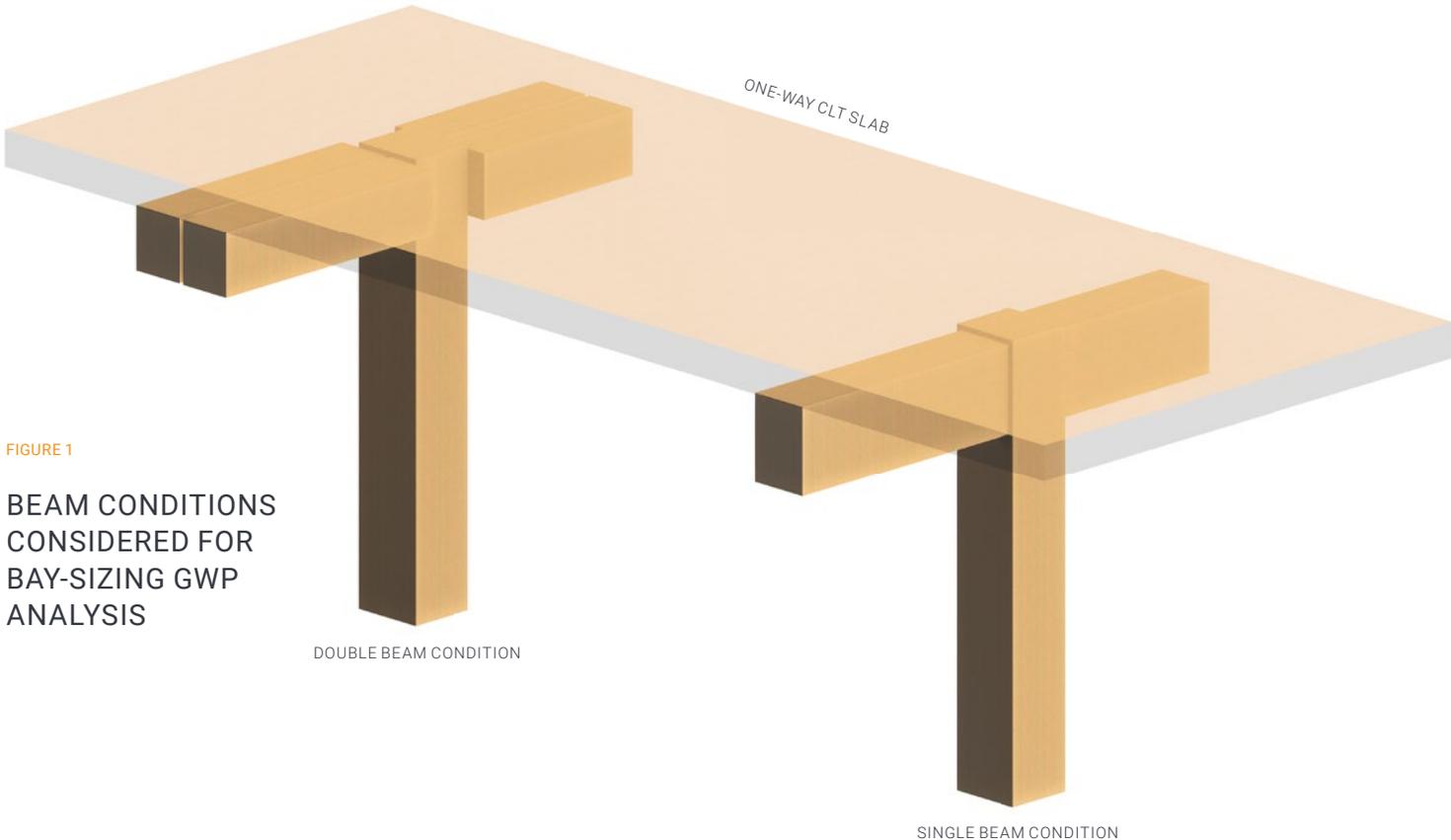


FIGURE 1
BEAM CONDITIONS
CONSIDERED FOR
BAY-SIZING GWP
ANALYSIS

Figure 2 demonstrates the estimated global warming potential (GWP) for a representative floor for primary glulam beam framing over a range of bay sizes. This comparative study applies a life cycle analysis (LCA) boundary including stages A1-A3 and uses published environmental product declarations (EPDs) for Canadian manufacturers. Only the GWP of the glulam framing is considered in this comparison. In addition to the beam study below, a similar study was conducted to assess the effect of bay sizing on the GWP of column members. Figure 3 presents the GWP values for glulam (GL) and steel columns compared to the same range of bay sizes.

The below studies informed critical decisions moving into the schematic design phase. A double glulam beam system with glulam columns at a grid spacing of 6.4 m was selected best to balance architectural/client requirements and embodied carbon efficiency.

FIGURE 2
ESTIMATED GWP PER FLOOR FOR SINGLE/DOUBLE GLULAM BEAM OPTIONS FOR A RANGE OF PRIMARY SPANS. LCA STAGES A1-A3 ARE CONSIDERED.

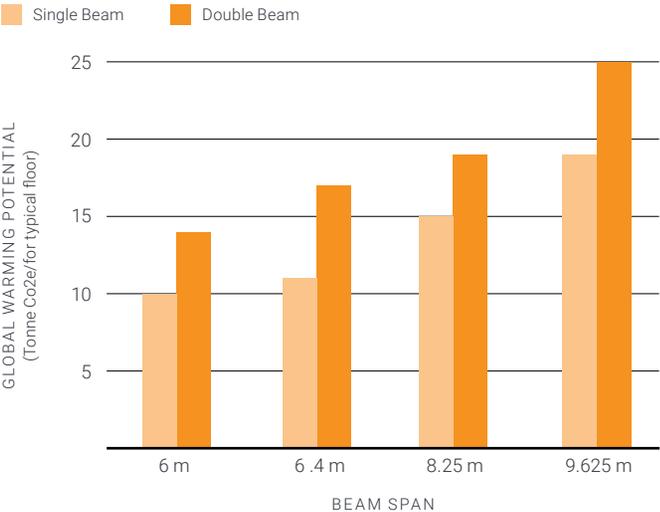
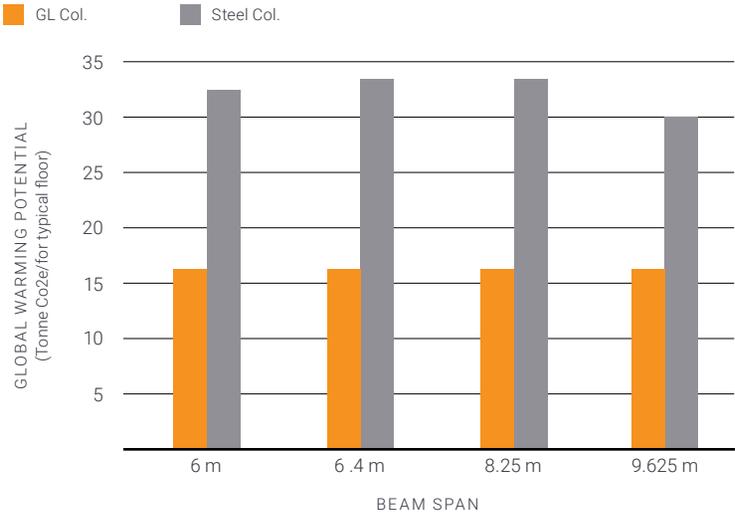


FIGURE 3
ESTIMATED GWP PER FLOOR FOR GLULAM AND STEEL COLUMN OPTIONS FOR A RANGE OF PRIMARY SPANS. LCA STAGES A1-A3 ARE CONSIDERED.

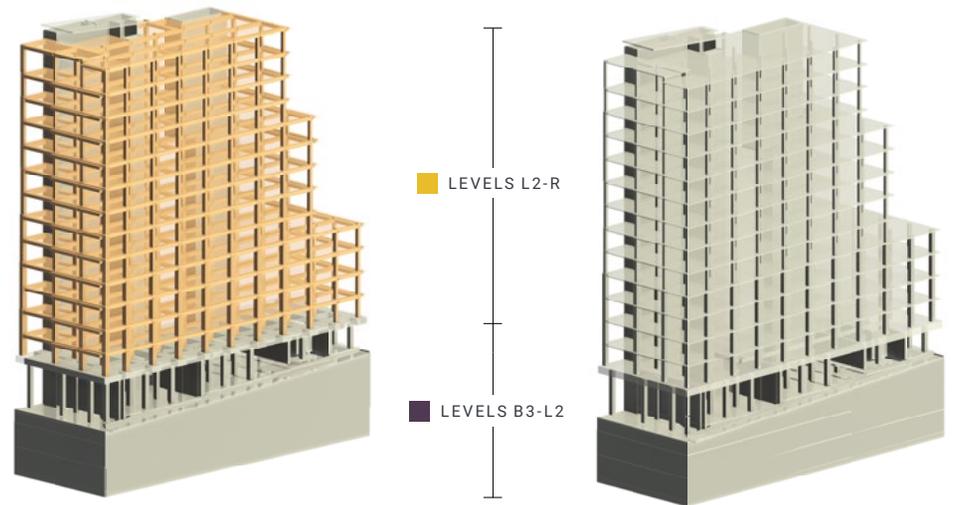


To conclude the schematic design stage, a full-structure cradle-to-gate LCA (stages A1-A3) was conducted by NORR to compare the mass timber design option to a built-as-usual concrete structure (see Figure 4). The mass timber structure has 13 stories of glulam and CLT framing atop a one-storey concrete transfer podium and three below-grade levels. Two concrete cores comprise the lateral load-resisting system. An aggressive 50% cement substitution is considered for all concrete elements in the primary design option. The built-as-usual option has the same configuration with equivalent reinforced concrete members, however no cement substitution is considered. Considering beam, column, floor, wall, and foundation elements, as well as the associated reinforcing steel where applicable, the LCA yielded a GWP value of 340 kg CO₂ e/m² for the built-as-usual structure and 180 kg CO₂ e/m² for the mass timber structure.

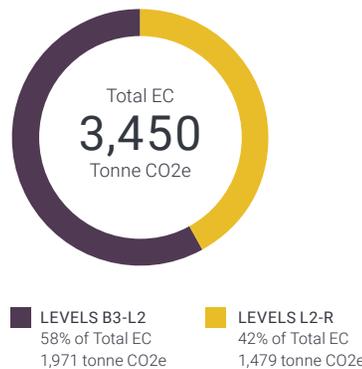
Ultimately, NORR’s Structural Engineering team influenced architectural and client decisions through multiple design iterations and stages of life cycle analyses. The presented option at the conclusion of the schematic design stage offered both savings in embodied carbon when compared to the built-as-usual case and optimal architectural use of space. For NORR, this case study has reasserted the importance of considering embodied carbon in design as early as possible so design teams can understand the impacts of early design decisions on a structure’s environmental impact. Moving forward, NORR’s Structural Engineers aim to continue engaging all disciplines and clients on the environmental implications of design-related decisions to optimize their structures further and continue developing embodied carbon best practices in design. This iteration, analysis, and reflection process is the most effective way to reduce the embodied carbon associated with building structures and eventually to net zero by 2050.

FIGURE 4

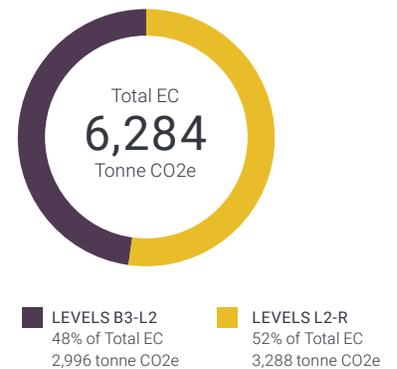
MODEL EXPORT OF THE MASS TIMBER AND BUILT-AS-USUAL CONCRETE DESIGN OPTIONS



MASS TIMBER DESIGN WITH 50% CEMENT SUBSTITUTION



BUILT-AS-USUAL CONCRETE DESIGN



EMBODIED CARBON TEAM



BENJAMIN NICOLETTA

Structural Designer
SE 2050 Embodied Carbon Champion

An aspiring structural engineer and current EIT, Ben joined NORR in April 2021 and leads the NORR Structural Engineering team's embodied carbon reduction efforts. Ben is a passionate advocate for climate change issues currently guides NORR's commitment to the SE 2050 Program. He graduated from a Master of Applied Science at York University in 2020 and completed his undergraduate degree in Civil Engineering from Carleton University in 2018.



HASSAN SAFFARINI, P.Eng., Ph.D., PMP, LEED AP, CAHP
Principal

Hassan heads NORR's structural engineering team in Canada. In his 35-years experience after obtaining a PhD from UC Berkeley, he has been particularly aware of the potential impact of architecture and engineering projects on the environment. He became a LEED AP in 2007 and is a board member of the Ontario Association of Heritage Professionals. He thus promptly bought into the SE 2050 commitment in 2021.



ALI HUSAIN, M.Eng., P.Eng., ing
Associate
Lead Structural Engineer

As the Lead Structural Engineer with 15 years of experience, Ali has a proven track record of success in a wide variety of projects in Canada and abroad. With a passion for sustainable design and a deep commitment to finding new and innovative solutions, Ali is an expert in creating structures that meet the highest standards of environmental responsibility.



BLAKE JACKSON, AIA, LEED Fellow, WELL Faculty,
Fitwel Amb., CPHC, EcoDistricts AP
Director, Sustainability

As Director, Sustainability at NORR, Blake supports project delivery, CSR, and he leads the firm's global program to achieve the AIA 2030 Commitment and the Structural Engineering SE 2050 Challenge. For over 20 years, Blake has been working at the nexus of sustainability, wellness, resiliency and equity, promoting positive, measurable outcomes for built environment projects, worldwide.

WHO WE ARE



NORR is an employee-owned, fully integrated A&E firm. Our professional team of 800 architects, engineers, planners and interior designers work collaboratively across 12 market sectors in Canada, the US, UK and UAE.

Our mission is to create socially aware, environmentally responsible, and financially viable architecture and engineering design solutions to ensure our clients achieve their business goals while contributing to healthier and sustainable spaces and places across the globe.

A CARBON CONSCIOUS COMMITMENT

NORR is committed to supporting the transformation of the built environment from a major source of carbon emissions to an important contributor to combating the climate emergency. We embrace the climate change mitigation strategy put forth in the Paris Agreement and accept the urgent challenge to make carbon neutral buildings a standard practice, rather than the exception.

MARKET SECTORS



- Commercial
- Education
- Health Sciences
- Hospitality
- Industrial
- Justice
- Public Buildings
- Residential
- Restaurants
- Retail
- Science & Research
- Transportation

NORR | Integrated Thinking. Inspired Design.

