

RDH



rdh ×
climate
2030

TABLE OF CONTENTS

rdh x climate 2030	5
Connecting with Our Purpose	9
Metrics and Impact	12
Case Studies	21
Looking Ahead	40

^[1] UN Climate Change Conference (COP21) Paris Agreement, Paris, December 12, 2015

^[2] Architecture2030, architecture2030.org

rdh × climate 2030

Central to averting climate disaster is the need for immediate and deep emissions reductions across all sectors.

To do this and limit global warming to 1.5C, greenhouse gas emissions must peak by 2025 and be reduced by 43% by 2030^[1], per the Paris Agreement declared at the UN Climate Change Conference (COP21), marking a multilateral binding agreement that brings all nations together to combat climate change and adapt to its effects.

Per Architecture 2030, a nonprofit organization established in 2002 in response to the ongoing climate emergency, we know that the built environment is responsible for at least 42% of annual global greenhouse gas emissions^[2].

The good news is that we—the AEC industry—have the skills and solutions to substantially reduce greenhouse gas emissions associated with new and existing buildings.

By applying our knowledge and expertise, RDH can empower our project teams to deliver responsive, durable, and healthy buildings while maintaining a low carbon footprint.

#NEVERNEUTRALONCARBON →

RDH is launching **rdh x climate 2030**—a platform to track our climate action and measure the impact against our Net Zero goal.

We recognize the crucial role of climate advocacy in corporate strategies. RDH is working with our clients and industry to pursue scalable, transferable, and responsible approaches to combat climate change in the built environment.

Specifically, to reach Net Zero greenhouse gas emissions across our organization by 2030 by operating with the lightest emissions possible and investing in high-quality offset opportunities.

In addition to sustainability planning and analysis, this multidisciplinary space will facilitate open dialogue within the community, offer technical and thought leadership, and illustrate pathways other organizations can adopt to help meet global climate goals.

RDH is a beacon for building science leadership, focused on delivering scalable climate-resilient solutions for clients and future generations.

While we've made progress, our drive to address the climate crisis requires much more action. We're continuing to look for ways to reduce our emissions, develop better systems to track our progress, support like-minded initiatives, and inspire others to act.

Making Buildings Better™

#NEVERNEUTRALONCARBON →

Workplace culture plays a role in enhancing engagement, improving performance, and contributing to the betterment of the built environment through our work and expertise.

Key to achieving the interconnected ambitions of **rdh x climate 2030** is embracing and optimizing our practices around our workplace environment, firmwide culture, and operations.

Each year, our report will include cultural and workplace highlights from the past 12 months. Here's the progress we made in 2023 that we're excited to share.



CONNECTING WITH OUR PURPOSE RDH CULTURE



Climate Services

Connecting with our purpose also means bringing our mindset on climate to the professional services we offer clients. RDH is constantly evolving our services and capabilities that illustrate clear pathways to optimizing the value of your building assets, whether that's through repair, restoration, rehabilitation, portfolio planning, or an innovative approach to a new build. We're making headway in this process, which began by aligning our Discipline Leaders (Energy and Climate, Facade, Structural Engineering, Enclosure, and Construction) and the work they do with climate-centered goals.



GHG Emissions Audit

Third-party auditing of our GHG emissions inventory is complete! This offers another level of confidence that our inventory for the fiscal year 2022 is accurate, reliable, and developed by recognized reporting guidelines. For this inventory, RDH is certified as a Climate Smart Business.



Climate Workshops

Internal workshops held in every region and office engage our technical teams and help us stay on the pulse of climate strategy and action. Emerging themes and topics that will remain a throughline in our approach to thinking about climate are broad and holistic; these include assemblies, materiality, embodied and operational carbon, construction types, tech adoption, training and research, and client engagement.



Sustainability Onboarding

The new hire process is a great place to empower employees and lay the foundation for RDH's POV on climate action, impact, and advocacy. Our onboarding process for new employees includes a return to fundamentals through training on climate change, webinars, first-hand project experience, and exposure to industry events.



Hybrid Working

On Earth Day, we should remember hybrid work is a pathway to a greener future. At RDH, we prioritize fine-tuning smart work processes and leverage technology for hybrid working, while optimizing our time spent in the office together for collaboration, mentorship, and connection.

TRACKING AND MEASURING OUR SUSTAINABLE PERFORMANCE

We've set ambitious goals for rdh x climate 2030 that break down our targets, measure against benchmarks that reduce cost, energy, and waste, and optimize our journey to **Net Zero emissions by 2030.**

We will be sharing all important milestones, starting with this [first report](#) identifying the metrics of performance RDH is tracking.

CURV—The Tallest Passive House in the World
Vancouver, BC



#NEVERNEUTRALONCARBON →

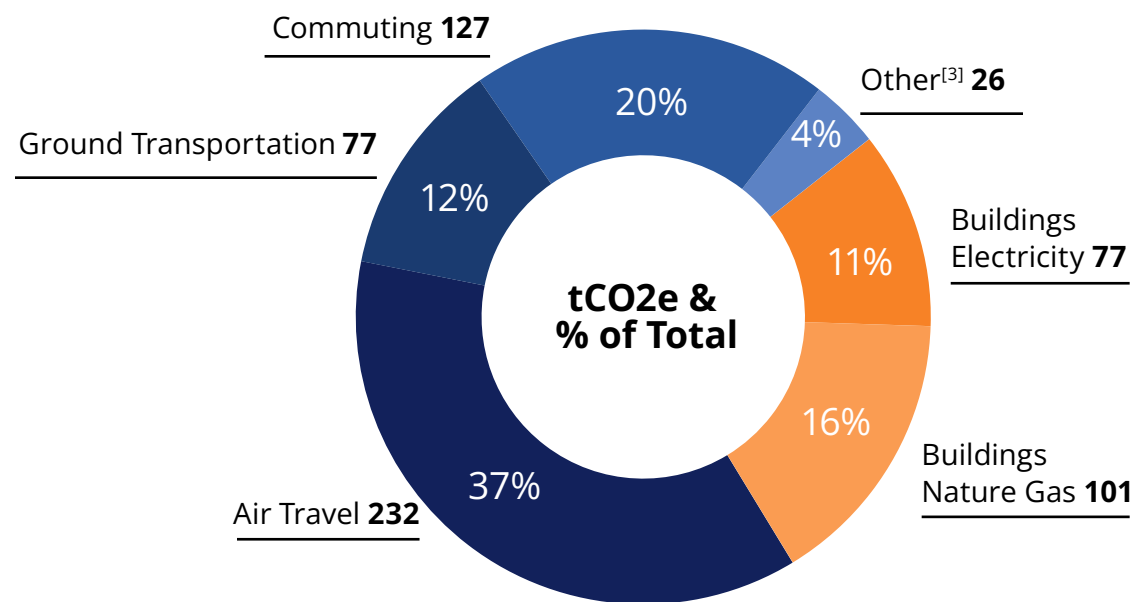
RDH measured Scope 1, 2, and 3 greenhouse gas emissions through the Climate Smart program (now BMO Climate Smart).

We've been tracking since 2010 and the most recent intake shows the lowest emissions per employee yet, indicating that through our growth as a company, we've remained responsible and diligent in managing and reducing our carbon emissions.

By Category (FY2022)

The graph below shows where we emit greenhouse gas emissions. Travel comprises over two thirds of our emissions, with air travel the

biggest proportion (37% of total emissions), followed by employee commuting (20%) and ground transportation for business travel (12%).

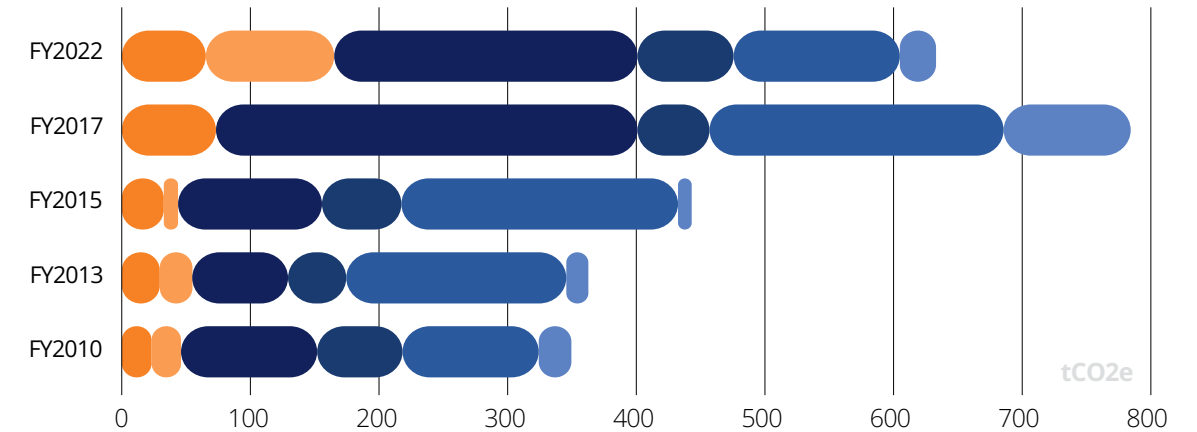


^[3]Other includes office waste, paper, accommodations during business travel, and transporting goods.

Overall Emissions

This graph shows our emissions by category since we started tracking in 2010. The opening of our eastern offices in 2016 increased travel as evidenced by the increase in our 2017 emissions.

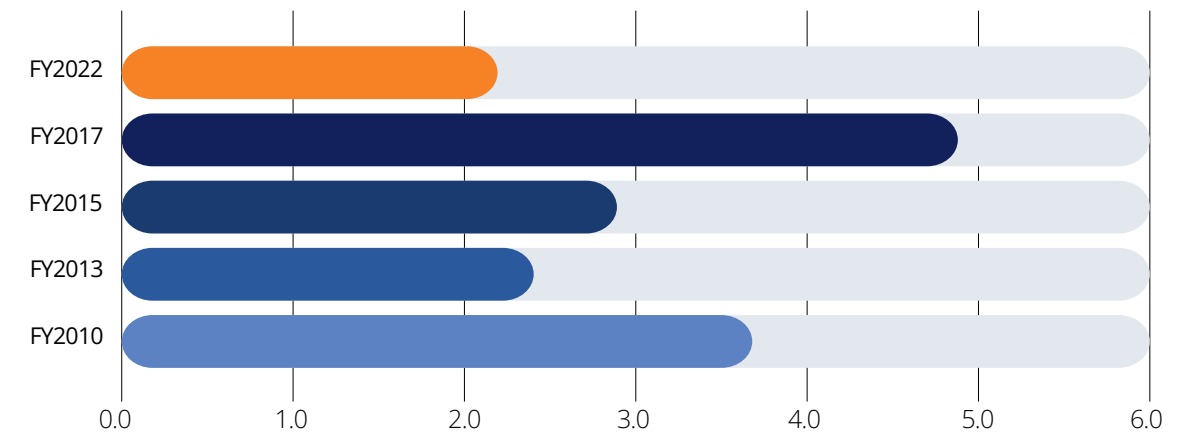
Since then, we've managed to reduce our total emissions through less travel and more digital collaboration.



Per Employee (FTE) (since FY2010)

The graph below shows our emissions per full time employee since we started tracking in 2010. While our company has grown substantially over the years, our latest inventory shows that we've managed to reduce our emissions per person

compared to our original inventory. While there's more work to be done, we're proud of the progress we've made in achieving 2.2 tonnes per person.



METRICS AND IMPACT

Our People

Real change starts with education. We provide interactive training, access to support organizations, and help fostering industry relationships to further our climate initiatives.



Thought Leadership

While we can have a significant impact on mitigating and adapting to climate change through our project work, our impact grows exponentially through thought leadership.

We seek to align ourselves with organizations that are moving the needle, through sponsorships, educational events, publications, and webinars.

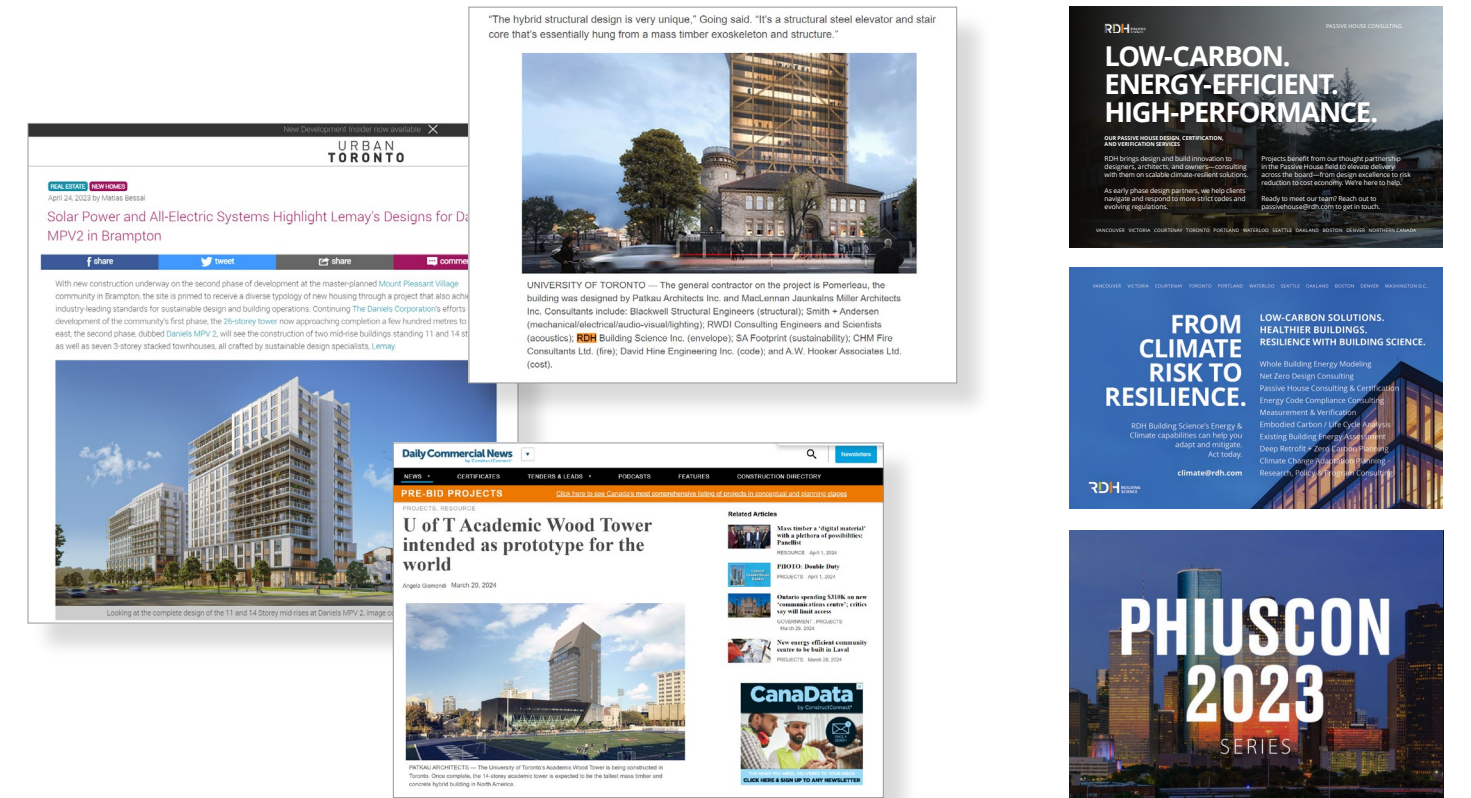


85%+
of RDH take continuing education courses on Energy & Climate, Sustainability, and Carbon.



50+
speaking engagements delivered by RDH on climate and sustainability in 2023.

7+
total Passive House Certifiers and Verifiers at RDH, with complete certifying coverage across North America.

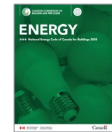


METRICS AND IMPACT

Technical Committees + Working Groups

While we can have a significant impact on mitigating and adapting to climate change through our project work, RDH's impact grows exponentially by providing industry training and contributing to other efforts to address climate change.

We are active participants in several diverse Technical Committees + Working Groups across North America where we bring our expertise, in-the-field knowledge, and thought leadership to the fore.



Canada's National Model Code Committee Energy Technical Advisory Group

Steve Kemp (TOR) is contributing to the development of the new National Energy Code for Buildings, with a key outcome being incorporating absolute performance targets into the code.



EGBC Built Environment Advisory Group

As a member of EGBC Advisory Groups, Warren Knowles (VAN) has contributed to developing professional practice guidelines to improve resilience and reduce overheating in buildings.



ASHRAE 227p Passive Buildings Committee

Chris Schumacher (WAT) is contributing to ASHRAE's efforts to make passive buildings commonplace through the introduction of a new standard.



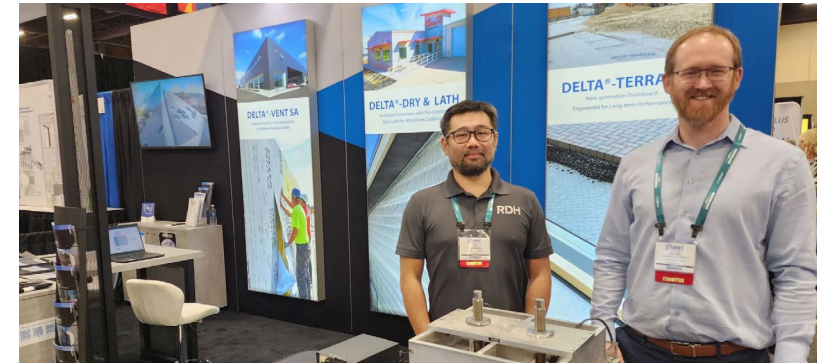
Massachusetts Stretch Energy Technical Advisory Committee

Wei Lam (BOS) and Andrew Steingiser (BOS) contributed to the development of an ambitious new code to reduce energy and emissions in buildings in Massachusetts.



Passive House Canada Board of Directors

Marine Sanchez (TOR) is a director for Passive House Canada, helping the organization to advance low carbon buildings in Canada.



Research and Publications

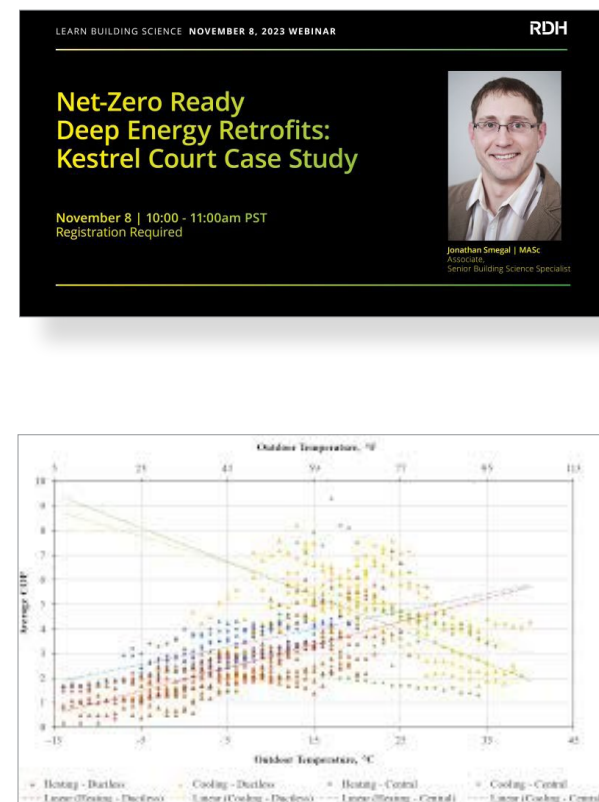
In 2023, RDH published six new resources to our Technical Library on topics related to net-zero design, deep energy retrofits, energy efficiency, and durable performance:

- Net-Zero Design and Feasibility for Residential Buildings in the North
- Prefabricated Exterior Energy Retrofit (PEER) Project Guide
- Conventional Roof Assemblies: 6-Year Field Monitoring Study Update
- In-Situ Performance of Cold Climate Air-Source Heat Pumps in British Columbia
- Literature Review Report: Rainscreen Performance
- Net-Zero Ready Deep Energy Retrofits: Kestrel Court Case Study

Training

RDH's Learn Building Science webinar series included 8 sessions on topics related to energy efficiency, durability, and high performance enclosures, with over 3,000 participants learning from our experts:

- High-Performance Enclosures Exterior Shade Design
- Net-Zero Ready Deep Energy Retrofits: Kestrel Court Case Study
- Façade Movement from Building Seismic Drift
- Deep Dive into Rainscreens
 - Session 1 Introduction
 - Session 2 Looking Back
 - Session 3 Defining Drainage
 - Session 4 The Value of Ventilation
 - Session 5 The Last Line of Defense



Case Studies

The most significant impact we can have on the environment is to bring a climate lens to every project we're on and help design and retrofit buildings in alignment with a low-carbon, resilient future.

Whether it be through targeting the most stringent low-carbon performance goals or taking incremental steps along a path to reducing emissions, we're committed to being trusted partners in this process.

#NEVERNEUTRALONCARBON →

University of Victoria, New Student Housing & Dining

Location:	Victoria, BC
Services provided:	Passive House Consulting, Building Enclosure Consulting, Airtightness Testing
Market:	Residential (student housing), Commercial (kitchen)
Completion:	2022
Client:	Perkins & Will
Team:	Graham Finch, Byron Searle, Marine Sanchez, Torsten Ely, Eric Watters, Laura Simandl, Kathleen Narbonne, Brittany Coughlin, Warren Knowles

A new residence at the University of Victoria designed for Passive House and LEED Gold Certification demonstrates the school's commitment to providing affordable student housing with the lowest emissions possible. This pioneering project is a big leap towards reaching the university's goals of achieving net zero greenhouse gas emissions by 2040. It includes two buildings whose names are inspired by local First Nations: the Cheko'nien House and Sngeque House.

Cheko'nien House: 8 stories, 600-seat dining, a large institutional kitchen, multi-purpose room, and retail spaces (opened in September 2022).

Sngeque House: 11 stories, teaching theatres, conference facilities, offices, meeting spaces, and a designated Indigenous student lounge (opened in September 2023).

RDH was engaged during Schematic Design and provided Passive House, Building Enclosure Consulting, and Airtightness Testing.

In the early design phases with the General Contractor, EllisDon/Kinetic, and the design team, RDH helped establish performance targets for all major design elements, helping the team make appropriately balanced decisions at the intersection of performance and design.

The final massing and pragmatic design thoughtfully integrates window size and placement, solar shading, and whole systems thinking to deliver on this low-carbon, high-performing space that prioritizes occupant comfort and wellness.

Our work extended to the large commercial kitchen, where we led the research and analysis to apply Passive House principles to the commercial kitchen. This started with an exhaustive review of energy uses. We implemented best practices and were able to work with the team to refine the kitchen's layout, equipment choices, refrigeration system specification, and ventilation design.

Our diagnostic airtightness testing and diligence helped the project surpass an airtightness target of 0.4 ACH @ 50 Pa, stricter than the Passive House target of 0.6 ACH @ 50 Pa.

This project demonstrates significant leadership in applying one of the most stringent energy and carbon design standards to a large mixed use building with complex energy needs. It lays the groundwork for projects to follow in reducing energy and carbon associated with large new buildings.



Madrone Apartments PHIUS Design

Location:	Seattle, WA
Services provided:	Building Enclosure Consulting, Passive House Consulting
Market:	Residential
Completion:	2024
Client:	Cascade Built
Team:	Dave Fox, Justin Soto

Designed to Phius standards, a priority set by the development team, Madrone uses high-performance windows, air sealing, and insulation to reduce the energy needed to maintain temperature control.

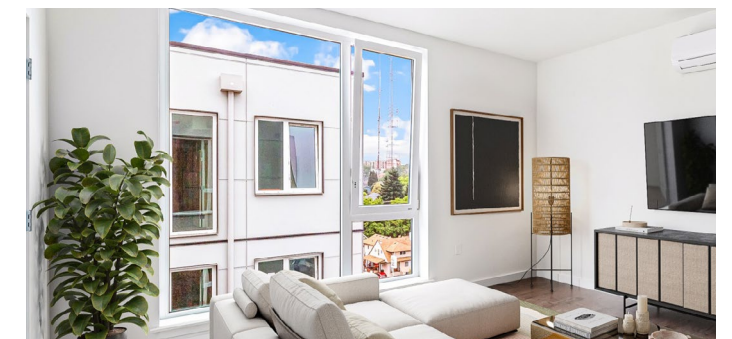
Comprised of two, eight-story towers, the 107-unit building includes exterior covered bridges on each floor, a second-floor courtyard, and a roof deck.

Every phase of work was collaborative and inclusive of designers and sub-trades to focus on critical mechanical systems and the building enclosure.

Our Seattle team provided building enclosure and Passive House consulting services, including construction document review, construction administration support, field review, and water testing.

RDH assisted in the selection of high-performance windows, high performance enclosure, and mechanical systems by generating the WUFI-Passive energy model, completing two-dimensional heat transfer simulations, and performing whole-building airtightness testing.

Madrone Apartments is Phius Certified.



MIT Volpe Redevelopment

Location:	Cambridge, MA
Services provided:	Building Enclosure Consulting, Facade Engineering, Passive House Consulting
Market:	Mixed-use (residential)
Completion:	2024
Client:	Stantec
Team:	Brittany Coughlin, Marine Sanchez, Andrew Steingeiser

The MIT Volpe Redevelopment is a 14-acre mixed-use hub in Kendall Square. RDH was retained by Stantec to provide Building Enclosure Consulting, Facade Engineering, and Passive House Consulting services on a 20-story residential apartment with 200-250 units located in the Volpe parcel in Cambridge, MA with retail and community spaces programmed for the second-story podium. MIT intends the residential buildings (40% of the Project's GFA and approximately 1,400 units) to be all-electric, and therefore, will have zero on-site emissions to support a net-zero carbon future. The project is targeting Passive House Certification through Phius for code compliance.

The Volpe site also establishes a pathway for getting to all-electric commercial buildings and will evaluate each building against this pathway as it approaches the design review phase.

In addition to sustainability design elements, Volpe includes resiliency design elements such as raising the finished grade of the entire 10-acre site to the 2070 100-year flood elevation. Together, these strategies distinguish it and build upon sustainable commitments for resilient design, transit, and community.

RDH's evaluation of options for Phius certification during Schematic Design helped guide the design and optimize the performance of the enclosure, mechanical, and electrical systems. Building off our building enclosure services, our Passive House consulting includes developing the WUFI Passive energy model, developing enclosure performance targets, and mechanical system selection. RDH is also providing Phius verification through the construction phase.

To see that the proposed pre-fabricated wall systems could meet upcoming Energy Code requirements, RDH performed 2D and 3D thermal analyses of four panelized wall-type options. Our scope included the development of details that formed the basis of the thermal simulations.



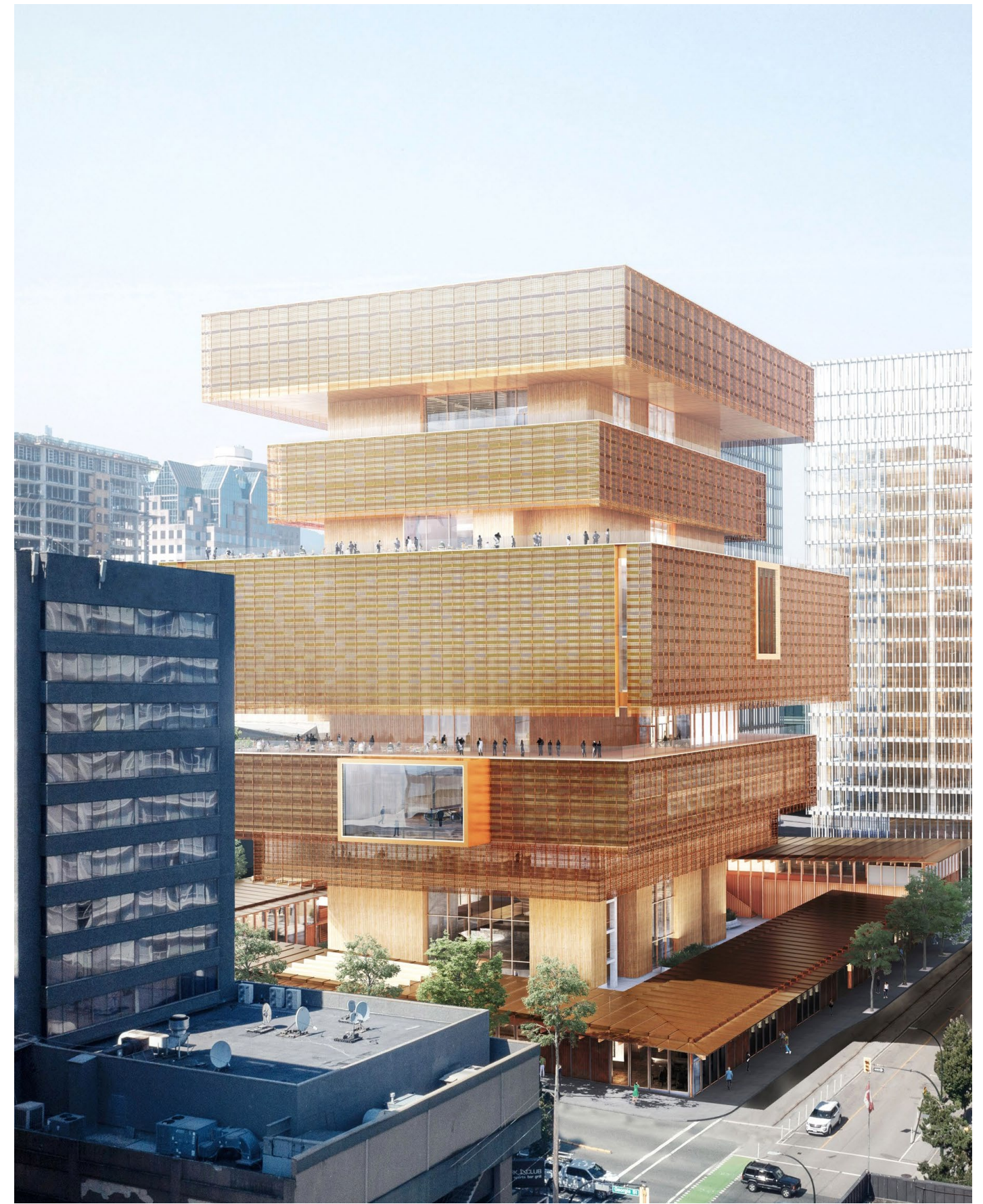
New Vancouver Art Gallery

Location:	Vancouver, BC
Services provided:	Building Enclosure Consulting, Facade Engineering, Energy Modeling, and Zero Carbon Building Certification Consulting
Market:	Cultural
Completion:	2028
Client:	Vancouver Art Gallery
Team:	Warren Knowles, Daniel Haaland, Eric Catania, David Vadocz, Matthew Hamilton

The new Vancouver Art Gallery has a goal of meeting world-class sustainability standards and becoming the most environmentally sustainable art museum in Canada. The Vancouver Art Gallery is comprised of 300,000 square feet over 9 storeys that will include artist studios, an Indigenous community space, a theatre, a restaurant, retail, and of course exhibition space.

The icon, set to be the largest CAGBC Zero Carbon art space in the world, features a woven metal façade inspired by indigenous weaving culture. In addition to the feature metal weave, there is an extensive use of mass timber and wood cladding elements on the exterior of the building, honoring the heritage of British Columbia.

Our team is providing Building Enclosure Consulting, Facade Engineering, Energy Modeling, and Zero Carbon Building Certification Consulting on this generation-defining project. We're pleased to be working with the design team to develop high performance building enclosure and mechanical design strategies capable of achieving Net Zero carbon emissions that can serve as a template for buildings to come.



University of Toronto, Academic Wood Tower

Location:	Toronto, ON
Services provided:	Building Enclosure Consulting
Market:	Higher-ed
Completion:	2024
Client:	MJMA Architecture & Design
Team:	David Stanton, Graham Finch, Ben Brown

The University of Toronto has begun construction on a new 14-story mass timber building that will not only be the tallest academic timber structure in Canada, but a precedent for climate-responsive design.

RDH provided a holistic report of the embodied carbon contributions of the building and modeled the design to assess building life-cycle emissions, which revealed a significant environmental benefit to implementing mass timber.

By choosing mass timber, The Academic Tower reduces pollution and energy waste while contributing to a growing area of climate action and a future of low-carbon construction.

The project also helps expand Canada's wood market into tall wood structures, creating forestry jobs and construction sector opportunities that contribute to Canada's response to the climate crisis.

The Academic Tower repurposes the foundation, substantially reducing embodied carbon emissions.

Designed by award-winning Canadian firms Patkau Architects and MJMA Architecture & Design with consulting from Blackwell Structural Engineers, Smith+Andersen, and RDH, the Academic Wood Tower's unique and sustainable structure has already won a Canadian Architect Award of Excellence.

As the Building Enclosure Consultant, RDH provided a detailed design of a panelized, high-performance enclosure system designed specifically for the tall mass timber structure. The enclosure is a high-performance curtain wall glazing and exterior solar shading mechanism, with each façade optimized for views, daylight, and solar control.



CalSTRS Headquarters Expansion Project

Location:	West Sacramento, CA
Services provided:	Building Enclosure Design Assist, Curtain Wall Consulting, Building Enclosure Commissioning (BECx)
Market:	Education
Completion:	2025
Client:	ZGF Architects
Team:	Felix Weber

In September 2021, the CalSTRS Teachers' Retirement Board pledged to achieve net zero greenhouse gas emissions across the CalSTRS Investment Portfolio by 2050. The board also went on to approve a package of investment actions toward a net zero investment portfolio, including an interim goal to reduce emissions by 50% before 2030.

A key project of CalSTRS' low carbon action is the new, 275,000 sf Headquarters Expansion Project in West Sacramento, CA. RDH is on board to provide Building Enclosure Design Assist, Curtain Wall Consulting, and Building Enclosure Commissioning (BECx) services for this 11-story office building.

This project is slated to achieve Zero Net Energy, LEED Platinum certification, Living Building Challenge, and WELL Building certification. Additionally, the building will feature 80% on-site renewable energy, which enables CalSTRS to achieve a Zero Net Energy (ZNE) facility designation. To support these goals, we are working with the design team to optimize the enclosure and façade systems to optimize thermal performance and solar control.



West Tisbury School Feasibility Study

Location:	West Tisbury, MA
Services provided:	Zero Carbon-Ready Retrofit Study, Energy Performance Consulting
Market:	Education
Completion:	2022
Client:	Up-Island Regional School District
Team:	Andrew Steingeiser, Andrea Pietila, Wei Lam

West Tisbury High School near Boston, providing Pre K-5 and grade 6-8 education, was last renovated in the mid-1990s. The facility is due for a major renewal that presents an opportunity to significantly reduce greenhouse gas emissions, among other benefits.

RDH partnered with key stakeholders from the school, school district, and community's Environmentally Friendly School Building Task Force to deliver a comprehensive Zero-Carbon ready feasibility study. The findings and analysis unveil current significant energy use through heating, cooling, and ventilation as well as from other outdated building systems. The pre-bid estimates offer a path forward for decision-making that prioritizes a range of solutions (low to high touch) that make the school energy-tight, efficient, and nonpolluting.

RDH performed field surveys of existing mechanical systems and building enclosure systems, with input from maintenance personnel and other stakeholders familiar with the operation of the school.

RDH also performed field testing, including thermal imaging based on ASTM C1060 and ASTM E1186 as well as whole-building airtightness testing.

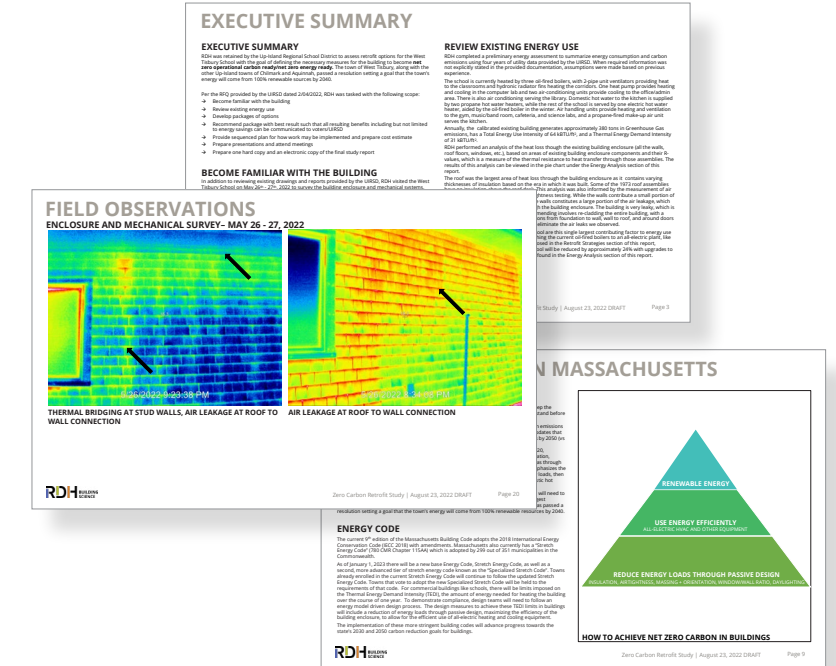
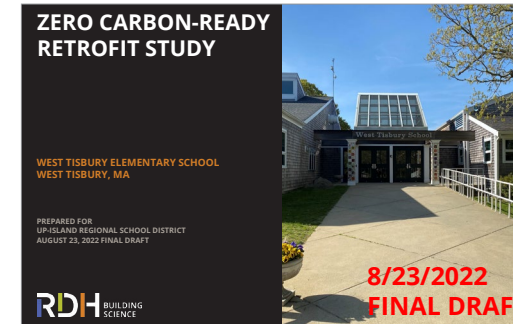
RDH reviewed the existing energy use of the building, developed packages of retrofit options based on energy modeling, and recommended the package with the optimal results for all stakeholders.

RDH's work also included the evaluation of renewable system options, including photovoltaic panel options, to offset the remaining reduced energy use of the building, as well as an evaluation of potentially available incentive programs for the project.

RDH provided a sequenced plan for how work may be implemented and prepared a cost estimate as part of the final report, allowing project stakeholders to evaluate how to proceed with the next steps of the design phase.

RDH leveraged the firm's integrated expertise in Building Enclosure, including field experience, thermal analysis and system detailing, Energy Analysis and Energy modeling, including knowledge of appropriate mechanical systems, and experience orchestrating holistic retrofits of existing buildings.

RDH was able to provide a spectrum of retrofit options for the school and task force to consider. Providing accurate information to enable informed decision making among the stakeholders as they balance the needs of West Tisbury against the building needs of the Vineyard's six schools was central to our success as project partners.



PSPC Net Zero Portfolio Plan

Location:	Canada
Services provided:	Zero Carbon-Ready Retrofit Study, Energy Performance Consulting
Market:	Government
Completion:	2023
Client:	Public Services and Procurement Canada
Team:	Steve Kemp, Neil Norris, Brittany Coughlin, Sarah Bozoian

The Government of Canada has committed to net-zero carbon emissions from government operations by 2050, and Public Services and Procurement Canada (PSPC) has set an aspirational goal of achieving this for its crown real property portfolio by 2030. This ambitious timeline to achieve net-zero operational carbon demonstrates significant leadership within government and provides strategies that industry can use to accelerate the transition to net-zero carbon across Canada. RDH worked with PSPC to update their plan to achieve net-zero scope 1 and scope 2 carbon emissions from all real properties within several portfolio groups, including crown-owned offices, leased offices, infrastructure, and other portfolios.

Our work with building owners and managers like PSPC to develop pathways to net-zero that are feasible and cost effective is key to moving the built environment towards zero carbon emissions.

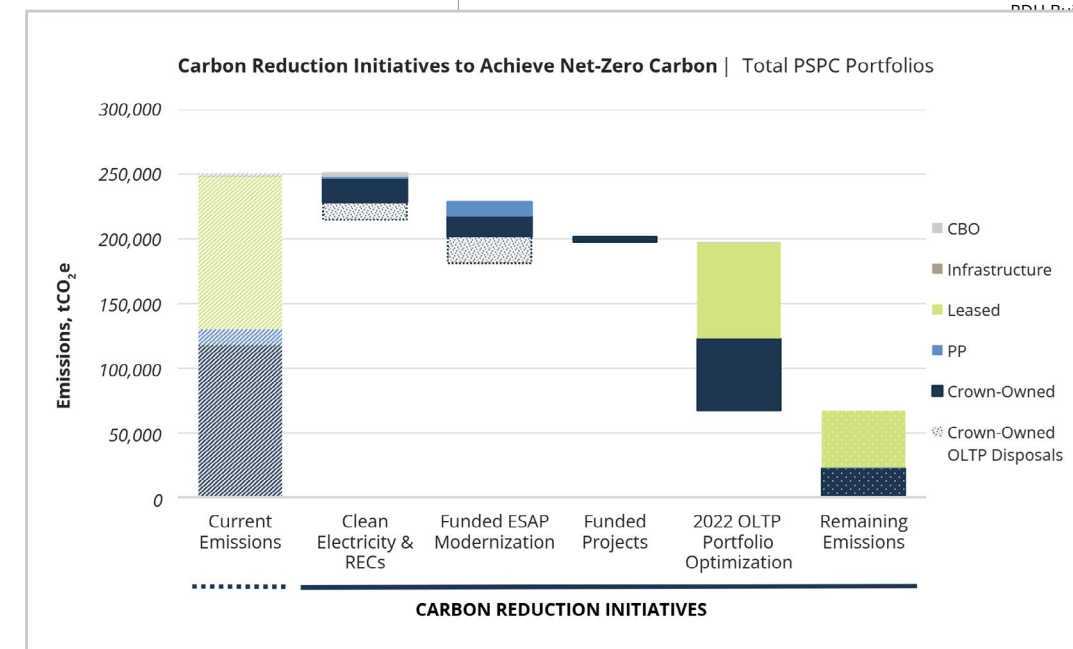


Net-Zero Carbon Portfolio Plan

PUBLIC SERVICES AND PROCUREMENT CANADA
MAY 2023

For
Public Services and Procurement Canada
11 Laurier Street
Gatineau, QC K1A 0S5

Prepared by
RDH Building Science Inc.
1000 Lakeshore Drive #400
Ottawa, ON K1V 6S6



TMU Lifecycle Analysis (LCA)

Location:	Canada
Services provided:	Lifecycle Analysis (LCA)
Market:	Higher-ed
Completion:	2023
Client:	Toronto Metropolitan University (TMU)
Team:	Steve Kemp, Rehanna Devraj-Kizuk

The Toronto Metropolitan University (TMU) x RDH study and resulting database—funded by The Atmospheric Fund (TAF)— informs design decisions at the earliest stages (before details are established) with critical consideration of embodied carbon.

Readily available comparative data from studies on assemblies such as this opens up the opportunity to reconsider how materiality can significantly reduce embodied carbon emissions in buildings.

This study serves as our collective effort to bring this information to the fore serves designers and manufacturers as they make considered and thoughtful decisions on their building enclosure systems.

TMU x RDH also sees this comparative data as a resource for policymakers to right-size mandates, alternatives, and incentives.

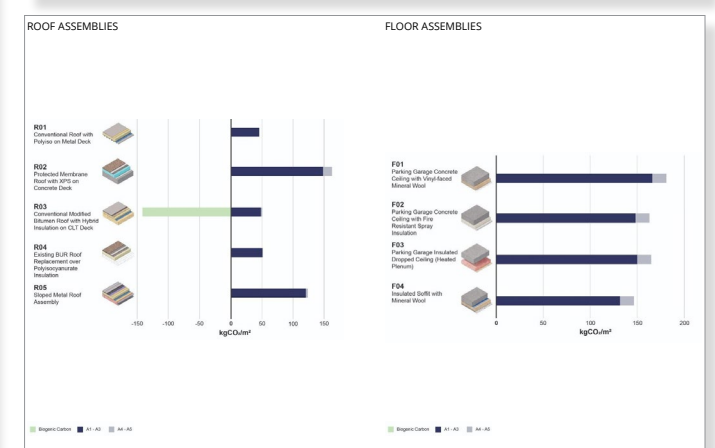
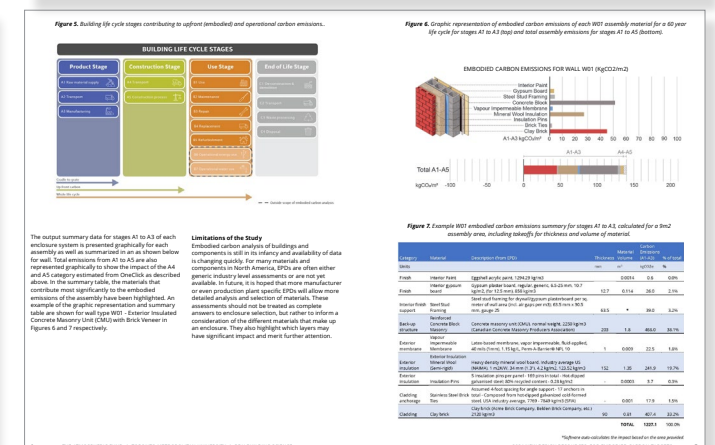
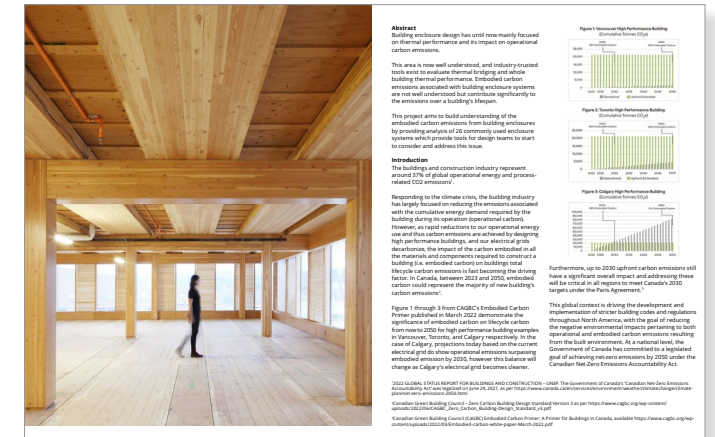
Embodied carbon emissions refer to the amount of GHG emissions associated with the whole life cycle of a product or building, i.e. raw material extraction, processing, transportation, manufacturing, installation, maintenance, and disposal. These emissions are not well understood yet contribute significantly to the total carbon emissions produced over a building's lifespan.

The Study and Outcome

Embodied carbon metrics for twenty-six (26) enclosure systems commonly used in the Greater Toronto and Hamilton Area (GHTA) were analysed using a standardized life cycle assessment methodology for calculating CO2 equivalent embodied emissions.

The results break down emissions by material layer, showing which components have the most negative impact (and where opportunities to reconsider material choice are available).

This comparative data can be used to inform decisions during concept design, before project specifications and detailed drawings are developed and priced, enabling project and team efficiency, productivity, and streamlining.



LOOKING AHEAD 2024 GOALS



Establish new travel guidelines to support RDH employees as they carry out their responsibilities safely, effectively, and with the lightest carbon emissions possible.



Purchase high-quality carbon offsets for emissions from RDH-owned vehicles and RDH-leased offices as a step towards net zero carbon.



Develop a streamlined process for consistently and accurately **measuring and reporting GHG emissions**, including a real-time dashboard.



Launch regional Sustainability Committees to facilitate emissions reduction at the local office level.



See that the right professional development and responsibility structures are in place across management roles to integrate GHG emissions accountability at all levels.

OUR VISION

RDH is a beacon for building science leadership, focused on delivering scalable climate-resilient solutions for clients and future generations.

While we've made progress, our drive to address the climate crisis requires much more action. We're continuing to look for ways to reduce our emissions, develop better systems to track our progress, support like-minded initiatives, and inspire others to act.

Making Buildings Better™

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VANCOUVER VICTORIA COURTENAY SEATTLE PORTLAND OAKLAND DENVER TORONTO WATERLOO BOSTON