

# Targeting Hidden Carbon Emissions in Nelson BC

The Low Carbon Homes Pilot

August 2024



# When you look at these houses, what do you see?



You may see two comfortable-looking homes, both places to relax, eat, and sleep, warm and protected from the elements.

You may be surprised to learn that two seemingly identical houses, with the same floorplans, features, and location, could have wildly varying impacts on the environment and climate. This report explores how this is possible. It also highlights how the City of Nelson is working to understand and reduce the embodied carbon emissions from building materials while ensuring residents have access to healthy, affordable, efficient, and climate-resilient homes.





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# What are Embodied Carbon Emissions?

The materials we use to build our homes have substantial impacts on our planet. One significant aspect of these impacts is known as embodied carbon emissions. It is estimated that embodied emissions contribute about 50% of the total emissions that a given building incurs over its lifetime. Over the last five years, provincial and federal building codes (BC Step Code, National Energy Code for Buildings) have substantially improved the requirements for energy efficiency performance of new buildings. However, embodied emissions have largely remained unaddressed. Several local governments across BC have been investigating this issue over the last few years, including the City of Vancouver, The District of Squamish, the Municipality of Whistler, and the District of Saanich. The City of Nelson has also established itself as a leader in this field with the work it has led through the **Low Carbon Homes Pilot** (LCHP) and precursory investigations that began in 2020.

## There are 2 Main Types of Building Emissions:

1

### OPERATIONAL CARBON EMISSIONS

refer to the GHG emissions produced from building energy use such as heating, cooling, and lighting.

**Historically, green building policy only focused on reducing these emissions.**

2

### EMBODIED CARBON EMISSIONS

refer to the GHG emissions produced through the creation, use, and disposal of buildings and building materials.

**Increasingly, these emissions are also being considered.**

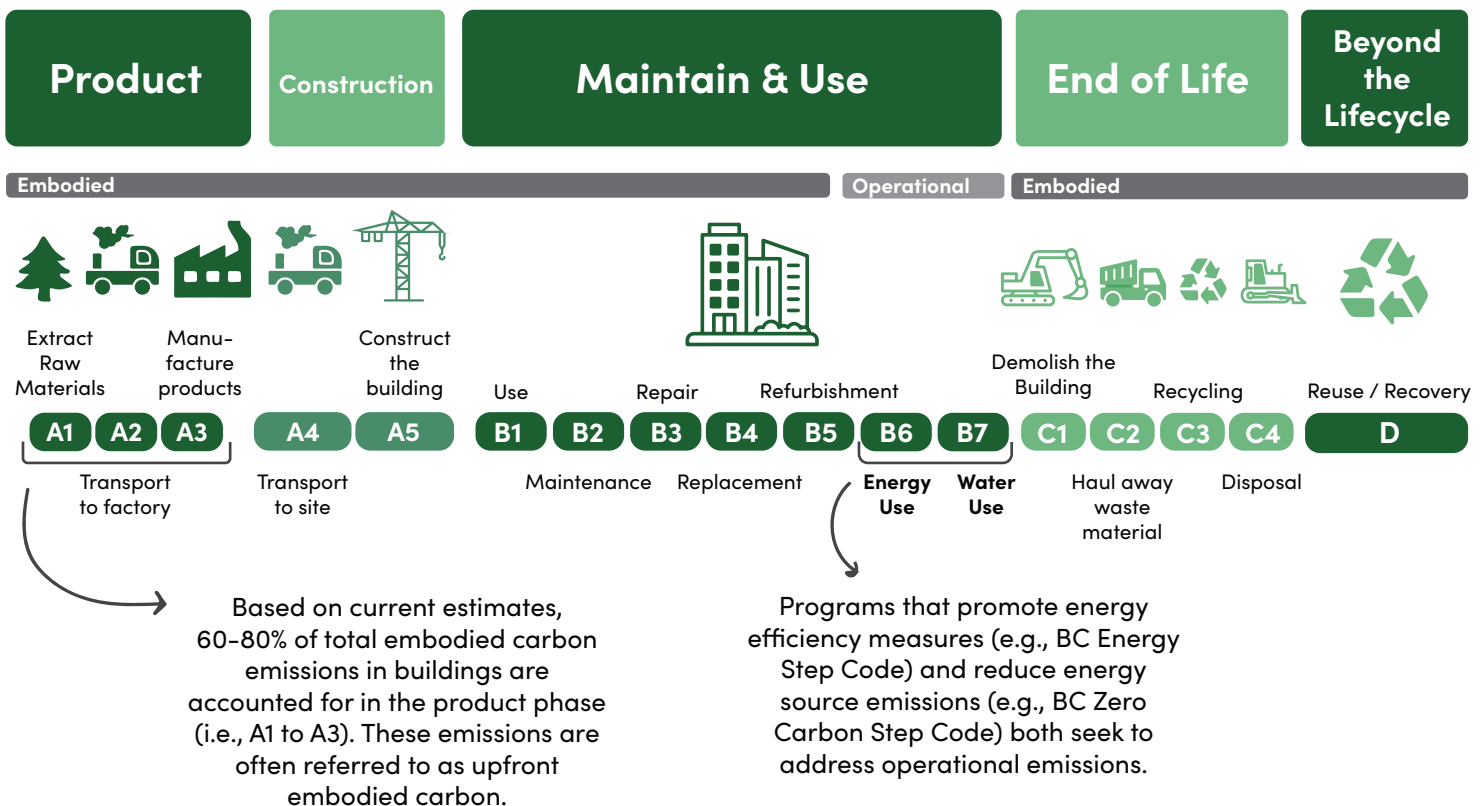


# Material Life Cycle Impacts

A significant part of Canada's energy consumption can be attributed to the electricity, natural gas, and other fuel sources used to heat and power our homes. However, the environmental impacts of our homes are not limited to the energy consumption that can be easily seen, understood, or quantified. All of the products and materials we use in our daily lives have unseen impacts, both before and after we purchase and use them. These are known as **lifecycle impacts**, and they can be evaluated through a process called a **Life Cycle Assessment (LCA)**.

## What is a Whole Building Life Cycle Assessment (wbLCA)?

It is a method of compiling and analyzing all the inputs, outputs, and potential environmental impacts of all the individual building components over its lifetime.



## Phase 1

# Opening the Embodied Carbon Conversation

Phase I of The City of Nelson's Low Carbon Homes Pilot, with funding from FortisBC & the City of Castlegar, launched in 2021. It began with a study to evaluate the average amount of embodied carbon associated with the construction of newly built homes in Nelson and Castlegar. The study also worked to identify which materials represented the largest emissions contributions. Findings were shared through a series of workshops and two educational documents – the **Material Carbon Emissions Guide** and the **Benchmarking Report**. These documents have been widely referenced by municipalities and organizations across the province and country, contributing to the advancement of embodied carbon research and policy.





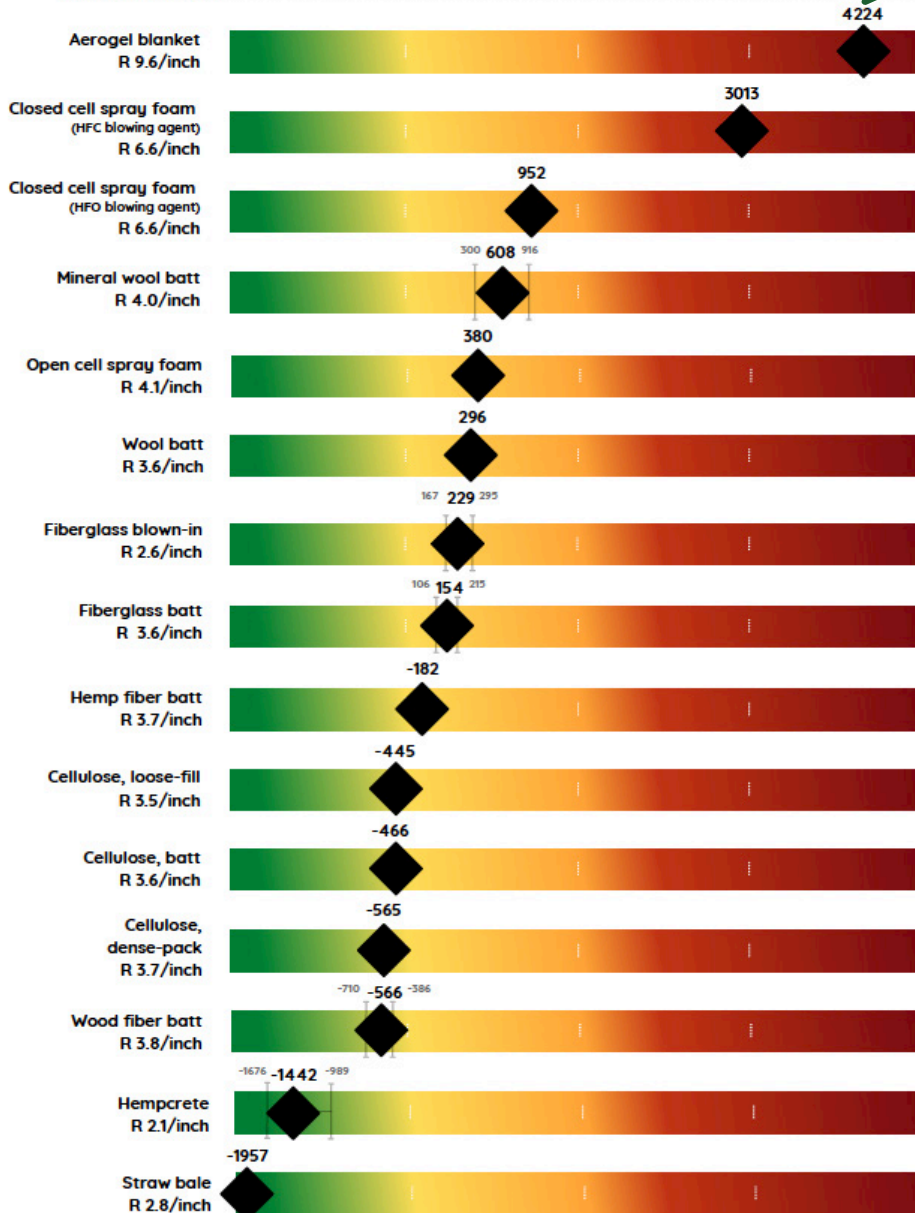
# Material Carbon Emissions Guide

The **Material Carbon Emissions Guide** is a resource that helps identify commonly used materials with high embodied emissions and suggests potential alternatives. It focuses on various material options for building assembly categories such as the roof, foundation, insulation, framing, and cladding. The guide provides information on the average embodied emissions associated with those materials. An example of this is shown in the image below, which compares the emissions associated with various insulation options.

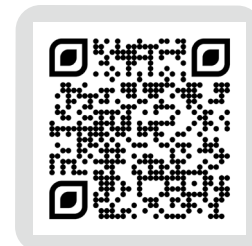
## Wall Cavity & Attic Insulation

insulation emissions based on 100 m<sup>2</sup> (at R-13)

(kg of CO<sub>2</sub>e/m<sup>2</sup>) -2000 4500



These numbers refer to the average amount of emissions associated with this product (using Environmental Product Declarations from all brands that provide them).

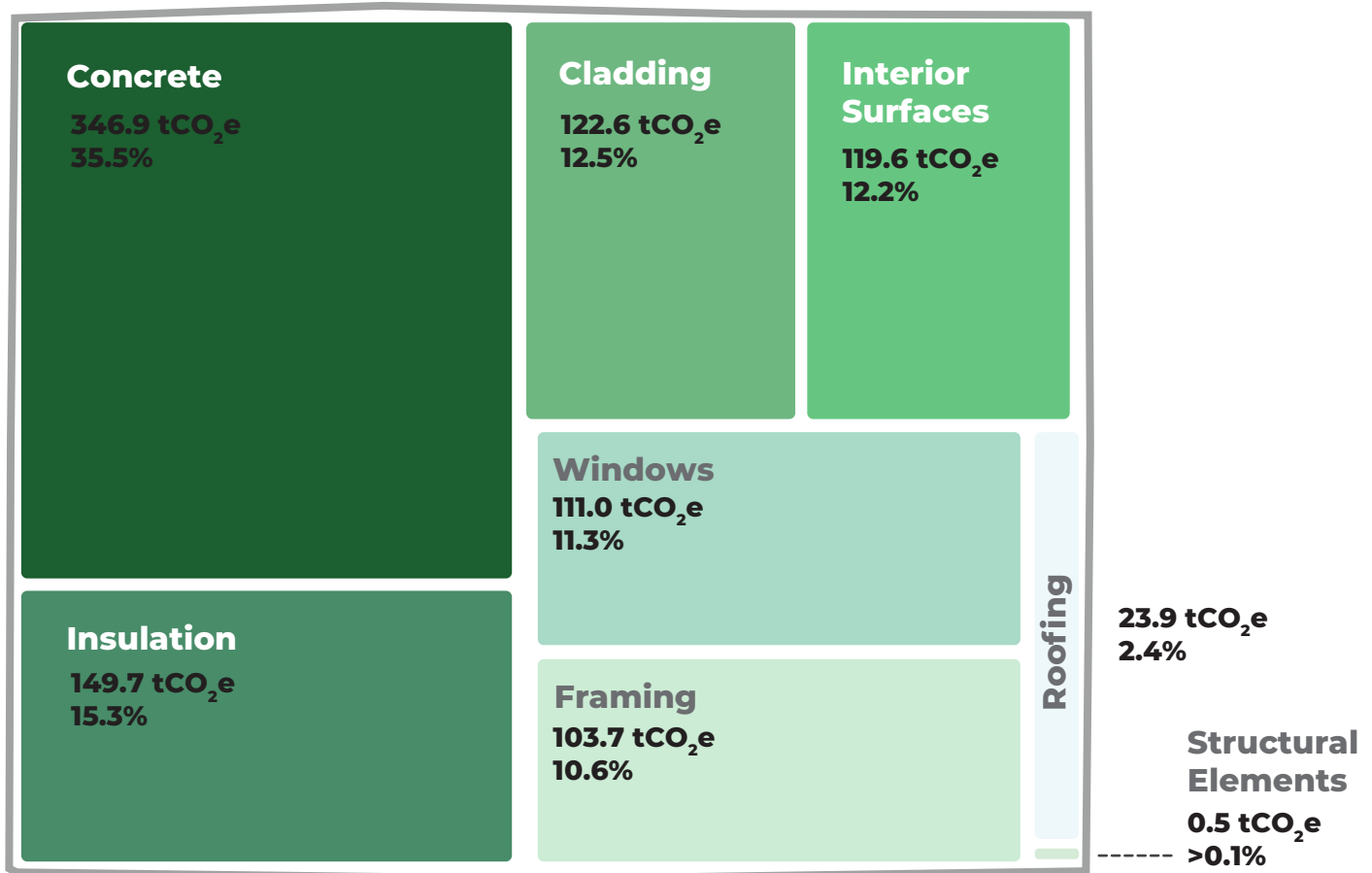


Scan the QR Code to access the **Material Carbon Emissions Guide** and learn more about some of the alternatives to high embodied emissions materials.

# Benchmarking Report

The **Benchmarking Report** establishes benchmark metrics for newly constructed local residential buildings. It measures both the total Material Carbon Emissions (MCE – kg CO<sub>2</sub>e) attributed to the building materials, and the Material Carbon Intensities (MCI – kg CO<sub>2</sub>e/m<sup>2</sup>), which is the MCE divided by the heated floor area. These metrics serve as a baseline for improvements in the local building industry. The report includes targeted insight on embodied carbon reductions for building designers, contractors, energy advisors, and local government building officials.

The chart below illustrates which materials contributed the most amount of overall emissions across all 34 case study homes.



One of the significant findings is that there is no direct link between home energy efficiency and embodied emissions. In other words, it is entirely possible to construct a home that is both highly energy-efficient and has low embodied emissions.



Scan the QR Code to access the **Benchmarking Report**

## Phase 2

# Building Our Team



Building on the insights gained in Phase I, Phase II of the Low Carbon Homes Pilot (LCHP) launched in 2022 with additional funding from FortisBC. The primary goal of Phase II was to put the insights from Phase I's embodied emissions research into practice in the local building sector and create greater awareness about the impact of embodied carbon. This second phase focused on practical implementation and aimed to encourage the adoption of sustainable practices in the building industry through:

- Developing educational workshops for the local building industry.
- Publishing four case studies aimed at bringing awareness about leading sustainable projects and concepts.
- Establishing Nelson's Embodied Carbon Advisory Group to build capacity and teamwork in the building community.
- Offering free embodied carbon analyses and consultations to local building professionals or homeowners to help them with their building projects.



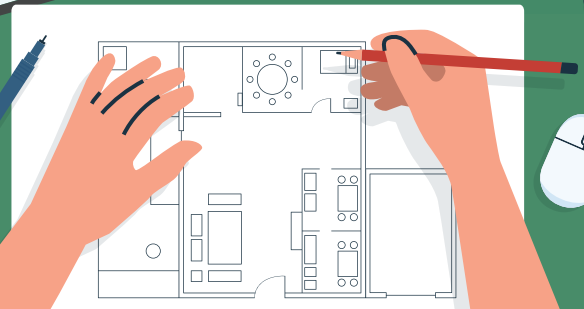
# Case Studies

Four case studies were developed to provide detailed analysis on how to tackle embodied carbon across various aspects of the construction process. Two of the case studies are described below and on the following page. The remaining two case studies resulted in further investigations in Phase 3 of the LCHP (see pages 13-14 and 17-19).

## Case Study 1: Free Embodied Carbon Consultations

One strategy used to further education on embodied carbon within the region was to offer free embodied carbon analyses and consultations for building projects within the Kootenays. Twelve projects were assessed in total. The intention of this work was to increase awareness of the topic, build local capacity, and facilitate embodied carbon emissions reductions. Anyone involved in the projects – including homeowners, builders, designers, and interested sub-contractors – were encouraged to participate. The Embodied Carbon Consultations occurred in three phases:

- 1 Analyses:** Building schematics were collected during the building permitting phase, and the **BEAM estimator tool** was used to assess embodied emissions associated with the proposed building plans.
- 2 Consultations:** Nelson's embodied carbon analysts met with the building team to discuss the findings and propose actions and material substitutions to reduce embodied carbon.
- 3 Evaluations:** Participants completed follow-up surveys. Their feedback indicated that these consultations were very helpful and resulted in many making changes to their building plans to reduce emissions. Two key aspects of this success were that the education and support was provided very early on in the building design process, and targeted a cross-disciplinary approach where the whole building team was involved.





## Case Study 2: Natural Buildings

Case Study 2 considered a local builder-owner who aspired to build an affordable home that not only achieved Step 5 of the BC Step Code, but also had very low material carbon emissions and provided residents with a healthy living environment. The wall assembly used in this home is known as light clay straw construction, which has the following

- 1 Creates a highly insulated and airtight building.
- 2 Results in much lower embodied emissions than conventional construction, as the organic materials (straw) store carbon sequestered during photosynthesis in their fibers for the lifetime of the building.
- 3 The techniques used in light clay straw construction can be quickly learned with a bit of research and dedication. This means that family, friends and interested community members can be included in the building process, minimizing labour costs (as it is a labour intensive process), and promoting education on natural building.



## Nelson's Embodied Carbon Advisory Group

In the fall of 2021, while hosting a series of educational embodied carbon workshops, we received feedback from various building professionals voicing their desire to become more involved. This prompted the development of **Nelson's Embodied Carbon Advisory Group**, which has met monthly ever since. This group continues to perpetuate the heartbeat of embodied emission work in the City and provides a unique opportunity for building professionals and local government building officials to engage together in a safe, collaborative environment.

Nelson's Embodied Carbon Advisory Group is intended not only to offer educational content for local and regional building professionals, but also to foster a sense of community between ambitious and thoughtful individuals in the building industry. Anyone who showed a keen interest in becoming involved, the ability to discuss complex topics respectfully, and a commitment to attending meetings regularly is welcomed into the group. The Embodied Carbon Advisory Group meets monthly and continues informal communication between meetings via email.

### Challenge

Balancing the need to give meeting attendees unique insights into the LCHP leads plans for their embodied carbon work and receiving their feedback without overloading them with too much detail or content in a short amount of time.

### Solution

Not overloading meetings with activities and allowing for organic discussion to occur.

### Challenge

Ensuring the group allows for a reciprocal relationship between the City and attendees so both groups benefit and meaningful collaboration can occur.

### Solution

Providing attendees with updates on progress in the realm of embodied carbon policy as well as valuable learning opportunities where they can hear from and connect with industry experts and other guest speakers.

### Challenge

A lack of participant capacity/time to prepare presentations, but an interest by participants to hear from each other about their work.

### Solution

Inviting presentations without slides, and gently encouraging participants to send pictures if it would help describe their experiences and/or projects.

## Want to Start Your Own Advisory Group?

The development and evolution of this advisory group has allowed Nelson to establish itself as a leader in embodied emissions work. We highly recommend that other local governments who are hoping to address embodied emissions in the construction industry consider creating a similar group in their own region. We would be happy to help support this process. We recommend considering the following points, as they helped us in the development of our working group:

- Keep things relatively informal, flexible, and social.
- Don't ask too much from the advisory group participants for at least the first year. Instead, work on building trust and the sense that this is a worthy use of their time.
- Welcome in individuals who have varied perspectives and don't all agree (as long as they are willing to listen and articulate themselves respectfully).
- Connect embodied carbon education with other relevant building related concepts (make the discussion/content practical, timely, and relevant to what they are encountering in their day-to-day work).
- Help the group stay involved and up to date by sending out calendar invites, meeting reminders, and following up with notes and important links after each meeting.
- Snacks keep everyone happy and talkative!



## Commitment to Change Award

In April 2023, the City of Nelson won a Commitment to Change award at the inaugural BC Embodied Carbon Awards hosted by ZebX, Carbon Leadership Forum Vancouver, and the Metro Vancouver Zero Emissions Innovation Centre. The City was recognized for placing a focus on embodied emissions and leading the way for other larger municipalities to do the same by producing the Embodied Carbon Benchmarking Report and Materials Guide, as well as offering free consultations to builders/designers.

This work was made possible through the active involvement and participation of the Embodied Carbon Advisory Group and all of its dedicated members as well as the LCHP publications.

# Phase 3

## Inspiring Local Action

Phase III of the Low Carbon Homes Pilot aimed to further embed lessons learned from the research and testing phases of the Pilot into the local building industry and City processes. It also focused on continuing to build more awareness about embodied carbon in the community. The work carried out in this phase consisted of:

- Offering educational opportunities like the **free Embodied Carbon Consultation and Embodied Carbon 101 Sessions** (see page 12), and a Low Carbon Building Assembly workshop (see pages 15-16)
- Supporting a local concrete seminar where strategies to reduce concrete carbon emissions were discussed (see pages 13-14) – for more details on local efforts to reduce concrete emissions check out this **Community Champion highlight**
- Networking and relationship-building through participation in the Embodied Emissions Peer Network and Research Networks, supporting expert panel reviews for other local governments and organizations working on embodied carbon research, and advocating for consideration of embodied carbon in higher-level government policy



[Low Carbon Building Assemblies Workshop](#)



[Rockform Solutions' Low Carbon Concrete Policy](#)

## Key Findings from Phase III of the LCHP

- One key finding from the third phase of the Low Carbon Homes Pilot is the opportunity to focus on procurement initiatives and the challenge of crafting an effective yet flexible procurement policy for small, under-resourced communities (this opportunity is targeted by Phase IV of the LCHP).
- Another key finding was that there is a gap in availability for embodied emissions data beyond the production phase of building materials' lifecycles. While the material extraction and manufacturing processes (phases A1-A3, see the graphic on page 2) account for the majority of a material's lifecycle emissions, the transportation, construction, maintenance, use, and end-of-life processes (phases A4-D) are also responsible for substantial emissions, and merit further investigation.
- There is a gap in current knowledge regarding the embodied emissions implications of retrofit projects. This is an area that deserves further research as far more retrofits are occurring each year (estimated 400 retrofits vs. 20 new builds). A potential research project to begin addressing this gap is included on pages 17-19 of this report.
- There is a need to support the local building industry in accessing low carbon building material options and provide education on the specific applications of the materials recommended through the Material Carbon Emissions Guide and other LCHP educational resources (this opportunity is targeted by Phase IV of the LCHP).



## Free Embodied Carbon Consultations

Due to the success of the Embodied Carbon Consultations in Phase II of the LCHP, the City of Nelson continued to offer this service to the community through Phase III. The City also expanded the offering to include projects in the City of Rossland as well as regional participants in the RDCK's Regional Energy Efficiency Program (REEP). This round of consultations was offered by local embodied Carbon consultants Mike Coen from Build Environmental, and Michele Deluca from Harmony Engineering. Likely due to an especially low number of homes being built in the region during 2023, uptake for this round of consultations was slow. But there were a few valuable takeaways from the consultations that did occur:

Fire resilience was a key topic in every consultation, especially when biogenic low carbon building materials were suggested. More research is needed to ensure that low embodied carbon materials align with the growing concern of wildfires in our region.

Every participant said they were likely to make low carbon material substitutions after the meeting (while some were not able to make these substitutions in their current projects, they mentioned that this information was a valuable resource for future projects).

Increasing the availability of low carbon building materials and related knowledge of local building suppliers was stressed as a primary area to focus efforts.

## Embodied Carbon 101 Series

The Embodied Carbon 101 series aimed to open conversations with large organizations in the region around the importance of considering embodied emissions. The organizations that participated were Maglio's Building Centre, the City of Nelson's Public Works & Utilities department, Columbia Basin Trust, and Doctors and Physicians for Planetary Health. The conversations centered around several key topics, including:

1

**Embodied carbon and its significance**

2

**The distinction between embodied carbon emissions and operational emissions in new buildings**

3

**The importance of addressing embodied carbon emissions in construction projects**

Attendees learned about the City of Nelson's efforts to reduce embodied carbon emissions to date and discussed future initiatives. Local case studies were presented to illustrate how embodied carbon reductions can be achieved.



# Low Carbon Concrete

## Why is concrete such a big deal?

The Low Carbon Homes Pilot Benchmarking Report – conducted on 34 new homes built in Nelson and Castlegar in 2020 – found that concrete was responsible for 35% of the up-front embodied carbon emissions of those projects. These findings align with similar studies conducted in larger municipalities across the country. Globally, cement contributes about 8% of total annual carbon emissions, which is approximately triple that of the aviation industry; and if the cement industry were a country, it would be the third largest producer of carbon emissions.

## Low Carbon Concrete Seminar

In 2023, Rokform Solutions, a local concrete supplier, hosted a seminar on low-carbon concrete. The event – held in collaboration with the City of Nelson, Lafarge Canada Inc., and Nelson Ready Mix – aimed to educate the local building industry on technical aspects and sustainability measures related to the use of concrete. Shortly after the seminar, Dan **Thompson of Rokform Solutions** developed an internal **Low-Carbon Policy**. This policy attempts to leverage various strategies to reduce the carbon emissions tied to the concrete Rokform Solutions supplies to the local region. These strategies include:



[Rockform Solutions' Low Carbon Concrete Policy](#)

- Supplying and promoting a high-volume fly ash (low carbon) concrete mix
- Recommending and educating local contractors on the importance of not over specifying strengths and thicknesses of various concrete building assemblies
- Other innovative efforts like using concrete as a finished product

Most of these strategies result in cost savings for the contractors as the total volume of concrete is reduced and fly ash can be cheaper than cement to source.



An immediate positive response was noticed from local contractors who attended the Low Carbon Concrete Seminar. They began ordering high-volume fly ash mix for both flat and formed concrete applications and stopped bumping up assembly thickness and concrete strength ratings beyond code specifications.

Rokform's Low Carbon Concrete Policy, implemented in July of 2023, has already resulted in a significant reduction of CO<sub>2</sub> pollution, with Rokform estimating a total of **60 tons of CO<sub>2</sub> reduced so far**. About 29 of these tons were attributed to reduced use of concrete during concrete design and pouring processes, and the other 31 tons were attributed to the use of the high-volume fly ash concrete mix.



In 2023, Nelson Ready Mix supplied the area with over 15,000m<sup>3</sup> of concrete (>6,300m<sup>3</sup> for commercial use, and >8,700m<sup>3</sup> for residential use). If we assumed a 75% replacement of conventional concrete mix with the high-volume fly ash mix for residential use, and 20% reduction for commercial use (percentages Rokform estimated could be realistically achievable), this would result in the reduction of about **500 tons of CO<sub>2</sub> avoided in a year**.

On December 14, 2023, Dan Thompson received a Sustainable Leadership Award from the City of Nelson for his dedicated work.





## Low Carbon Building Assemblies Workshop

The **Low Carbon Building Assemblies Workshop** was developed by FortisBC, BCIT, and the City of Nelson. It was designed to help inform and educate the local building industry on what materials and building assemblies can help reduce carbon emissions associated with new construction projects. The workshop included an overview of embodied carbon considerations in the construction industry, a review of the current political landscape in BC regarding low carbon building, a demonstration of four different low-carbon building assemblies, and two local case studies of buildings that deployed low embodied carbon design.

A key takeaway from the workshop was that local builders already using some of these materials and assemblies found that their projects did not have increased costs due to these choices.



The above photos show physical models of low carbon building assemblies (roof and wall structures) that were constructed for workshop attendees to examine. These assemblies included the use of dense packed cellulose, hempcrete, and wood-fibre board - three low-carbon insulation alternatives. The models were built to optimize the use of low carbon building materials as well as building envelope energy efficiency measures like air sealing and continuous insulation to ensure operational and embodied carbon reductions simultaneously.

Check out the **"Building Better in the Kootenays: Low Carbon Building Assemblies Workshop" Report**





## Barriers and Approaches to Embodied Carbon Action

Attendees identified the following local barriers to embodied carbon action, and potential respective approaches to address these barriers:

### Barrier

### Approach

Provincial Code and material regulations.

Support for allowing/incentivizing natural building material applications in building codes. Adding a formal balance between operational & embodied carbon emissions into legislation.

High building costs in the industry currently.

Financial supports for embodied emission reductions. Highlighting and promoting cost-effective solutions.

Uninformed insurers and warranty providers.

Education for these groups paired with code updates.

Uninformed local building inspectors and homeowners.

Training and education targeting both homeowners and building inspectors.

Limited local industry capacity and expertise.

Hands-on learning opportunities for builders regarding specific materials and applications.

Local availability limitations for low-embodied carbon materials and professionals.

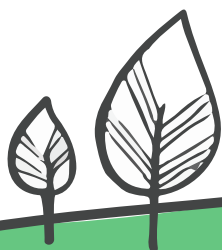
Databases for low-carbon material sourcing. Contact lists for low-carbon home professionals.

Societal assumptions around cost and feasibility.

Pre-packaged solutions or steps that can reduce embodied carbon emissions and are simple and cost-effective.

Limited data to characterize decision impacts.

Improved data availability through high-level supply chain regulation or local research efforts.



## Embodied Carbon in Retrofits

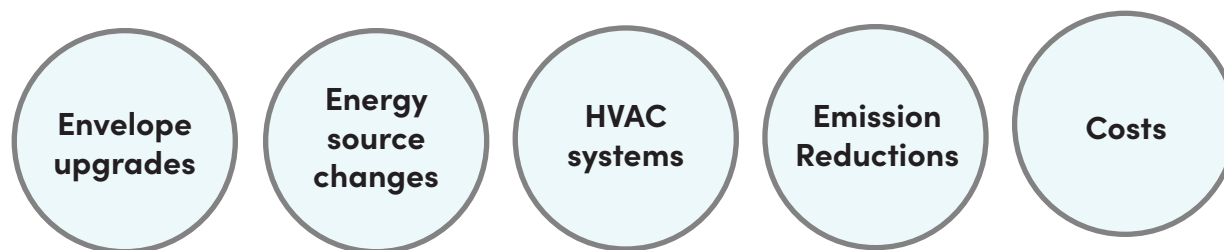
Energy retrofit projects often involve the addition of building materials and new mechanical systems, resulting in significant embodied emissions. The opportunity to apply embodied carbon learnings from the LCHP research in the world of new construction to the realm of renovations and energy retrofits was identified during many conversations with the public and meetings with the Embodied Carbon Advisory Group. Due to limitations of the initial funding agreement, this iteration of the Pilot was unable to focus on existing buildings. This information would complement the work and funding opportunities promoted by the **Regional Energy Efficiency Program**. Moving forward, it is imperative that Nelson begin to more directly address the need to consider embodied carbon emissions in existing building renovation and retrofit projects. Included on the following pages is a rough structure for a potential study that could help to identify embodied emission implications of common retrofit decisions made by local homeowners. This was informed by an informal review of two local deep energy retrofits conducted by the Embodied Carbon Advisory Group during a monthly meeting as a constructive exercise to assess the operational and embodied carbon emission tradeoffs.



# Future Research Proposal: Characterizing Embodied Emission in Retrofits

## Overview

When it comes to retrofitting an existing home to be more energy efficient and comfortable, homeowners are quickly faced with a multitude of decisions and complicating factors including:



This can be a daunting task for homeowners who don't have a building background or access to affordable, professional advice.

While there are many resources available to support aspects of these decisions – such as the Regional Energy Efficiency Program (REEP) – currently, no such resource exists to specifically inform homeowners of the tradeoffs between embodied and operational carbon emissions when investigating energy retrofit options for their home. The proposed study would target this gap, and would also benefit building designers, contractors, energy modelers, and municipal planners/policymakers.

## Goals

We aim to produce a brief or guide that helps homeowners take embodied carbon emissions into consideration with energy efficiency, comfort, and cost considerations when planning to retrofit their homes. This resource will outline common retrofit options and provide estimated embodied and operational emissions tradeoffs, payback periods, and other considerations associated with each option. We also aim to produce a credible resource for other local governments and research bodies to use and reference. This would advance the current understanding of emissions related to retrofits, and could inform policy, incentive programs, and related future research.

## Scope

The study would review a sample of pre- and post-retrofit energy-assessments (and attached participant intent survey responses) conducted on homes in the REEP program to characterize the common decisions and situations that retrofit projects face. We may also make use of modelled scenarios to better understand the possibilities that may not have already been executed within this data set.

## Research Steps

1

Review REEP participant intent survey responses. This will help determine the primary reasons homeowners pursue an energy retrofit. Although our work will focus specifically on emissions reductions, we understand that this may not be the typical primary reason for undergoing a retrofit and want to understand some of the other variables at play.

2

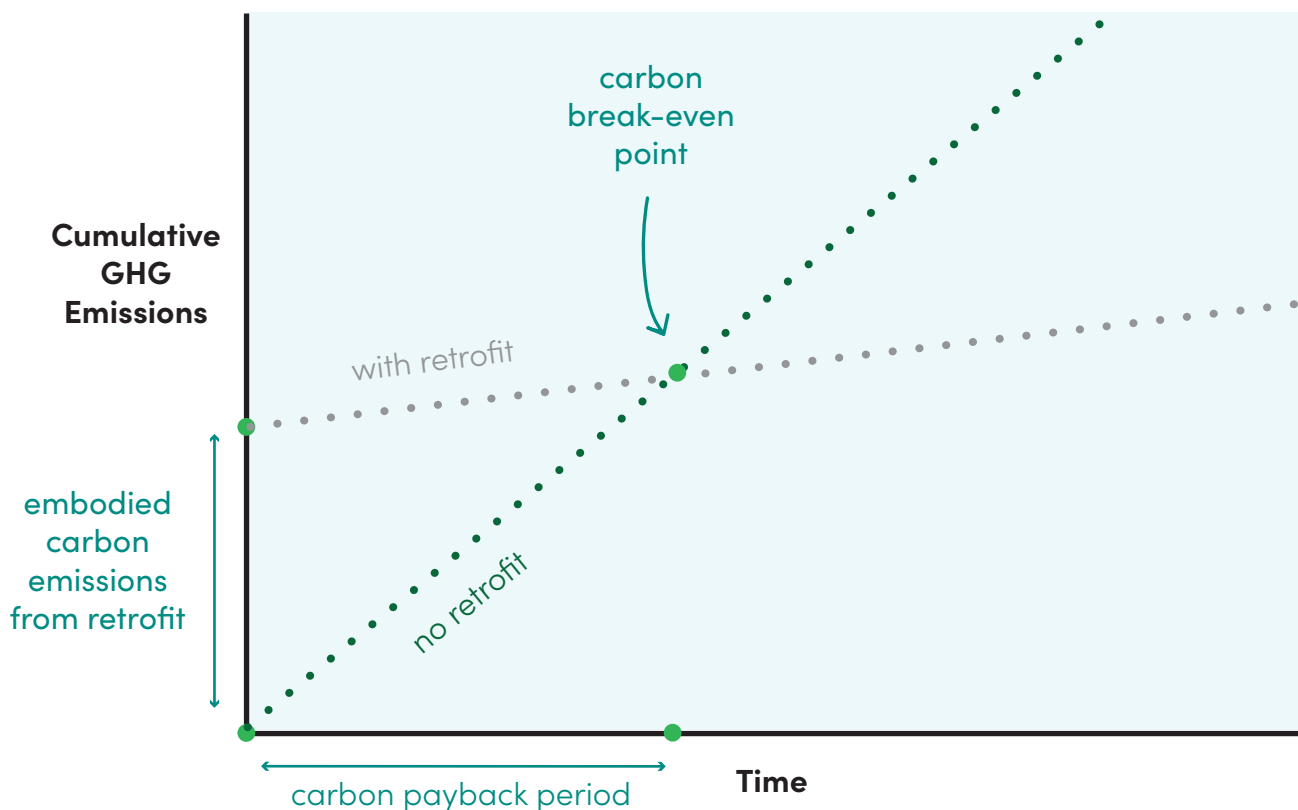
Characterize the common retrofits carried out by homeowners by reviewing REEP Energy Assessment D & E reports (i.e., upgrading mechanical systems, installing secondary suite, air sealing vs. insulation, air changes/hour, annual energy use, etc.).

3

Calculate the operational and embodied carbon trade-offs for the various retrofits and building profiles identified through the REEP energy evaluation reports.

4

Develop a guide or informational brief that summarizes the study findings to help homeowners make informed decisions.



**Figure 1:** The above graph gives a sense of the carbon payback period that would be associated with the embodied carbon emissions resulting from retrofits.



## Phase 4

# Next Steps for the Low Carbon Homes Pilot

**Phase IV** of the LCHP aims to take from the success and learnings of the last three phases and begin to share this knowledge and expertise with a wider network of communities beyond Nelson City boundaries. These efforts will target industry (builders, architects, engineers, and material suppliers), local governments/policymakers, and community residents. Phase IV will focus on the development of two shareable template toolkits that will be developed and piloted with other local government partners to characterize and address barriers to implementation.

## Toolkit A: Incremental Steps to Achieve Embodied Carbon Reductions

### Resources for Building Construction & Design Teams

At times, the emission reduction targets we set for industry or communities can seem like insurmountable achievements. It is helpful to break these aspirational goals down into more manageable steps. This resource will outline various steps that building teams can take to achieve incremental embodied carbon reductions in new construction projects, and tie in other important potential impacts and co-benefits like: costs/payback periods, labour-intensity, health risks/benefits, funding opportunities, climate resiliency, etc. The toolkit development process will also consider key barriers such as material sourcing, access to qualified professionals, insurance and code considerations, and local environmental conditions. Specific guidance for each suggested action will be carefully detailed to support building teams with their implementation, and further supports like education, training, and consultations will be provided where helpful.



## Toolkit B: Integrating Embodied Carbon Considerations into Corporate Procurement Policy

Effective policy implementation often requires a phased and iterative approach that allows for capacity building and careful integration of feedback to increase buy-in and limit resistance. The LCHP team will engage closely with the City Procurement team on the development and implementation of this toolkit. In hopes of creating a robust and widely applicable resource package, we will also be partnering with other local governments and reviewing the challenges and opportunities encountered by each during the process. To build the necessary internal capacity for low-carbon procurement, delivery of this policy program will include support and training for municipal staff involved. After the piloting phase, the toolkit will be shared with a wider audience of local governments and corporations interested in low-carbon procurement.

**Nelson has secured a student from the University of British Columbia Sustainability Scholar program who has extensive local government procurement policy experience to assist with this project over the summer (2024)!**

**Strategies explored will include:**

The consideration of an initial requirement to acquire Environmental Product Declarations/Life Cycle Assessments (Environmental Product Declaration (EPD) and Lifecycle Analysis (LCA)) as a first step in the procurement process. This would help build understanding and capacity on the issue.

The development of material-specific embodied carbon policies to target large emission reductions (i.e., low-carbon concrete policy).

Project-specific support for staff as they begin to include embodied carbon considerations in procurement processes.

Standardization of scoring and evaluation criteria in Request for Proposals and Request for Qualifications (i.e., cost/tons of CO<sub>2</sub>e avoided via low-carbon material selection).

# Conclusion

Three years after Nelson first initiated work to reduce embodied carbon, the community has become a leader in the field. Nelson has become known for the educational documents we have published, such as the Material Carbon Emissions Guide, and for the successful implementation of an ongoing educational and relationship-building campaign that has led to meaningful and replicable change. For example, a local concrete plant switched to a lower carbon concrete mix, and the thriving Embodied Carbon Advisory Group was established. The Low Carbon Homes Pilot, now in its fourth phase, maintains its core goal of ambitiously, creatively, and pragmatically reducing greenhouse gas emissions in the building sector by aligning embodied emission reductions with existing efforts to reduce operational emissions.

## Your Participation Matters

The City of Nelson is focusing on the structures, processes, and systems needed to embed a climate lens into the work we do as a municipality. We aim to create a foundation for a safer, healthier community for all our residents, and we encourage everyone to get involved.

You can start by exploring the Low Carbon Homes Pilot and other climate programs offered through Nelson Next today at [nelson.ca/programs](https://nelson.ca/programs).

Low Carbon Homes Pilot Partners

