



EMBODIED CARBON CALCULATOR THROUGH WHOLE-BUILDING LIFE CYCLE ASSESSMENT

2150 KEITH DRIVE

353
kg CO₂ eq./m²

ARCHITECT | **DIALOG**
STRUCTURAL ENGINEER | **Fast + Epp**
YEAR COMPLETED | **Under construction (2021)**
LOCATION | **Vancouver, BC**
USE | **Offices**
GFA | **24,555 m²**
TOTAL STORIES | **10**
HEIGHT | **60.5 m**
PRIMARY STRUCTURE | **Mass timber and concrete hybrid**

Located in Vancouver BC, 2150 Keith Drive is an innovative 10-storey office building that will include office spaces, flexible meeting areas, rooftop deck, and wellness and social spaces. The hybrid structure includes nine levels of mass timber construction above a concrete ground floor. The structure also features a unique honeycomb curtainwall façade design that provides structural benefits, creates balconies and outdoor spaces and gives the building its signature look. Mass timber elements within the structure include glulam beams, columns and braces, and cross laminated timber walls and floor panels, that were sustainably and locally sourced. The building project is targeting high performance environmental standards like LEED Gold certification.

LCA PARAMETERS

PROJECT DATA SOURCE

BIM model

PROJECT PHASE

Design development complete

LCA STUDY PERIOD

60 years

TOOL

Tally (Version 2020.06.09.01)

DATE OF ASSESSMENT

February 2021

LCA SCOPE

OBJECT OF ASSESSMENT

Foundation and slab-on-grade
Floors (incl. stairs)
Exterior walls, windows and doors
Interior walls, doors and ceilings
Roof

NOTABLE EXCLUSIONS

Interior finishes

SYSTEM BOUNDARY (LIFE CYCLE MODULE)

Product (A1-A3), Construction Process (A4)
Use (B2-B5), End of Life (C2-C4)



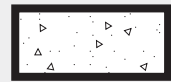
TOTAL GWP
8,669,915
kg CO₂ eq



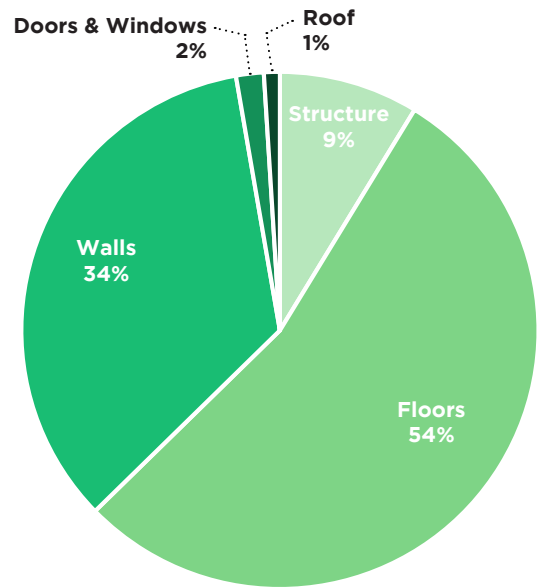
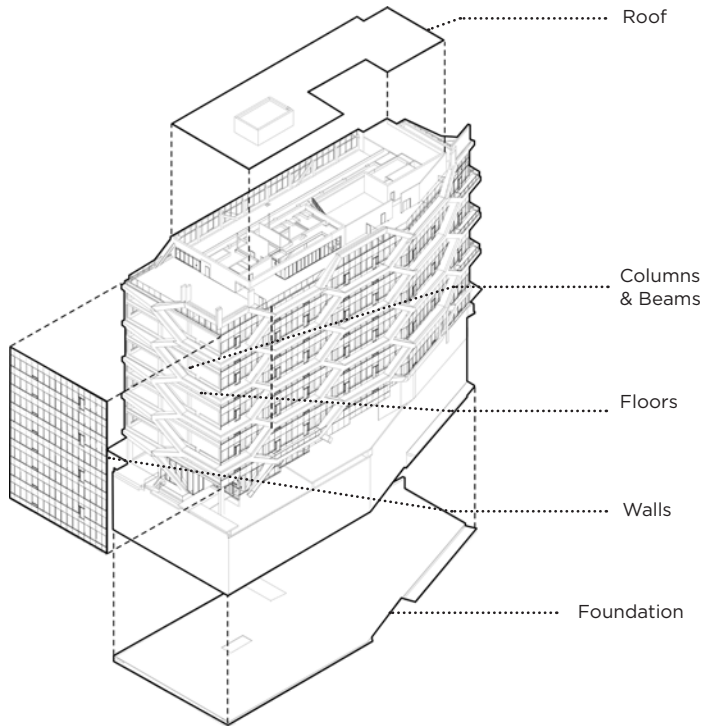
HIGHEST IMPACT
BUILDING ASSEMBLY
FLOORS



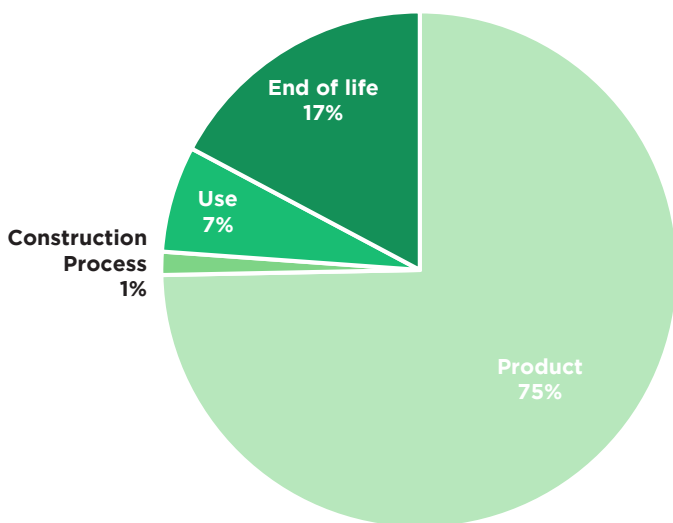
HIGHEST IMPACT
LIFE CYCLE MODULE
A - PRODUCT



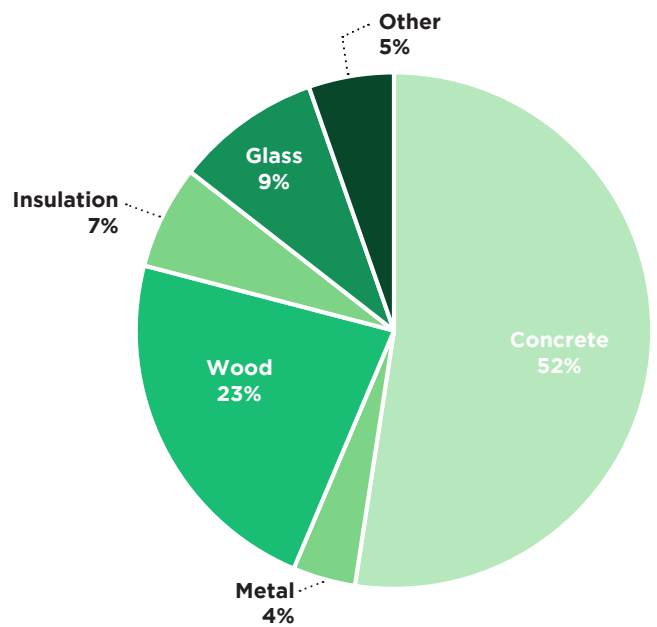
HIGHEST IMPACT
BUILDING MATERIAL
CONCRETE



GWP BY BUILDING ELEMENT



GWP BY LIFE CYCLE STAGE



GWP BY BUILDING MATERIAL

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EMBODIED CARBON CALCULATOR THROUGH WHOLE-BUILDING LIFE CYCLE ASSESSMENT

825 PACIFIC

430
kg CO₂ eq./m²

DEVELOPER | **Grosvenor Americas**
 ARCHITECT | **IBI Group Architects**
 STRUCTURAL ENGINEER | **DIALOG**
 YEAR COMPLETED | **Under Construction (2021)**
 LOCATION | **Vancouver, BC**
 USE | **Cultural hub**
 GFA | **2,704 m²**
 TOTAL STORIES | **7**
 HEIGHT | **33.1 m**
 PRIMARY STRUCTURE | **Concrete and Steel**

Located in Downtown Vancouver 825 Pacific is a multi-purpose arts and culture hub for the local community that will accommodate production studios, gallery and office space. Upon completion, anticipated Summer 2021, the building will be provided to the City of Vancouver to support the City's initiative of creating and repurposing spaces for arts and culture. The seven-storey, concrete and steel frame building will be constructed to Passive House standards with unique envelope solutions that meet the energy targets.

LCA PARAMETERS

PROJECT DATA SOURCE

BIM model

PROJECT PHASE

Design development complete

LCA STUDY PERIOD

60 years

TOOL

Athena IE4B (Version 5.4.0101)

DATE OF ASSESSMENT

January 2021

LCA SCOPE

OBJECT OF ASSESSMENT

Foundation and slab-on-grade
 Floors (incl. stairs)
 Exterior walls, windows and doors
 Interior walls, doors and ceilings
 Roof

NOTABLE EXCLUSIONS

Interior finishes

SYSTEM BOUNDARY (LIFE CYCLE MODULE)

Product (A1-A3), Construction Process (A4-A5)
 Use (B2, B4), End of Life (C1-C2, C4)



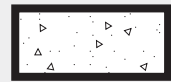
TOTAL GWP
1,164,508
kg CO₂ eq



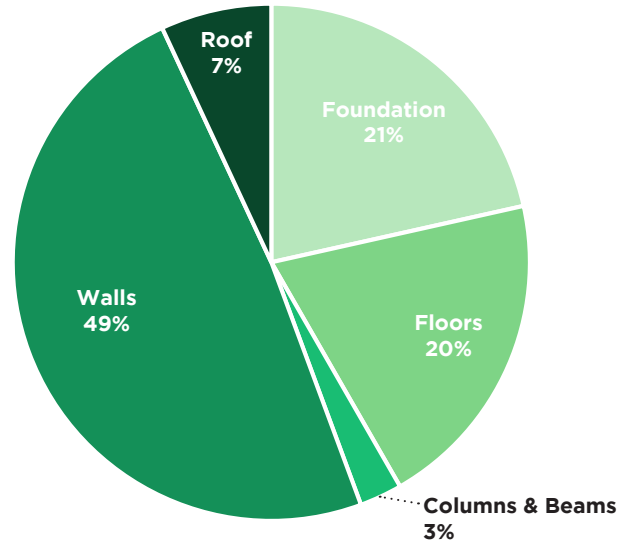
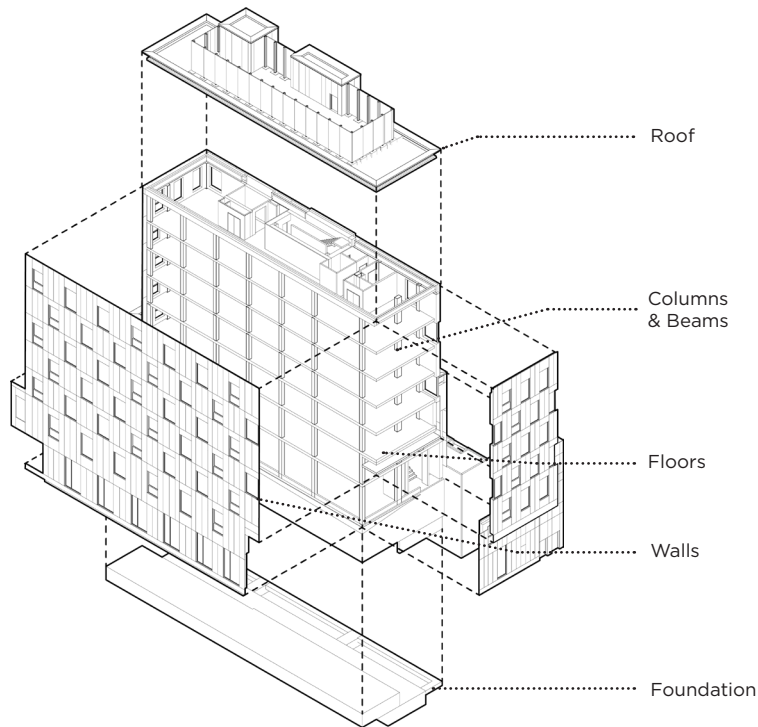
HIGHEST IMPACT
BUILDING ASSEMBLY
WALLS



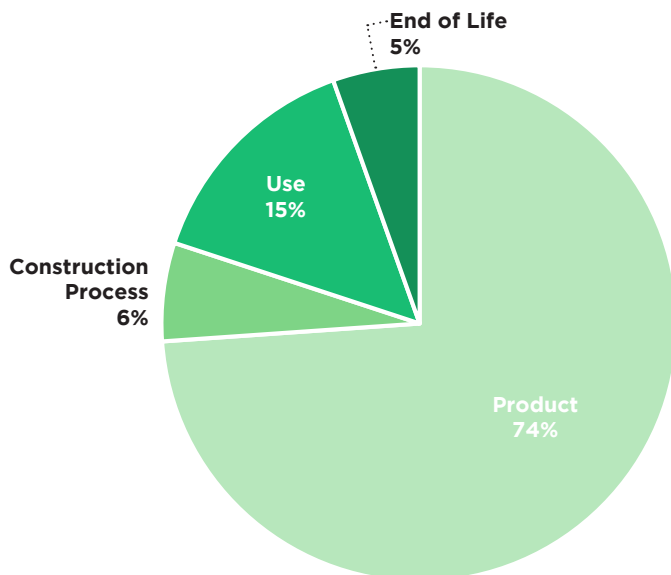
HIGHEST IMPACT
LIFE CYCLE MODULE
A - PRODUCT



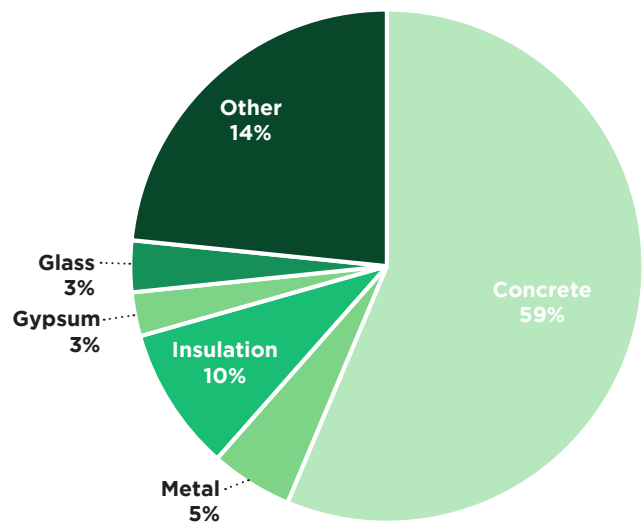
HIGHEST IMPACT
BUILDING MATERIAL
CONCRETE



GWP BY BUILDING ELEMENT



GWP BY LIFE CYCLE STAGE



GWP BY BUILDING MATERIAL

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EMBODIED CARBON CALCULATOR THROUGH WHOLE-BUILDING LIFE CYCLE ASSESSMENT

BROCK COMMONS PHASE 2 (SOUTH TOWER)

443
kg CO₂ eq./m²

ARCHITECT | **HCMA Architecture + Design**
STRUCTURAL ENGINEER | **WHM Structural Engineers**

YEAR COMPLETED | **Under Design (2022)**

LOCATION | **UBC Vancouver Campus, BC**

USE | **Mixed-use residential / academic**

GFA | **19,543 m²**

TOTAL STORIES | **13**

PRIMARY STRUCTURE | **Concrete**

Brock Commons Phase 2, located at UBC Vancouver campus, is an academic and student housing hub that will provide up to 600 student beds, as well as institutional, childcare and community spaces. The development includes a concrete 18-storey north tower and a concrete 13-storey south tower. The north tower will have majority of student accommodation, while the south tower will contain majority of institutional spaces with a focus on student services and wellness. The project has set several sustainability goals in relation to environmental impacts and social well-being, such as LEED Gold certification, climate adaptation, biodiversity protection, water efficiency and use of sustainable materials and resources.

LCA PARAMETERS

PROJECT DATA SOURCE

Architectural BIM model

PROJECT PHASE

Design development (tender)

LCA STUDY PERIOD

60 years

TOOL

One Click LCA (Student version, 2020)

DATE OF ASSESSMENT

February 2021

LCA SCOPE

OBJECT OF ASSESSMENT

Foundation
Floors
Exterior walls
Interior walls
Roof

NOTABLE EXCLUSIONS

Windows, doors, stairs
Interior finishes

SYSTEM BOUNDARY (LIFE CYCLE MODULE)

Product (A1-A3), Construction Process (A4)
Use (B1-B5), End of Life (C1-C4)



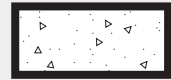
TOTAL GWP
8,659,018
kg CO₂ eq



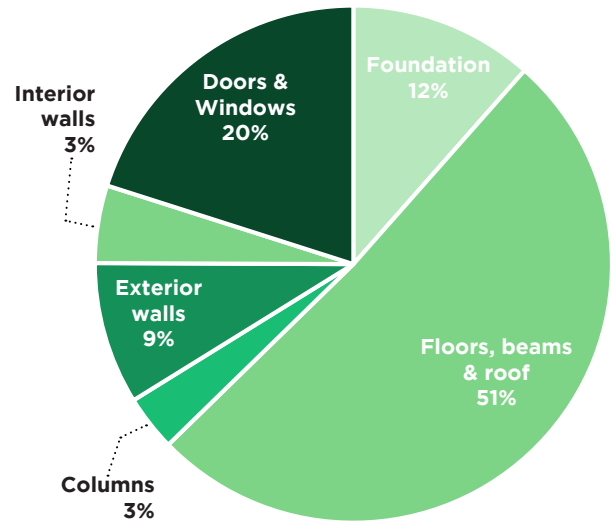
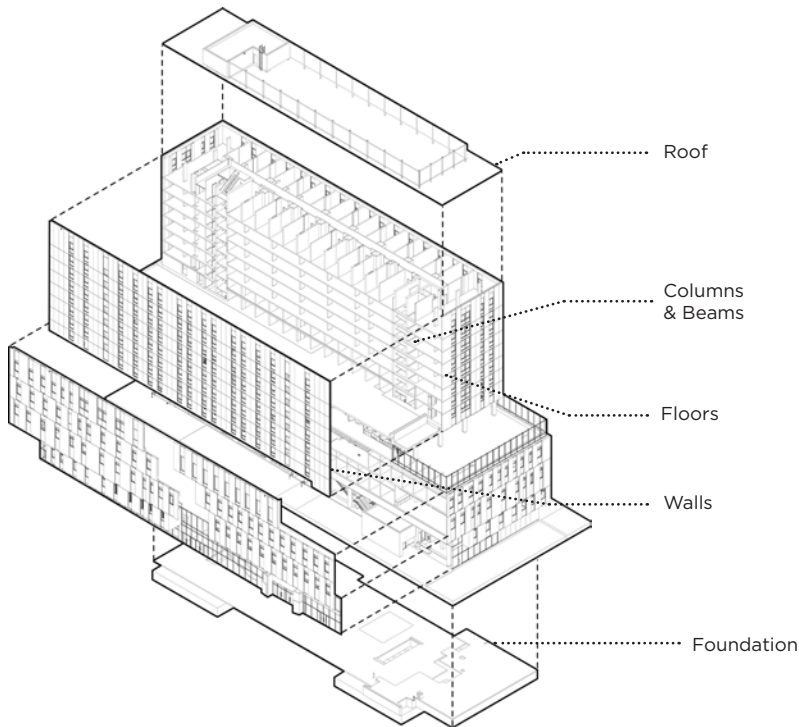
HIGHEST IMPACT
BUILDING ASSEMBLY
FLOORS+ROOF



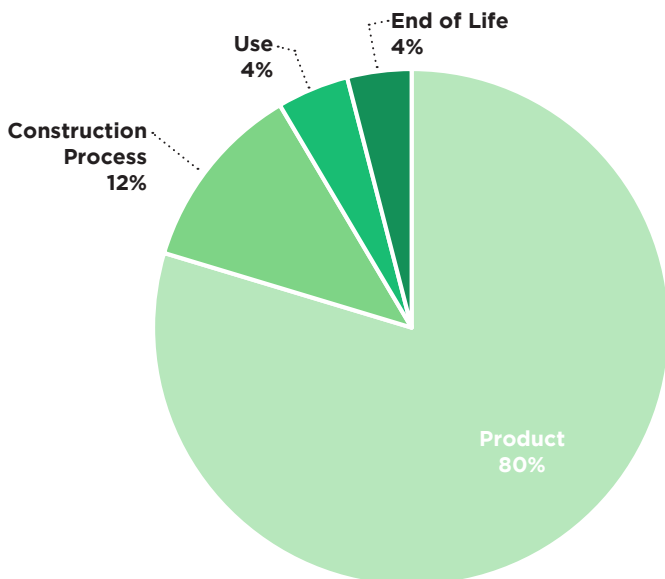
HIGHEST IMPACT
LIFE CYCLE MODULE
A - PRODUCT



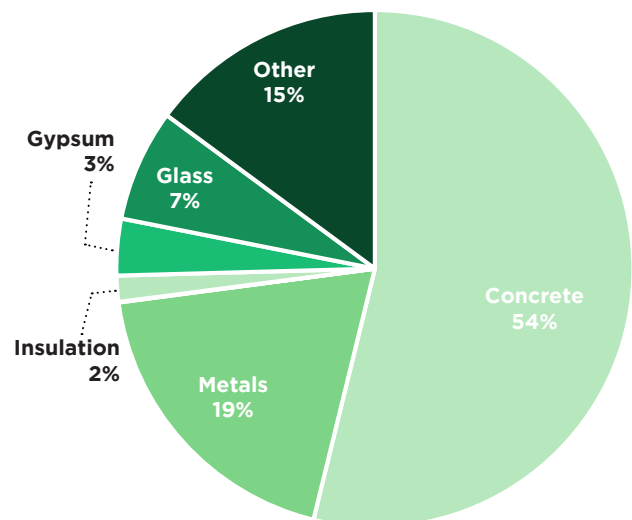
HIGHEST IMPACT
BUILDING MATERIAL
CONCRETE



GWP BY BUILDING ELEMENT



GWP BY LIFE CYCLE STAGE



GWP BY BUILDING MATERIAL

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EMBODIED CARBON CALCULATOR THROUGH WHOLE-BUILDING LIFE CYCLE ASSESSMENT

CARRINGTON VIEW (BUILDING A)

121
kg CO₂ eq./m²

DEVELOPER | **Highstreet Ventures**
 ARCHITECT | **WD Fisher Architecture**
 STRUCTURAL ENGINEER | **Sorensen Trilogy**
 YEAR COMPLETED | **Under Construction (2021)**
 LOCATION | **Kelowna, BC**
 USE | **Multi-unit residential**
 GFA | **7,729 m²**
 TOTAL STORIES | **4**
 HEIGHT | **16.4 m**
 PRIMARY STRUCTURE | **Wood-frame**

Carrington View Building A is a high-performance building that is part of an upcoming multi-unit residential development in West Kelowna. The four storey wood-frame building consist of 186 new rental housing units including studio, 1-bedroom and 2-bedroom suites, and amenities including social lounge, gym, rooftop patio, community garden and meeting rooms. The building also features a high-performance prefabricated wall system and on-site solar power generation.

LCA PARAMETERS

PROJECT DATA SOURCE

Cost estimate (Class C)

PROJECT PHASE

Design development complete

LCA STUDY PERIOD

60 years

TOOL

Athena IE4B (Version 5.4.0101)

DATE OF ASSESSMENT

January 2021

LCA SCOPE

OBJECT OF ASSESSMENT

Foundation and slab-on-grade
 Floors (incl. stairs)
 Exterior walls, windows and doors
 Interior walls, doors and ceilings
 Roof

NOTABLE EXCLUSIONS

Interior finishes

SYSTEM BOUNDARY (LIFE CYCLE MODULE)

Product (A1-A3), Construction Process (A4-A5)
 Use (B2, B4), End of Life (C1-C2, C4)



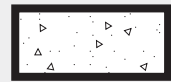
TOTAL GWP
937,126
kg CO₂ eq



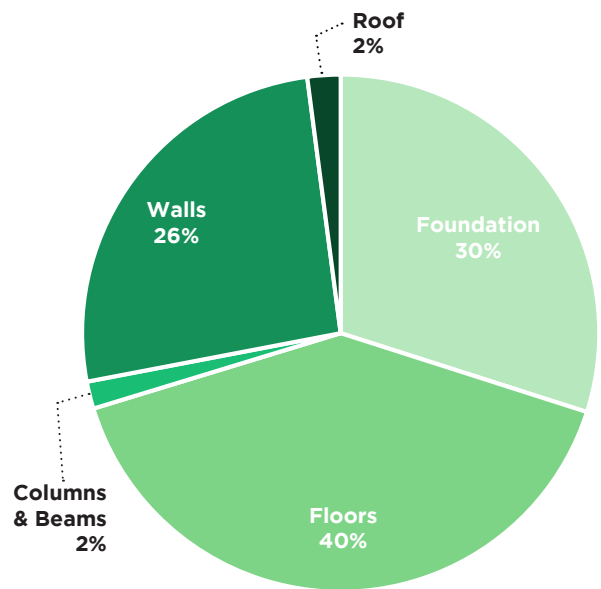
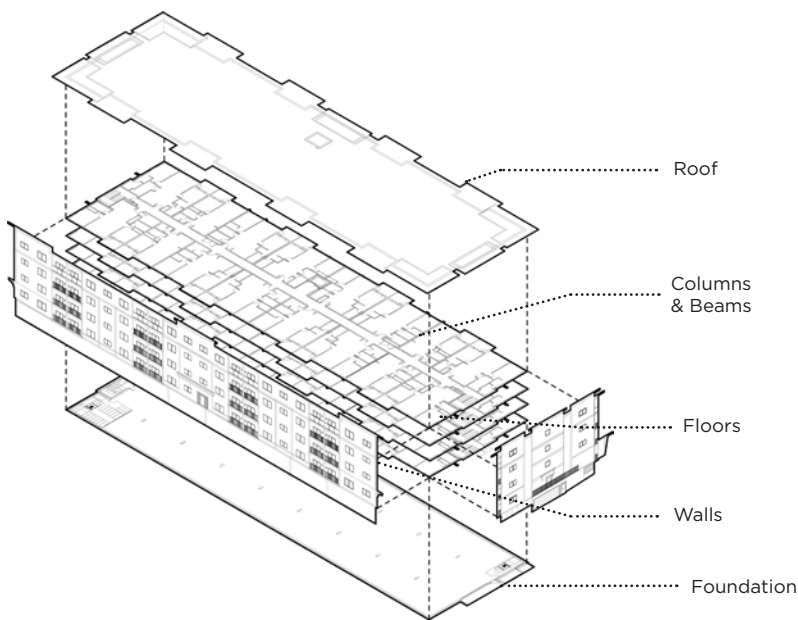
HIGHEST IMPACT
BUILDING ASSEMBLY
FLOORS



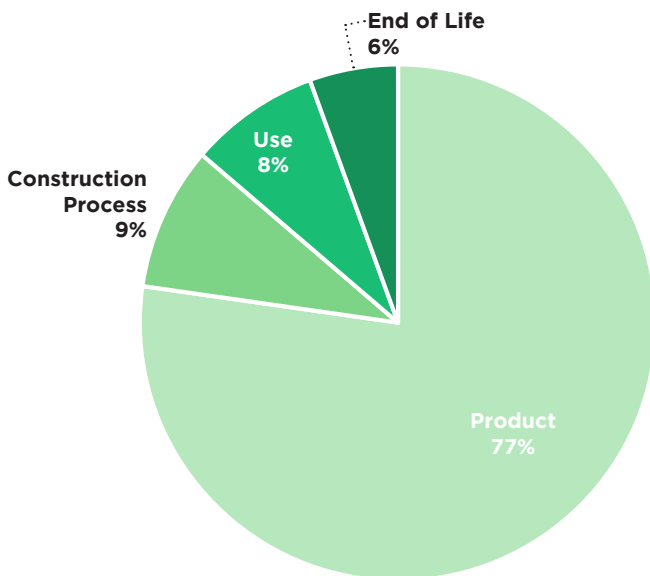
HIGHEST IMPACT
LIFE CYCLE MODULE
A - PRODUCT



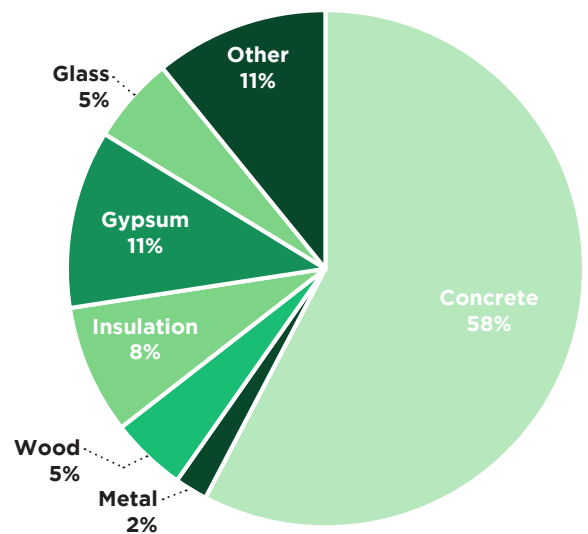
HIGHEST IMPACT
BUILDING MATERIAL
CONCRETE



GWP BY BUILDING ELEMENT



GWP BY LIFE CYCLE STAGE



GWP BY BUILDING MATERIAL

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EMBODIED CARBON CALCULATOR THROUGH WHOLE-BUILDING LIFE CYCLE ASSESSMENT

SFU PARCEL 21

162
kg CO₂ eq./m²

ARCHITECT | **Local Practice Architecture + Design**
 STRUCTURAL ENGINEER | **Associated Engineering**
 YEAR COMPLETED | **Under Construction (2021)**
 LOCATION | **SFU Burnaby Campus, BC**
 USE | **Multi-unit residential**
 GFA | **7,299 m²**
 TOTAL STORIES | **6 / 4 / 1**
 HEIGHT | **20.5 m / 17.1 m / 7.3 m**
 PRIMARY STRUCTURE | **Wood-frame and concrete parkade**

The Parcel 21 complex, located in the SFU Burnaby Campus in BC, is a student residence with 90 affordable rental units and amenity spaces. The residence includes a four-storey and six-storey wood frame buildings on a concrete parkade, connected by a single-storey pavilion. The building is designed to Passive House standards and in terms of materials, this means that the building has a highly-insulated envelope, high-performance windows and thermal separation of canopies and other structures. Additionally, the building is designed for high seismicity with structural details that mitigate the effects of vertical shrinkage and preserve the continuity of thermal envelope for the residential area of the structure.

LCA PARAMETERS

PROJECT DATA SOURCE

Architectural BIM model

PROJECT PHASE

Design development complete

LCA STUDY PERIOD

60 years

TOOL

Athena IE4B (Version 5.4.0101)

DATE OF ASSESSMENT

January 2021

LCA SCOPE

OBJECT OF ASSESSMENT

Foundation and slab-on-grade
 Floors (incl. stairs)
 Exterior walls
 Interior walls and doors
 Roof

NOTABLE EXCLUSIONS

Exterior windows and doors
 Interior finishes

SYSTEM BOUNDARY (LIFE CYCLE MODULE)

Product (A1-A3), Construction Process (A4-A5)
 Use (B2, B4), End of Life (C1-C2, C4)



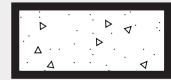
TOTAL GWP
1,184,348
kg CO₂ eq



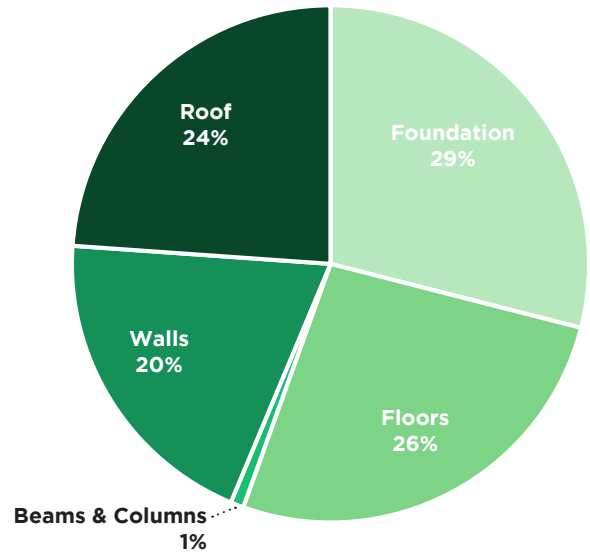
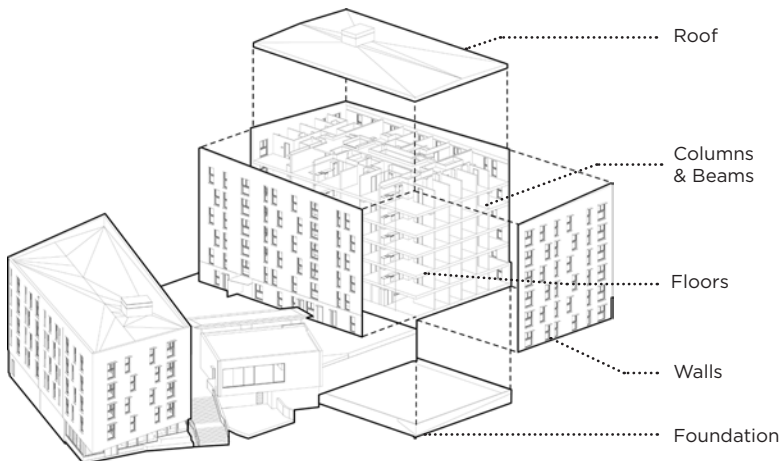
HIGHEST IMPACT
BUILDING ASSEMBLY
FOUNDATIONS



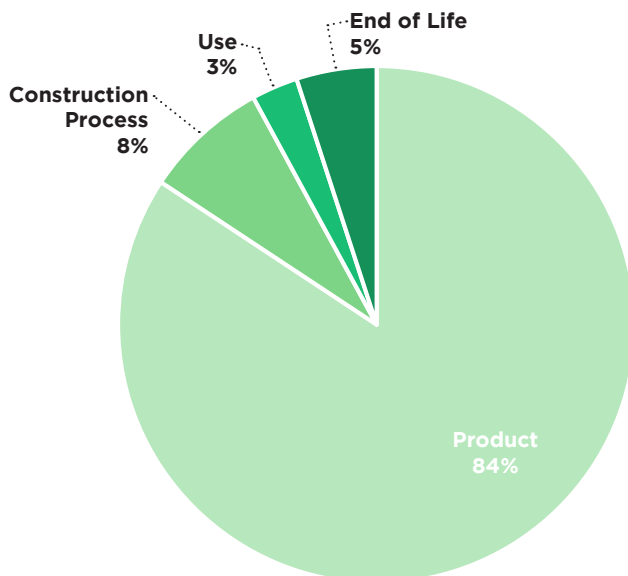
HIGHEST IMPACT
LIFE CYCLE MODULE
A - PRODUCT



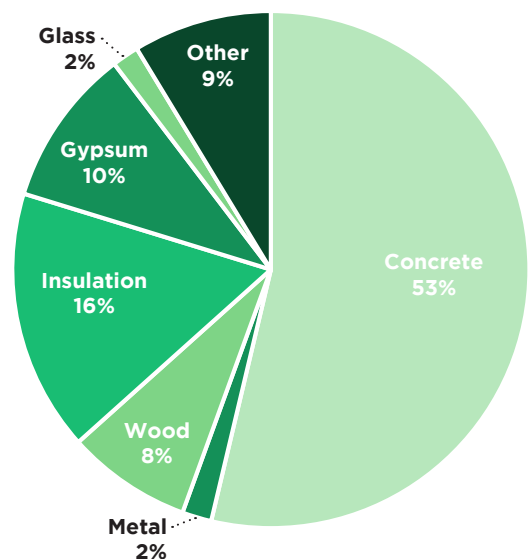
HIGHEST IMPACT
BUILDING MATERIAL
CONCRETE



GWP BY BUILDING ELEMENT



GWP BY LIFE CYCLE STAGE



GWP BY BUILDING MATERIAL

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EMBODIED CARBON CALCULATOR THROUGH WHOLE-BUILDING LIFE CYCLE ASSESSMENT ATHENA IE4B

TRIUMF IAMI (A)

784
kg CO₂ eq./m²

ARCHITECT | **Architecture 49**
STRUCTURAL ENGINEER | **Bush, Bohlman & Partners**
YEAR COMPLETED | **Under Construction**
LOCATION | **UBC Vancouver Campus, BC**
USE | **Institutional**
GFA | **3,575 m²**
TOTAL STORIES | **5**
HEIGHT | **21.8 m**
PRIMARY STRUCTURE | **Concrete and Steel**

The Institute for Advanced Medical Isotopes (IAMIs), located on the TRIUMF campus at UBC Vancouver is a research facility that will be used to support next-generation research on medical isotopes and radiopharmaceuticals. The building will accommodate a new particle accelerator and integrated lab and office space. The concrete and steel frame building with five levels (two levels below grade) includes spaces like labs, technical rooms, change rooms, mechanical/electrical rooms and offices. The building design considered the building orientation, positioning of main entrances, strategic location of loading bays, noise generating equipment, air intake, labs and office spaces, and view corridors from adjacent facilities. As required by the UBC campus, the building, which is currently under construction, is targeting LEED Gold certification.

LCA PARAMETERS

PROJECT DATA SOURCE

Architectural and structural BIM models

PROJECT PHASE

Design development complete

LCA STUDY PERIOD

60 years

TOOL

Athena IE4B (Version 5.4.0101)

DATE OF ASSESSMENT

February 2021

LCA SCOPE

OBJECT OF ASSESSMENT

Foundation and slab-on-grade
Floors (incl. stairs)
Exterior walls, windows and doors
Interior walls, windows and doors
Roof

NOTABLE EXCLUSIONS

Suspended ceilings and interior finishes

SYSTEM BOUNDARY (LIFE CYCLE STAGES)

Product (A1-A3), Construction Process (A4-A5)
Use (B2, B4), End of Life (C1-C2, C4)



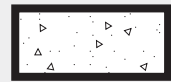
TOTAL GWP
2,804,584
kg CO₂ eq



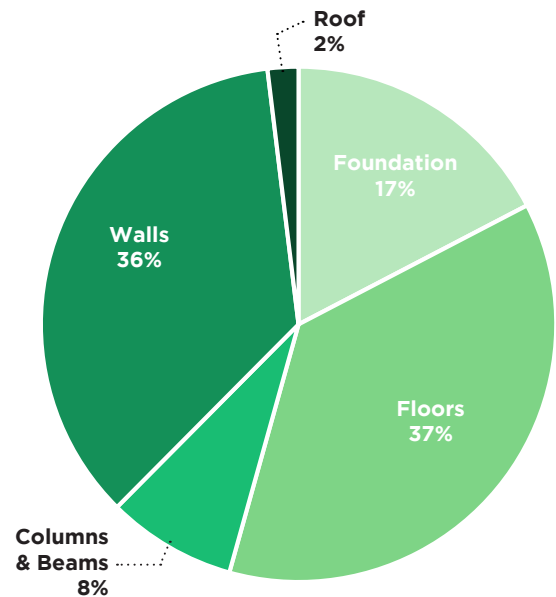
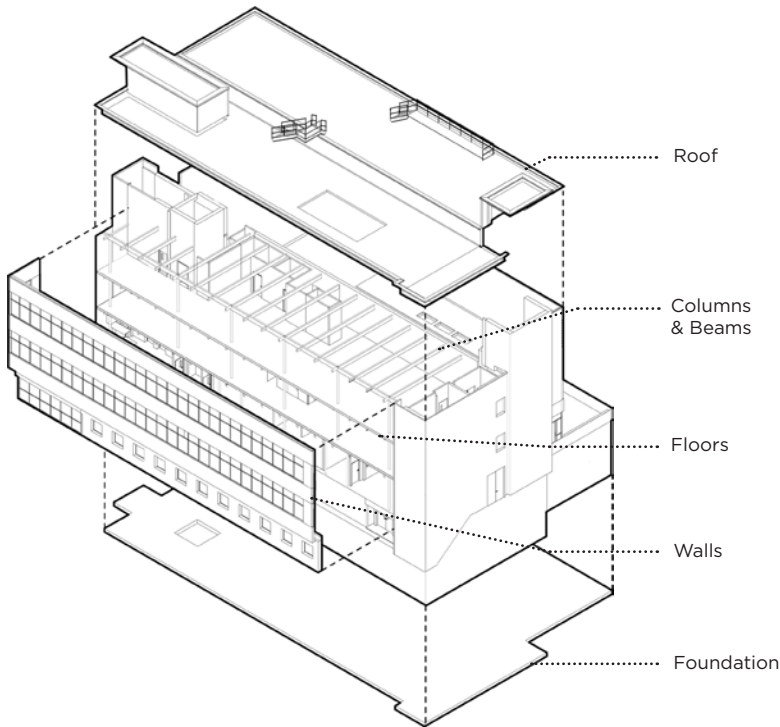
HIGHEST IMPACT
BUILDING ASSEMBLY
FLOORS



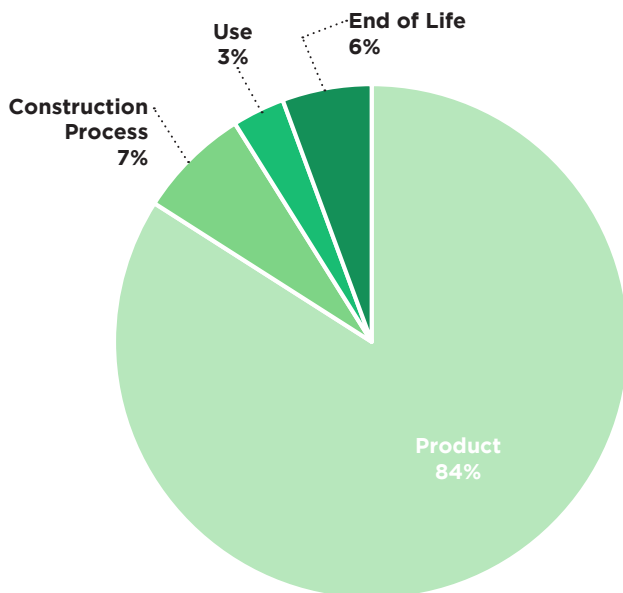
HIGHEST IMPACT
LIFE CYCLE MODULE
A - PRODUCT



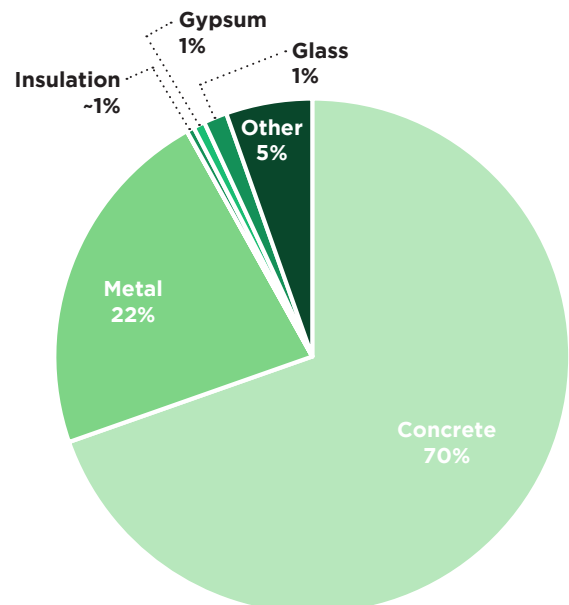
HIGHEST IMPACT
BUILDING MATERIAL
CONCRETE



GWP BY BUILDING ELEMENT



GWP BY LIFE CYCLE STAGE



GWP BY BUILDING MATERIAL

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EMBODIED CARBON CALCULATOR THROUGH WHOLE-BUILDING LIFE CYCLE ASSESSMENT TALLY

TRIUMF IAMI (T)

1,047
kg CO₂ eq./m²

ARCHITECT | **Architecture 49**
STRUCTURAL ENGINEER | **Bush, Bohlman & Partners**
YEAR COMPLETED | **Under Construction**
LOCATION | **UBC Vancouver Campus, BC**
USE | **Institutional**
GFA | **3,575 m²**
TOTAL STORIES | **5**
HEIGHT | **21.8 m**
PRIMARY STRUCTURE | **Concrete and Steel**

The Institute for Advanced Medical Isotopes (IAMIs), located on the TRIUMF campus at UBC Vancouver is a research facility that will be used to support next-generation research on medical isotopes and radiopharmaceuticals. The building will accommodate a new particle accelerator and integrated lab and office space. The concrete and steel frame building with five levels (two levels below grade) includes spaces like labs, technical rooms, change rooms, mechanical/electrical rooms and offices. The building design considered the building orientation, positioning of main entrances, strategic location of loading bays, noise generating equipment, air intake, labs and office spaces, and view corridors from adjacent facilities. As required by the UBC campus, the building, which is currently under construction, is targeting LEED Gold certification.

LCA PARAMETERS

PROJECT DATA SOURCE

Architectural and structural BIM models

PROJECT PHASE

Design development complete

LCA STUDY PERIOD

60 years

TOOL

Tally (Version 2020.06.09.01)

DATE OF ASSESSMENT

February 2021

LCA SCOPE

OBJECT OF ASSESSMENT

Foundation and slab-on-grade
Floors (incl. stairs)
Exterior walls, windows and doors
Interior walls, windows and doors
Roof

NOTABLE EXCLUSIONS

Suspended ceilings and interior finishes

SYSTEM BOUNDARY (LIFE CYCLE MODULE)

Product (A1-A3), Construction Process (A4)
Use (B2-B5), End of Life (C2-C4)



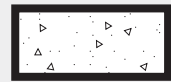
TOTAL GWP
3,744,552
kg CO₂ eq



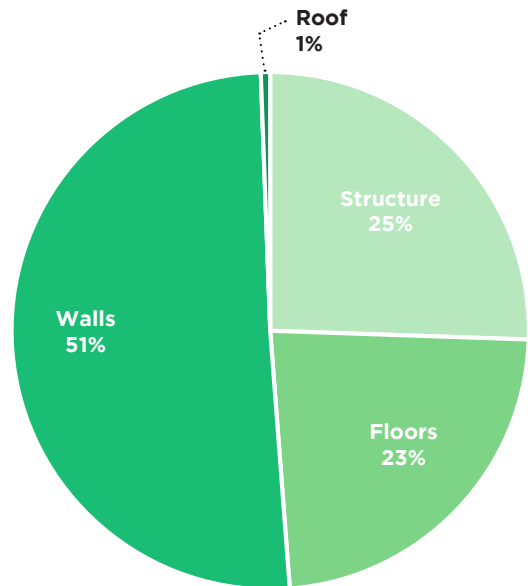
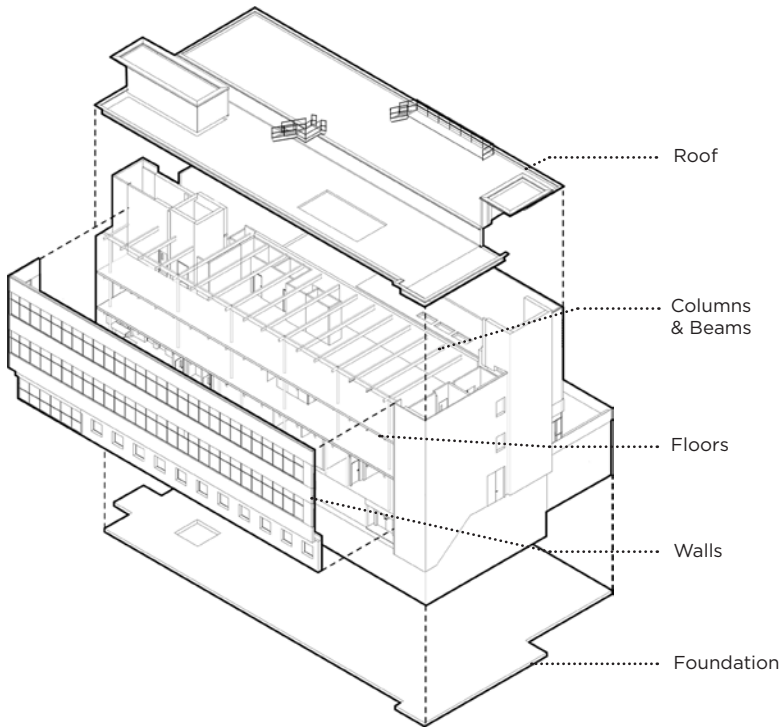
HIGHEST IMPACT
BUILDING ASSEMBLY
WALLS



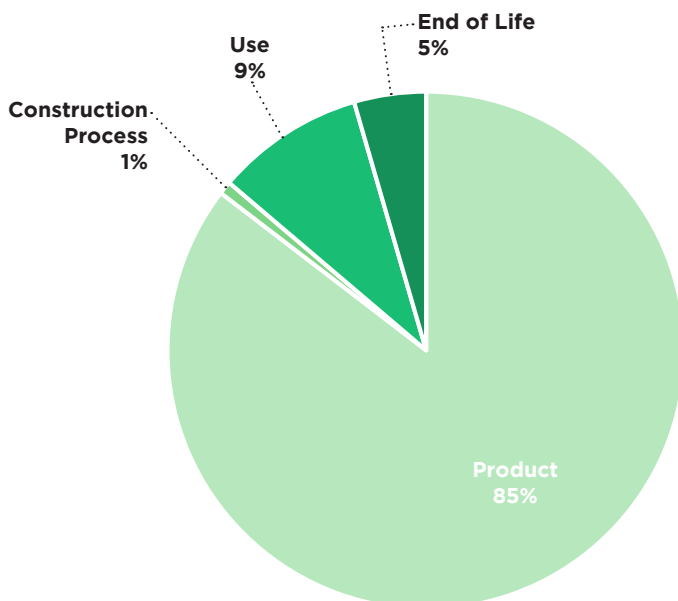
HIGHEST IMPACT
LIFE CYCLE MODULE
A - PRODUCT



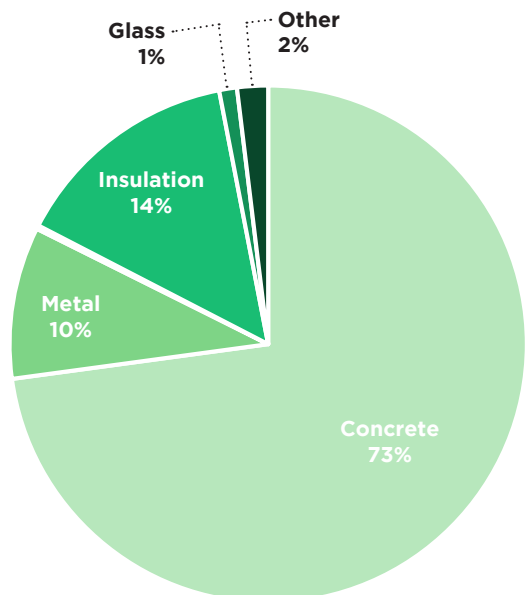
HIGHEST IMPACT
BUILDING MATERIAL
CONCRETE



GWP BY BUILDING ELEMENT



GWP BY LIFE CYCLE STAGE



GWP BY BUILDING MATERIAL

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EMBODIED CARBON CALCULATOR THROUGH WHOLE-BUILDING LIFE CYCLE ASSESSMENT **ATHENA IE4B**

UBCO SKEENA (A)

198
kg CO₂ eq./m²

ARCHITECT | **Public Design**
STRUCTURAL ENGINEER | **Bush, Bohlman & Partners**
YEAR COMPLETED | **2020**
LOCATION | **UBC Okanagan Campus, BC**
USE | **Student residence**
GFA | **6,744 m²**
TOTAL STORIES | **6**
HEIGHT | **20.6 m**
PRIMARY STRUCTURE | **Wood-frame and concrete**

The Skeena Residence, located at the UBC Okanagan Campus in Kelowna, BC is a student housing building with 220 beds and amenities including a lounge and study spaces, an activity room and laundry facilities. The new residence aims to support the growing demand of on-campus housing and focus on student life and services. The six storey has a concrete ground floor and wood-frame structure from second to sixth floor. The building design was driven by space and energy optimization through a repeating module of two bedrooms with shared bathroom. The building is targeted to achieve Passive House certification.

LCA PARAMETERS

PROJECT DATA SOURCE

BIM model

PROJECT PHASE

Design development complete

LCA STUDY PERIOD

60 years

TOOL

Athena IE4B (Version 5.4.0101)

DATE OF ASSESSMENT

February 2021

LCA SCOPE

OBJECT OF ASSESSMENT

Foundation and slab-on-grade
Floors (incl. stairs)
Exterior walls, windows and doors
Interior walls, windows, doors and ceilings
Roof

NOTABLE EXCLUSIONS

Interior finishes

SYSTEM BOUNDARY (LIFE CYCLE MODULE)

Product (A1-A3), Construction Process (A4-A5)
Use (B2, B4), End of Life (C1-C2, C4)



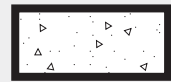
TOTAL GWP
1,338,625
kg CO₂ eq



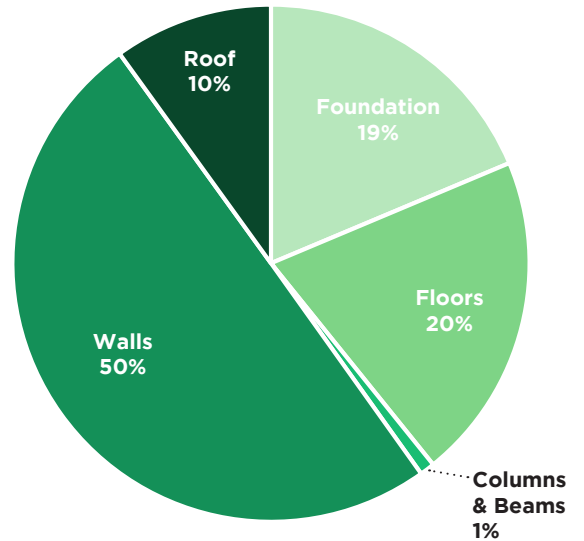
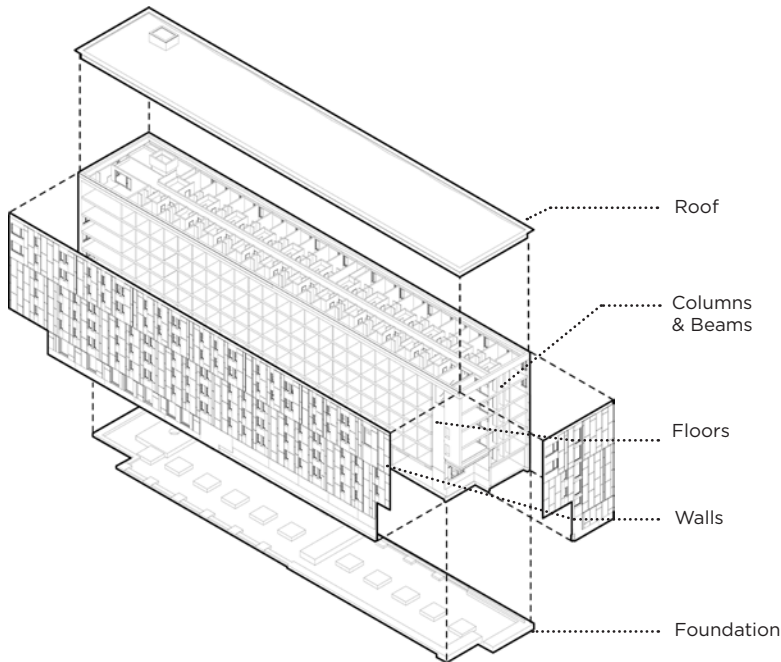
HIGHEST IMPACT
BUILDING ASSEMBLY
WALLS



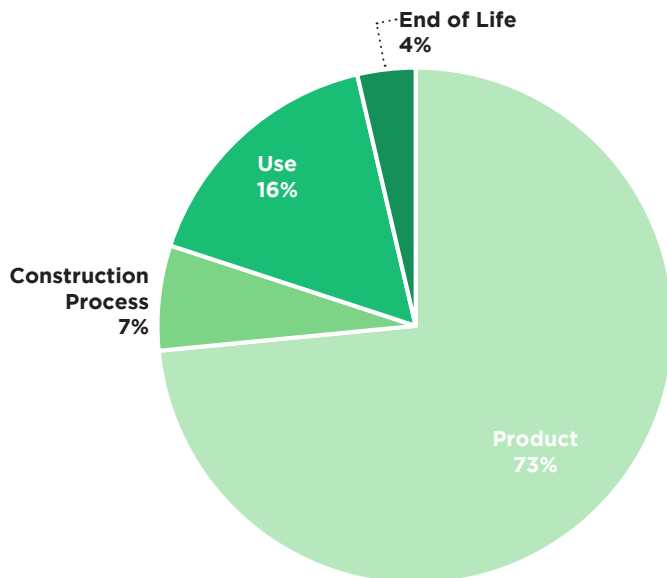
HIGHEST IMPACT
LIFE CYCLE MODULE
A - PRODUCT



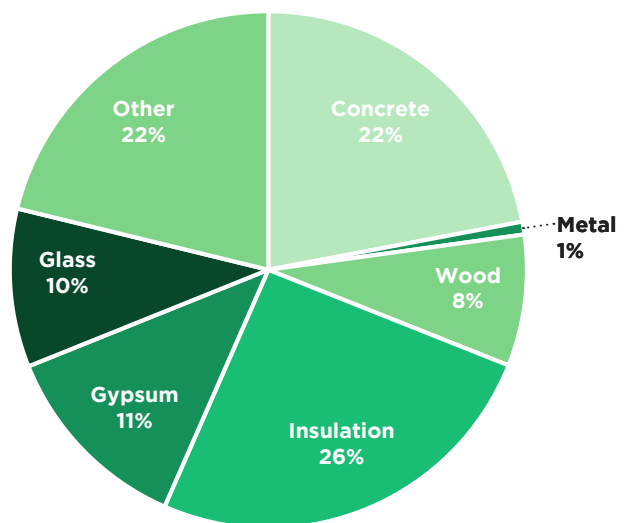
HIGHEST IMPACT
BUILDING MATERIAL
INSULATION



GWP BY BUILDING ELEMENT



GWP BY LIFE CYCLE STAGE



GWP BY BUILDING MATERIAL

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EMBODIED CARBON CALCULATOR THROUGH WHOLE-BUILDING LIFE CYCLE ASSESSMENT TALLY

UBCO SKEENA (T)

ARCHITECT | **Public Design**
 STRUCTURAL ENGINEER | **Bush, Bohlman & Partners**
 YEAR COMPLETED | **2020**
 LOCATION | **UBC Okanagan Campus, BC**
 USE | **Student residence**
 GFA | **6,744 m²**
 TOTAL STORIES | **6**
 HEIGHT | **20.6 m**
 PRIMARY STRUCTURE | **Wood-frame and concrete**

The Skeena Residence, located at the UBC Okanagan Campus in Kelowna, BC is a student housing building with 220 beds and amenities including a lounge and study spaces, an activity room and laundry facilities. The new residence aims to support the growing demand of on-campus housing and focus on student life and services. The six storey has a concrete ground floor and wood-frame structure from second to sixth floor. The building design was driven by space and energy optimization through a repeating module of two bedrooms with shared bathroom. The building is targeted to achieve Passive House certification.

LCA PARAMETERS

PROJECT DATA SOURCE

BIM model

PROJECT PHASE

Design development complete

LCA STUDY PERIOD

60 years

TOOL

Tally (Version 2020.06.09.01)

DATE OF ASSESSMENT

February 2021

LCA SCOPE

OBJECT OF ASSESSMENT

Foundation and slab-on-grade
 Floors (incl. stairs)
 Exterior walls, windows and doors
 Interior walls, windows, doors and ceilings
 Roof

NOTABLE EXCLUSIONS

Interior finishes

SYSTEM BOUNDARY (LIFE CYCLE MODULE)

Product (A1-A3), Construction Process (A4)
 Use (B2-B5), End of Life (C2-C4)



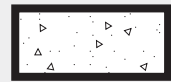
TOTAL GWP
4,923,868
kg CO₂ eq



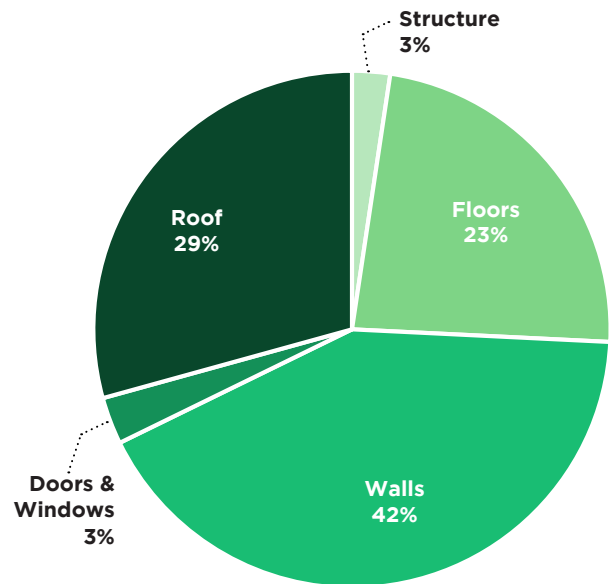
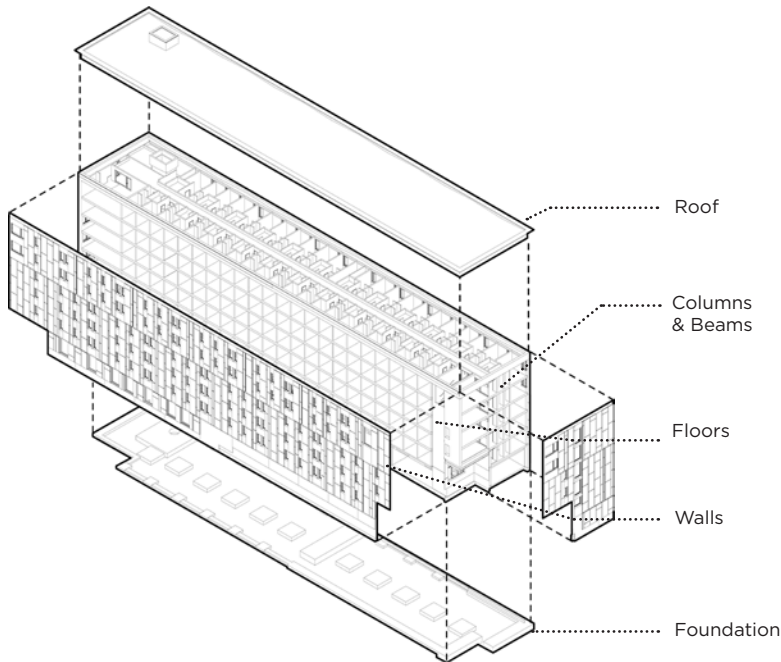
HIGHEST IMPACT
BUILDING ASSEMBLY
WALLS



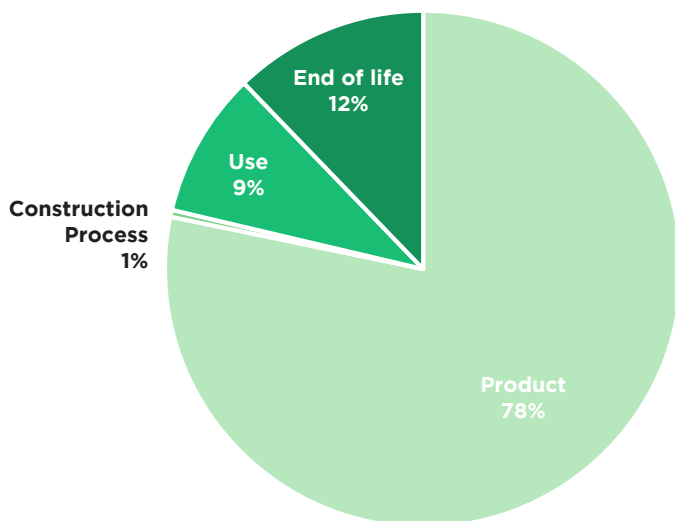
HIGHEST IMPACT
LIFE CYCLE MODULE
A - PRODUCT



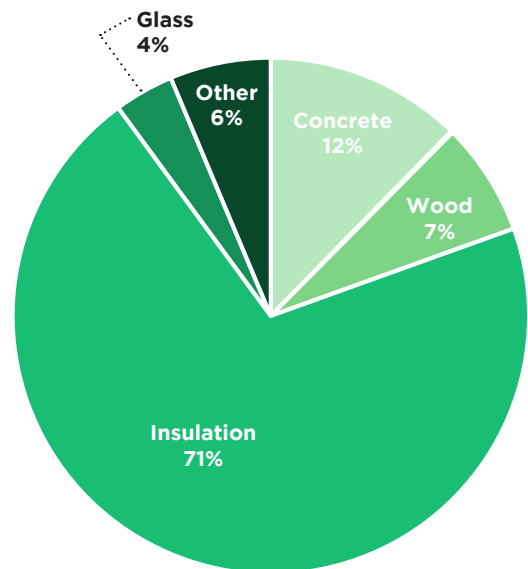
HIGHEST IMPACT
BUILDING MATERIAL
INSULATION



GWP BY BUILDING ELEMENT



GWP BY LIFE CYCLE STAGE



GWP BY BUILDING MATERIAL

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