

# Neighbourhood Climate Action Plan

JUNE 2024

UBC's pathway to a net-zero,  
climate resilient community for  
the campus neighbourhoods.



THE UNIVERSITY OF BRITISH COLUMBIA  
Campus + Community Planning



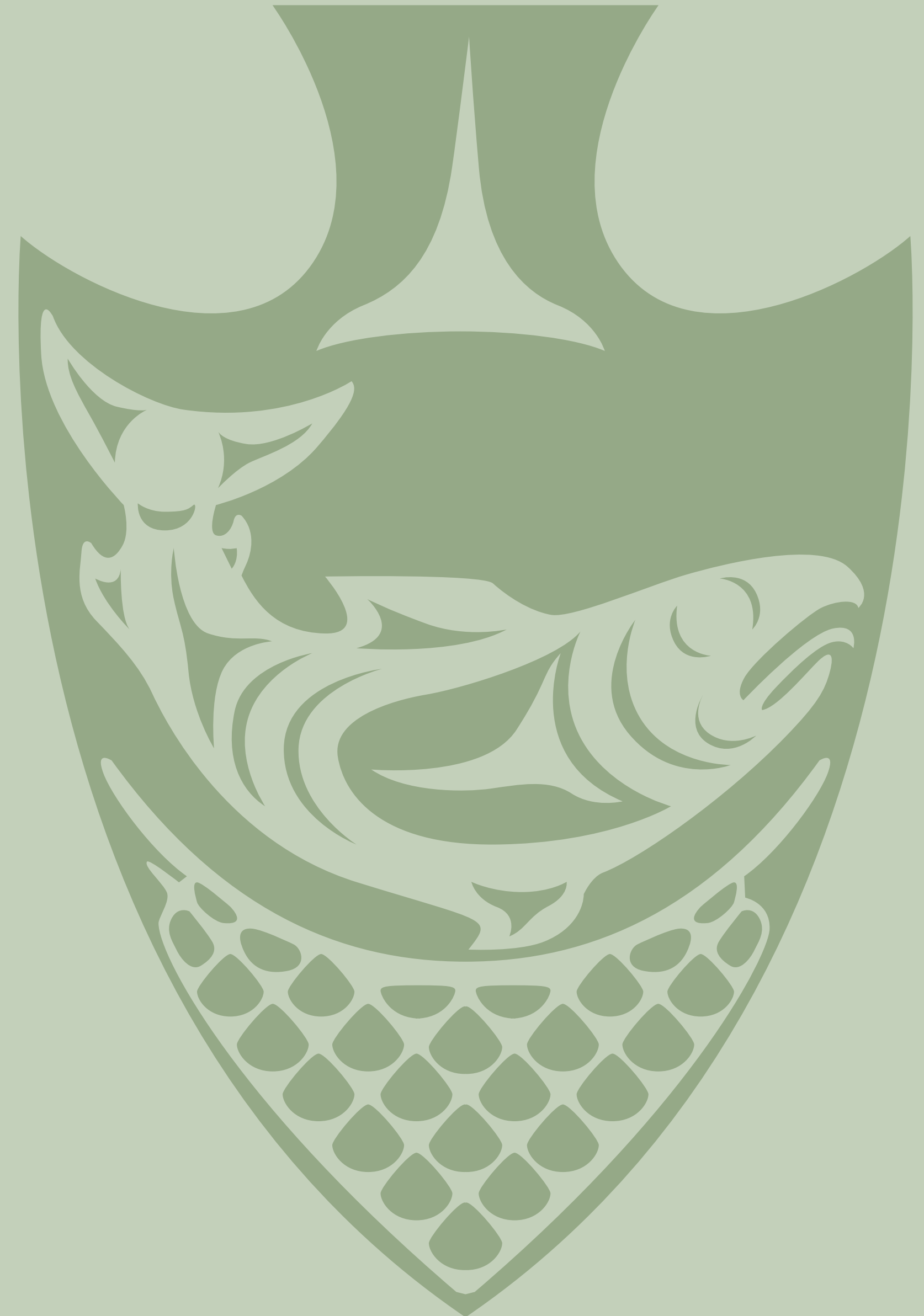
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## Land Acknowledgement

The UBC Point Grey campus is situated within the traditional, ancestral, and unceded territory of the x<sup>w</sup>məθk<sup>w</sup>əyəm (Musqueam) people. For millennia, x<sup>w</sup>məθk<sup>w</sup>əyəm have been stewards and caretakers of the lands upon which UBC is now located.

These lands are a place of cultural and spiritual learning, welcoming and interacting with visitors to the territory. In pursuit of sustainability, climate action, and climate justice, we understand that they are also a place of learning where the x<sup>w</sup>məθk<sup>w</sup>əyəm acquired knowledge of local plants and animals for their enduring wellbeing and ways of thriving with these resources. UBC is working toward building meaningful, reciprocal and mutually beneficial partnerships with x<sup>w</sup>məθk<sup>w</sup>əyəm.



## Introduction

The Neighbourhood Climate Action Plan (NCAP) sets a pathway to a net-zero and climate resilient community for the residential neighbourhoods on the University of British Columbia's (UBC) Vancouver campus.

Over 15,000 residents live in UBC's campus neighbourhoods – vibrant and diverse communities, home to a growing number of families, students, faculty and staff. Through compact design and high standards for green building performance, UBC's neighbourhoods achieve significantly lower GHG emissions than the regional averages.

In spite of local progress, global greenhouse gas emissions continue to grow and the effects of climate change are being felt by those living in UBC's campus neighbourhoods – from extreme heat and heavy precipitation to poor air quality from wildfires. With the far-reaching global impacts and disruptions brought by climate change and the increased intensity and frequency of these climate events over the last decade, updating the climate action plan for UBC's neighbourhoods is critical.

As the university plans for growth and with the increased intensity and frequency of local climate events brought on by the current climate crisis, NCAP identifies the additional immediate and long-term actions needed to continue progress on reducing greenhouse gas emissions in the neighbourhoods and to prepare as well as adapt for the impacts of a changing climate.

UBC is uniquely positioned to lead rapid climate action and model sustainable development in the university's residential neighbourhoods and beyond by using its intellectual capacity to develop innovative approaches that address climate change through strong collaborations between academic researchers, operational staff and partnerships with government, utilities, industry and non-governmental organizations. With UBC's Declaration on the Climate Emergency in December 2019 and subsequent update to the institutional Climate Action Plan, the university has shown both academic and operational leadership in mobilizing the community to confront the climate crisis.

A collaborative approach was taken to develop NCAP, leveraging the expertise of staff and academics to help develop actions and targets; working alongside the University Neighbourhoods Association (UNA) to propose tools and programming that support residents in taking climate action; and collaborating with UBC Properties Trust to ensure buildings and infrastructure are built and operated in accordance with UBC's sustainability plans. Input from two rounds of public engagement with the campus community helped inform the plan and ensure community needs and interests are reflected throughout.



# A Collaborative Approach

Achieving NCAP’s climate goals requires collaboration and coordination with the UNA, UBC Properties Trust, and neighbourhood residents. The primary roles of these groups are described here.

## University Neighbourhoods Association (UNA)

Maintains neighbourhood programming such as community gardens, community centres, recycling and composting initiatives and recreational and community building initiatives.

Maintains infrastructure such as street and sidewalk repairs, public waste and landscaping.

Regulates matters of concern in the public realm such as parking, noise and local emergency response.

Communicates directly with stratas and rental residents to support the distribution of information.

## University of British Columbia (UBC)

Develops the policy and plans around how land is used and buildings are built.

Oversees permitting process.

Leads the community engagement process that helps shape UBC plans and policy.

Provides campus-wide infrastructure such as rainwater management.

## UBC Properties Trust

Builds and manages rental homes and retail space in accordance with UBC’s Land Use Plan, Housing Action Plan, Neighbourhood Plans as well as sustainability related plans and guidelines.

Builds infrastructure such as transportation networks, greenways, parks and community gardens in accordance with UBC’s Land Use Plan, Neighbourhood Plans as well as sustainability related plans and guidelines.

## Neighbourhood Residents

Undertakes strata operations and retrofits.

Makes mobility choices (e.g. transit, walking and rolling, zero emission vehicles).

Undertakes waste sorting (recycling, organics) and waste reduction.

Participates in energy and water conservation.

Makes consumption choices.



## Musqueam Relationship Agreement

UBC and Musqueam Indian Band are working together to transform their long-standing relationship with a Relationship Agreement. This is an important part of UBC's institutional commitment to deepening the university's relationship with Musqueam and to reconciliation more broadly. Through the Relationship Agreement, UBC and Musqueam are co-developing a comprehensive framework for engaging Musqueam on land use initiatives to better understand and incorporate Musqueam values, needs and interests into planning. As NCAP moves into implementation, learnings from Musqueam engagement will be applied.

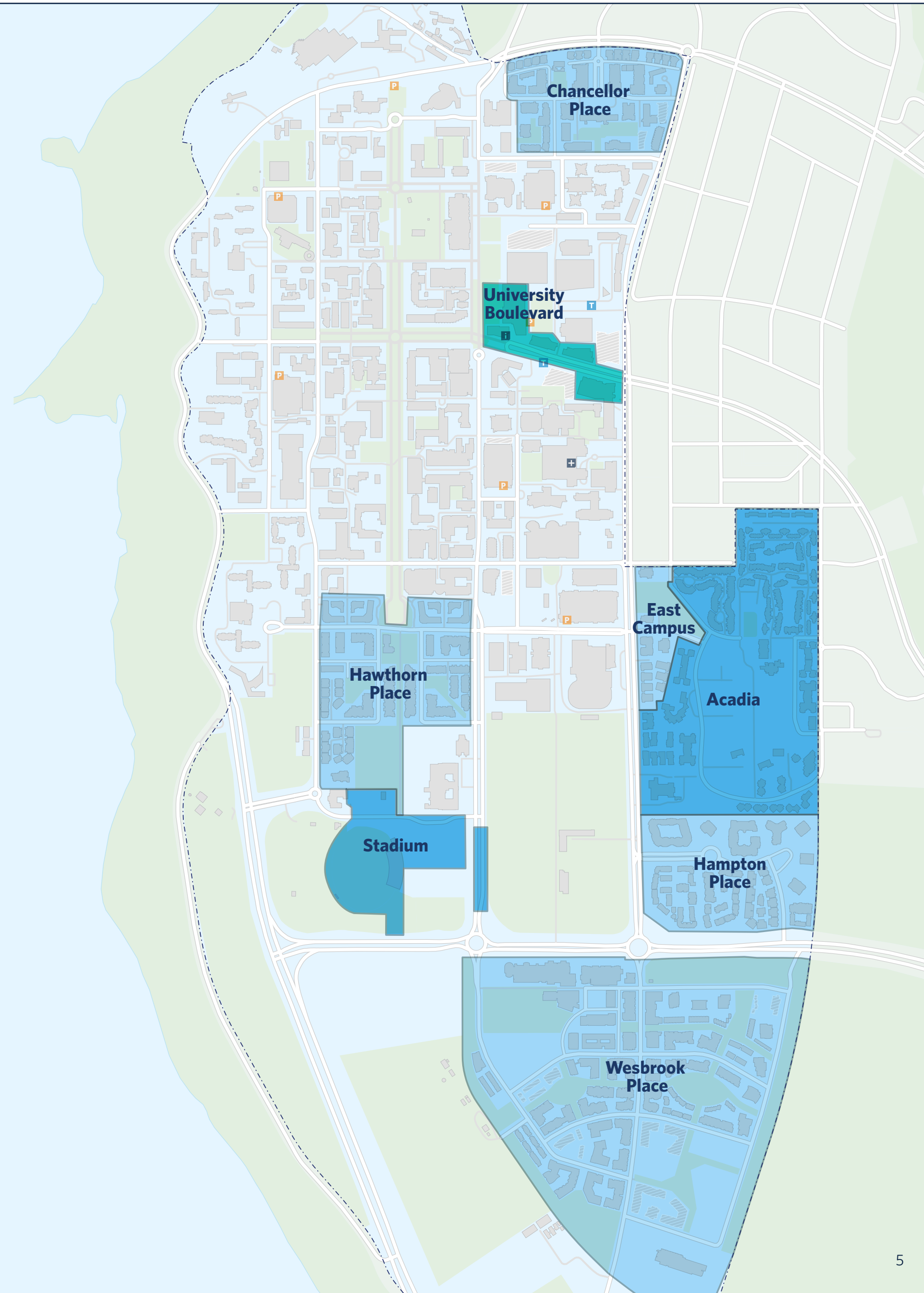


Image: sʔi:4qəy̓ qeqəḥ (double-headed serpent post) ▶  
by Musqueam artist Brent Sparrow.

# UBC's Residential Neighbourhoods

Neighbourhoods covered by NCAP include Hampton Place, Hawthorn Place, Wesbrook Place, Chancellor Place, East Campus, as well as the future Stadium and Acadia neighbourhoods.

- UBC Residential Neighbourhoods
- Future Neighbourhoods
- Village Centre Academic<sup>1</sup>



<sup>1</sup> Residential rental buildings in the University Boulevard area, such as Focal and Central, are also included in the NCAP scope

# The Climate Emergency

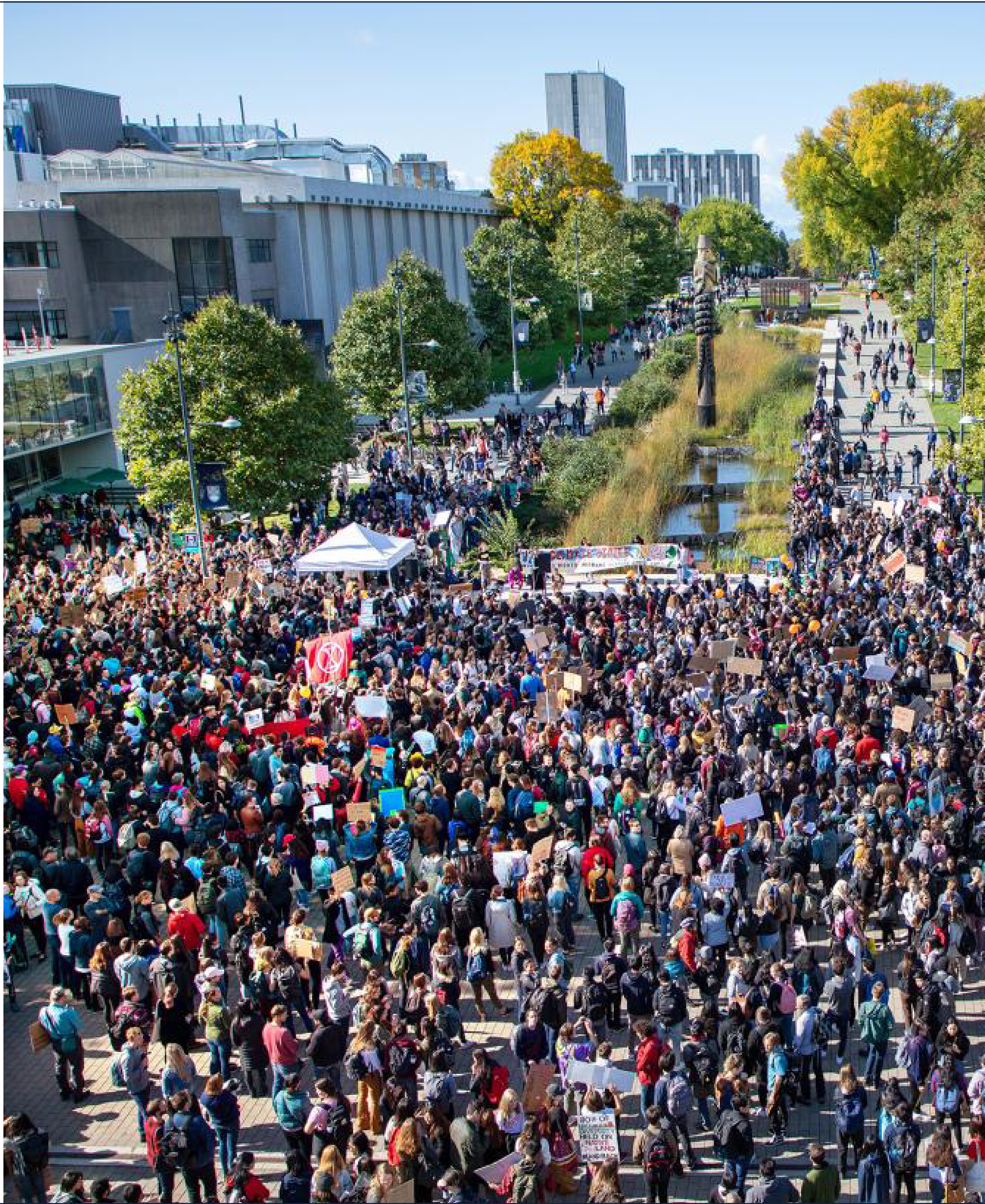
Global greenhouse gas emissions continue to grow, and climate scientists agree that extreme weather will increase and intensify without the reduction of global temperatures by lowering greenhouse gas emissions. According to a report on global warming released by the Intergovernmental Panel on Climate Change (IPCC)<sup>2</sup>, the world’s average temperature should not increase by more than 1.5 degrees Celsius to avoid the most extreme impacts of climate change.

Following the release of the IPCC report, UBC continued its longstanding commitment to advance climate action when the UBC Board of Governors unanimously endorsed a Declaration on the Climate Emergency in December 2019. In addition, the Declaration commits UBC to assembling its climate emergency response in partnership with campus and community members. NCAP is the university’s response to address the climate emergency for the campus neighbourhoods; the existing Climate Action Plan 2030 provides the response for the academic campus. NCAP also helps to further advance UBC’s efforts to address the UN (SDGs) as climate action is foundational to deliver a stable and secure world for future generations. Refer to for additional context on the UN SDGs.

This was the scene from the roof of the Robert H. Lee Alumni Centre on September 27, 2019 as students, faculty, and staff added their voices to those around the world calling for climate justice.

Learn more:

Photo credit: Joachim Zens





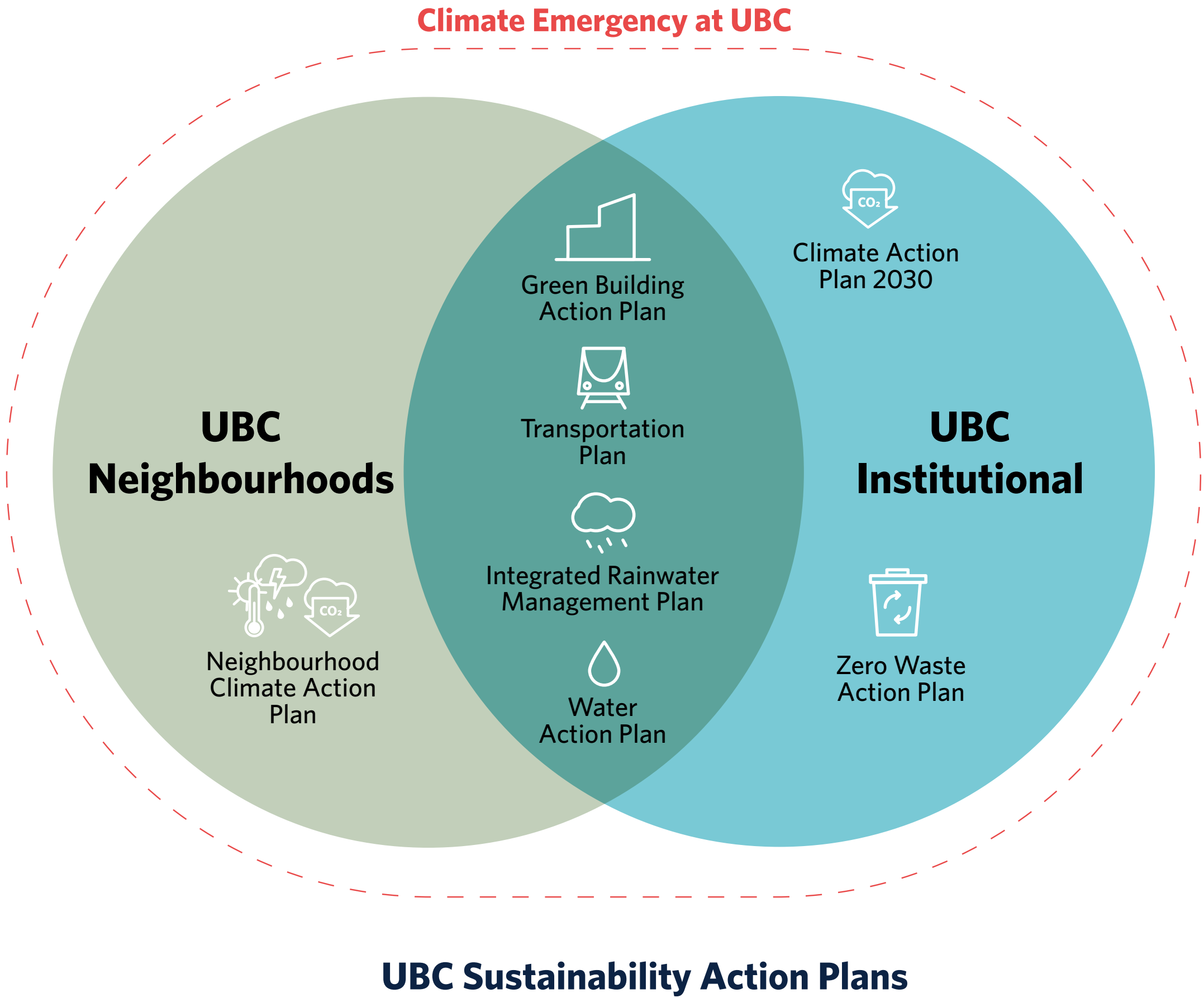
# Climate Action Planning at UBC

For more than 20 years, climate action has been a priority for UBC and the university community. Climate Action Plan 2030 (CAP2030) is the most recent demonstration of UBC’s commitment to drastically lower its emissions, defining the pathway to net-zero for the academic campus lands.

NCAP does the same for the neighbourhoods as well as address climate resilience in the neighbourhoods, through mitigation strategies to accelerate emission reductions and adaptation strategies to prepare for the impacts of an already changing climate.

NCAP expands upon the existing Community Energy Emissions Plan (CEEP), which was introduced in 2013 and has guided climate action and energy efficiency initiatives in UBC’s growing residential neighbourhoods.

NCAP is supported by an integrated policy and planning landscape. This includes mutually supportive and complementary plans and policies guiding sustainability and climate action, such as the UBC Green Building Action Plan, the Transportation Plan, the Integrated Rainwater Management Plan and the emerging Biodiversity Strategy. NCAP was developed with the vision and future growth defined in Campus Vision 2050. NCAP delivers on Campus Vision 2050 and Land Use Plan<sup>3</sup> commitments towards climate action, and will guide amended and future Neighbourhood Plans.



<sup>3</sup> Subject to Minister of Municipal Affairs adoption of UBC’s December 2023 amended Land Use Plan for the Point Grey Campus Lands.

# Guiding Principles

NCAP is shaped by five guiding principles that reflect the plan’s aspirations and priorities. These principles also provide the framework to prioritize actions and resources and metrics to evaluate the plan against. Further descriptions of our process and the Guiding Principles are found in .

## Community Connection

Engage community throughout the NCAP process, including two rounds of engagement and targeted workshops with key stakeholders (see additional details in ).

Define actions that will lead to stronger, more resilient, community connections.

## Long-term Accountability & Governance

Establish regular reporting cycles on neighbourhood climate action.

Develop an action plan, with defined responsibilities and adequate resourcing.

## Climate Justice & Equity

Recognize that climate change impacts are felt disproportionately among different communities.

Focus on equity to improve community outcomes, especially around affordability and health. Look to equitably distribute costs and benefits.

Recognize UBC’s responsibility within the broader global community to act in response to the climate emergency.

## Climate Leadership & Learning

Position UBC as a local and global leader in climate action.

Integrate UBC’s academic expertise with NCAP technical development.

Apply learnings from Musqueam and UBC’s co-developed emerging framework to enhance Musqueam values on campus.


## Shared Responsibility

Collaborate and coordinate with the UNA, UBC Properties Trust, neighbourhood residents, and outside partners.

Support local action with initiatives from other levels of government.

## Emission Sources in UBC's Neighbourhoods

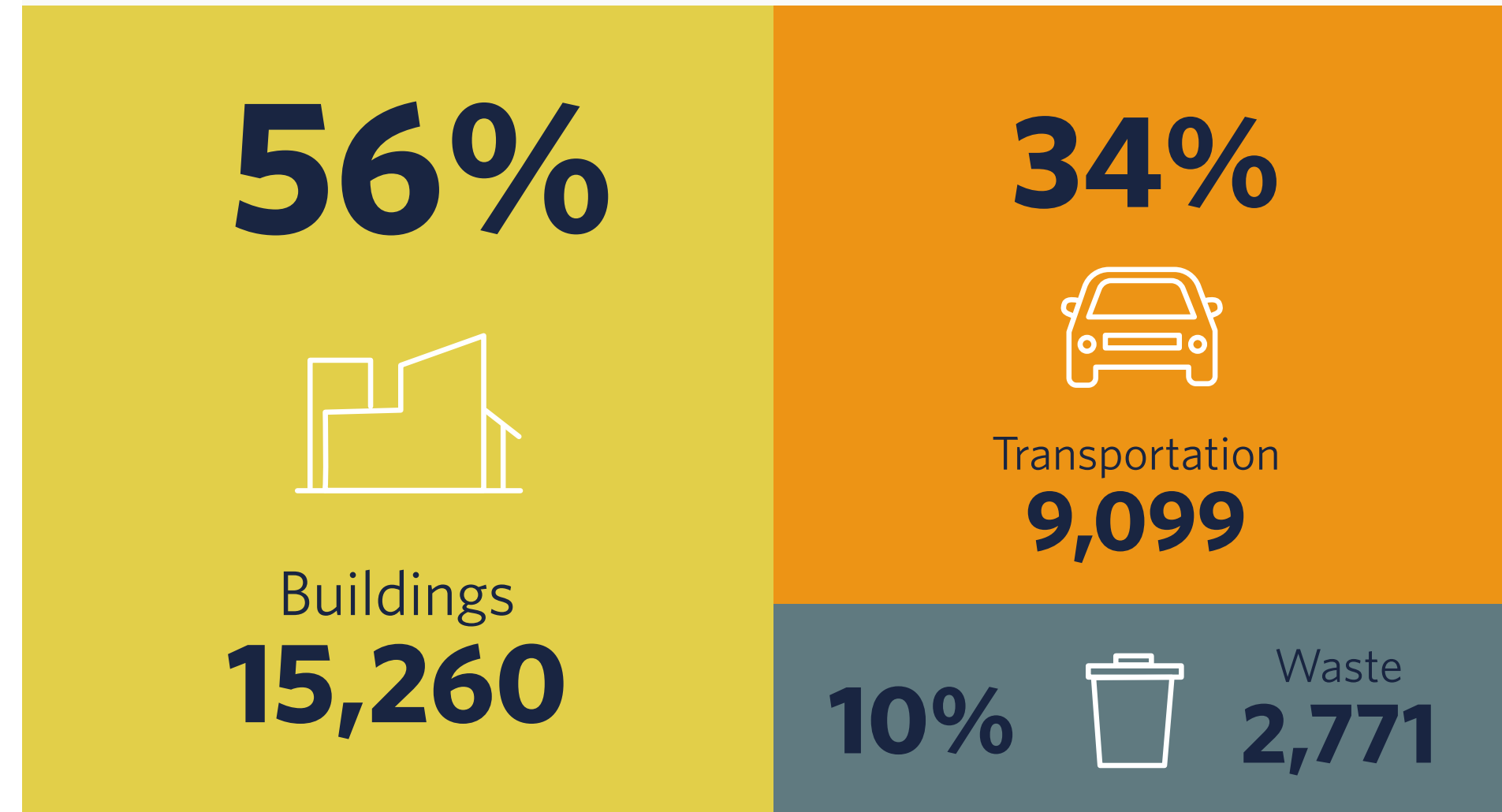
**Current community emissions are about 45% less than the regional averages<sup>4</sup>**, on a per capita basis. This is driven by significantly lower transportation emissions due to the UBC neighbourhoods' compact community design that is well supported by public transportation and enables people to live close to where they work, study, and play.

Additionally, past and current building standards guided by  and implemented through the Residential Environmental Assessment Program (REAP) have driven lower emissions in neighbourhood buildings. While this is a significant achievement, there is still more to do to meet NCAP's overall objectives.

### 2022 Baseline Community Emissions by Source

(tonnes CO<sub>2</sub>e)

Greenhouse gas emissions from buildings are the largest source of community emissions, followed by emissions from resident vehicle travel and direct emissions from waste at the landfill.



### NCAP has set the following community emissions targets:

**2035**  
reduce community emissions by  
**30%**  
vs 2022 levels

*Supported by achieving the Land Use Plan commitment to defining a pathway to achieve net-zero operational emissions in new Neighbourhood buildings no later than 2030*

**2050**  
reduce community emissions by  
**100%**  
(net-zero)

### Community emissions include the following<sup>5</sup>:



Energy use in buildings



On-road resident vehicle travel



Direct emissions from decomposition of organic material in solid waste at the landfill

<sup>4</sup> Comparison of 2021 UBC per capita community emissions to 2021 Metro Vancouver per capita emissions for relevant sectors (cars & trucks, buildings, waste), using the 2015 reported sectoral split of Metro Vancouver emissions.

Sources:

<sup>5</sup> These are standard emissions sectors for community-based emissions and provide UBC with a framework to compare against other jurisdictions. For more details on our GHG emissions accounting methodology, please see

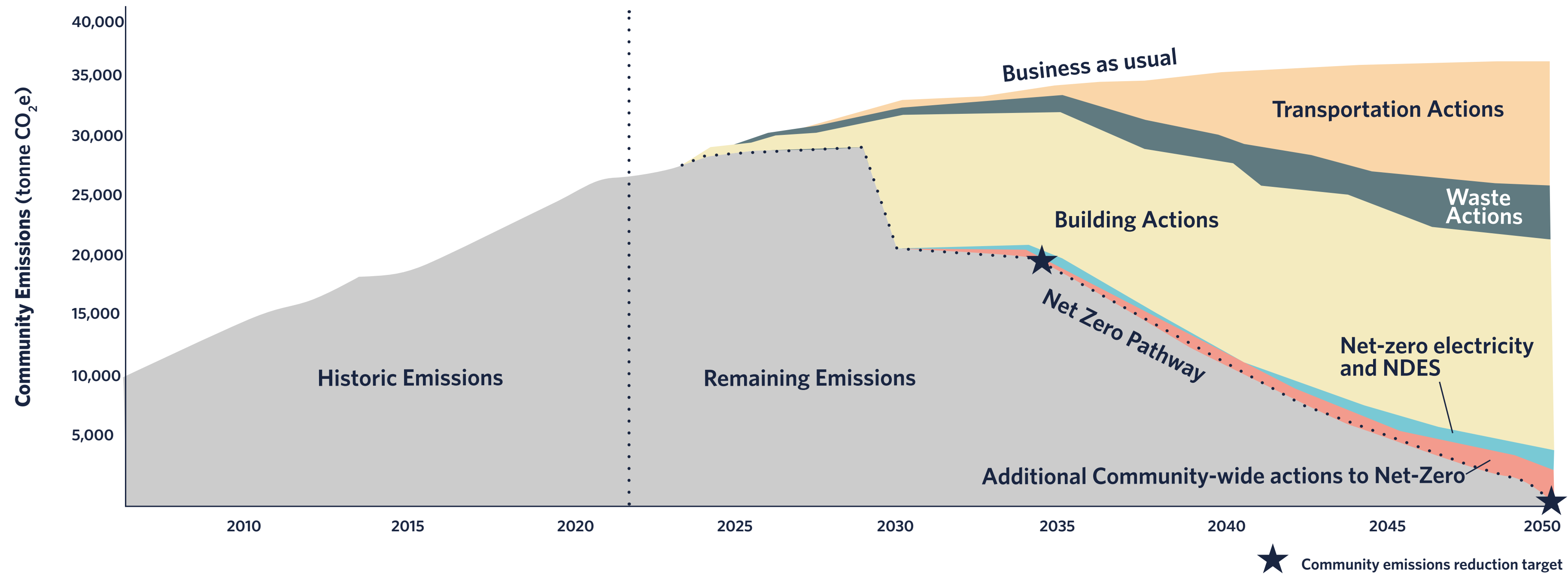
# Emissions Projections

Metro Vancouver is expected to grow to 3.8 million people by 2050. As one of Metro Vancouver's 'frequent transit development areas', UBC's neighbourhoods are identified as a growth area, which will provide local services and amenities and support rapid transit investment in both the immediate and longer term<sup>6</sup>.

With this regional growth the neighbourhood community population is expected to more than double by 2050. Without additional climate action, the associated community

emissions are expected to also grow by 35% from 2022 to 2050 (as shown in the 'business-as-usual' forecast below).

Ambitious and rapid action across all sectors is needed to achieve net-zero emissions. NCAP defines the pathway to achieve net-zero emissions by 2050, with contributions from each sector as shown in the figure below.



6 Source:

**LEARN  
MORE****Extended Emissions**

Beyond the scope of community emissions, there are significant extended emissions associated with UBC's residential neighbourhoods. These are emissions that occur outside of community boundaries, but are directly linked to community activities. These include embodied emissions in building materials, food, vehicles, and waste, as well as air travel. Considering the global impact of GHG emissions, it's critical to also understand and limit these impacts. Where UBC has authority, NCAP includes actions to address some of these extended emissions.

**Net-Zero Emissions**

NCAP primarily addresses reducing community emissions through actions at the sectoral level (i.e. buildings, transportation, or waste), but after these actions are implemented, there will be a small amount of community emissions that remain. These are the small amount of emissions related with electricity use, and organics that can't be removed from waste streams. To achieve net-zero community emissions, these remaining emissions need to be balanced by actions that remove an equivalent amount of emissions from the atmosphere.

The federal government<sup>7</sup> has signaled aspirations to achieve net-zero electricity supply, which would balance the remaining emissions in electricity. Beyond this, NCAP has highlighted the need for additional community-wide actions to achieve net-zero emissions by 2050. This may include carbon sequestration from natural carbon sinks that include trees, vegetation and soils, and carbon capture and storage technologies. These reductions must come as much as possible through direct, local action before exploring options to purchase reductions from actions located elsewhere (i.e. offsets). The additional community-wide actions will be defined through NCAP implementation, as improved data, research, and technologies emerge to support this work. This work will provide the final steps on our pathway to net-zero emissions, in support of UBC's Land Use Plan commitments.



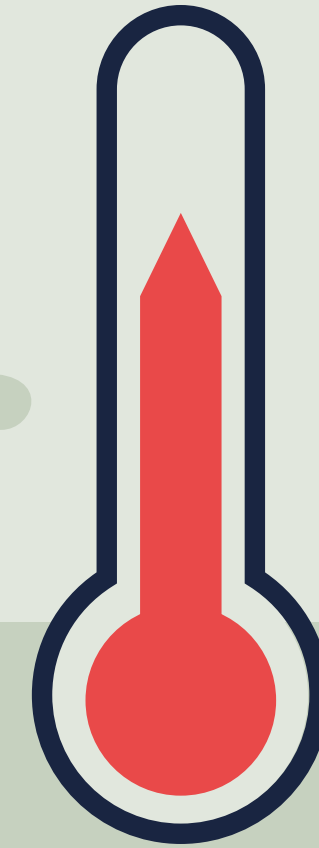
## Climate Projections

Climate projections<sup>8</sup> for the UBC Vancouver campus and neighbourhoods show significant changes are expected and will include gradual changes to average conditions, as well as an increase in extreme weather events.

These projected climactic changes will result in impacts throughout UBC's residential neighbourhoods, to the built environment, natural systems, and socio-economic conditions. These must be addressed to achieve the climate resilient community NCAP is targeting. Further details on the methodology behind this are included in

### Mean Temperatures

The mean temperatures are predicted to increase annually each season.



### Increased Wildfires



Extreme wildfire risk in western Canada continues to increase due to warmer temperatures and unchanged summer rainfall resulting in drought conditions.

Warmer weather is also causing snow melt and later fall frosts, all of which are expanding the fire season.

### Temperature Extremes

Extreme heat is projected to increase annually.

**Number of heat waves**

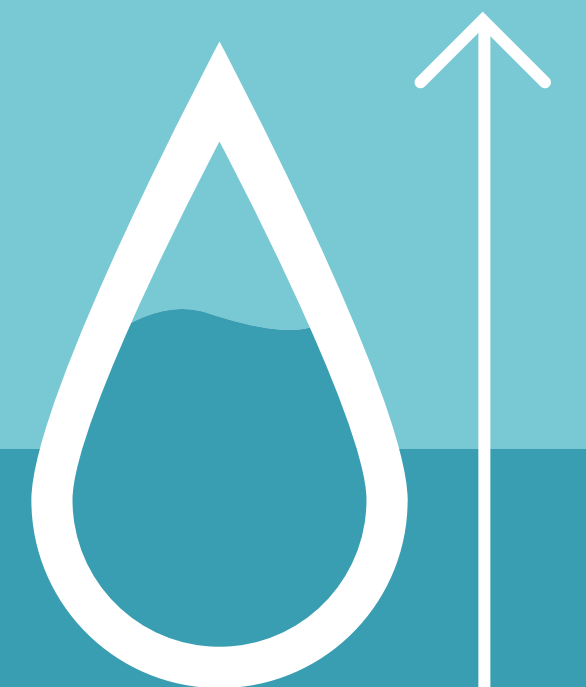


**Days over 30°C**



### Mean Precipitation

Annual precipitation is expected to increase. Winter and spring are projected to get significantly wetter, with droughts occurring in the summer.



# NCAP's Pathway

to a net-zero and climate  
resilient community



## Overview

The Neighbourhood Climate Action Plan sets a pathway to a net-zero and climate resilient community for the residential neighbourhoods on the University of British Columbia's Vancouver campus.

NCAP addresses this goal through climate actions in six scope areas. Each scope area includes:

An overall goal statement describing the desired outcome by 2050.

Key targets establishing measurable outcomes by specific dates.

Actions describing the steps to be taken to achieve the target and goal.

An action matrix has been developed that includes detailed information on the sequencing and prioritization of actions, identifies organizational leads and collaborators, linkages to other UBC plans and programs, co-benefits, and details equity considerations. The [full action matrix can be found here](#).

Overviews of the actions for each scope area are summarized in the following pages, including prioritized actions that:

1. Achieve high impact quickly - for mitigation or adaptation, and provide significant co-benefits for the community;
2. Complete foundational pieces that enable high impact actions in the near future.

## NCAP's Pathway

Shaped by NCAP's guiding principles, several co-benefits have been defined that NCAP actions will help deliver. These are:



### Affordability

Actions that reduce costs associated with taking climate action.



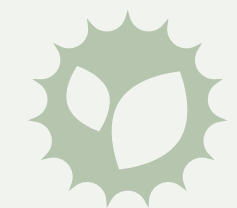
### Community Connection

Recognizing that a connected community is a resilient community, actions that support opportunities for community interaction and connection.



### Health & Wellbeing

Actions that improve health and wellbeing conditions for community members.



### Climate Leadership

Actions where UBC is leading climate action policy.



### Access for All

Actions that make it easier for everyone to access spaces, information, processes or programs.



### Academic Connection

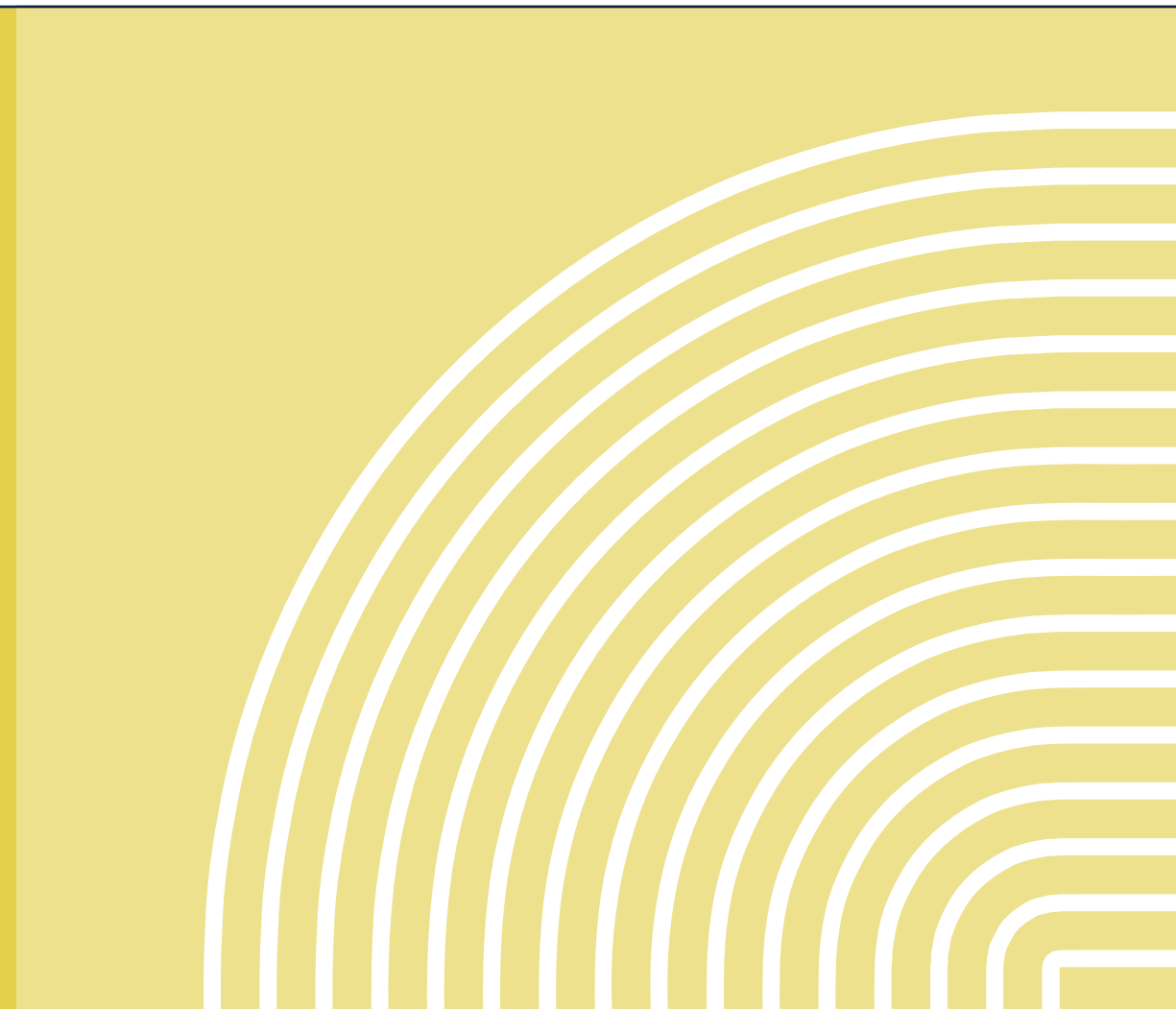
Actions that provide opportunity for research connections with UBC's academic community.



# Scope Areas



# New Construction & Existing Buildings



## Goal

New and existing buildings achieve low carbon, energy efficient operations, incorporate low embodied carbon materials and design, and provide residents with safe and healthy homes that are resilient to the effects of climate change.

## Targets

**By 2030**, embodied carbon in new buildings is reduced 40% versus baseline building.

**By 2030**, at least 50% of homes have active, low carbon cooling increasing to 100% before 2050.

- Supported by a passive-first approach to provide thermal comfort for new buildings and a plan to facilitate accelerated cooling upgrades in existing buildings.

**By 2035**, building operational emissions are reduced by at least 60% from 2022 levels.

- Supported by achieving the LUP commitment to defining a pathway to achieve net-zero operational emissions in new Neighbourhood buildings no later than 2030.

**By 2050**, all buildings in UBC's residential neighbourhoods achieve net-zero operational emissions and are resilient to current and future climate conditions.

## Highlights of Progress to Date

**In 2006**, UBC established the Residential Environmental Assessment Program (REAP) as a Land Use Rule.

Established performance-based energy targets in **2015**.

Adopted Step 3 of the BC Energy Step Code and early adopter of BC Zero Carbon Step Code (Moderate Step) in **2023**.

Established future climate design criteria in **2020** to prevent overheating in new buildings.

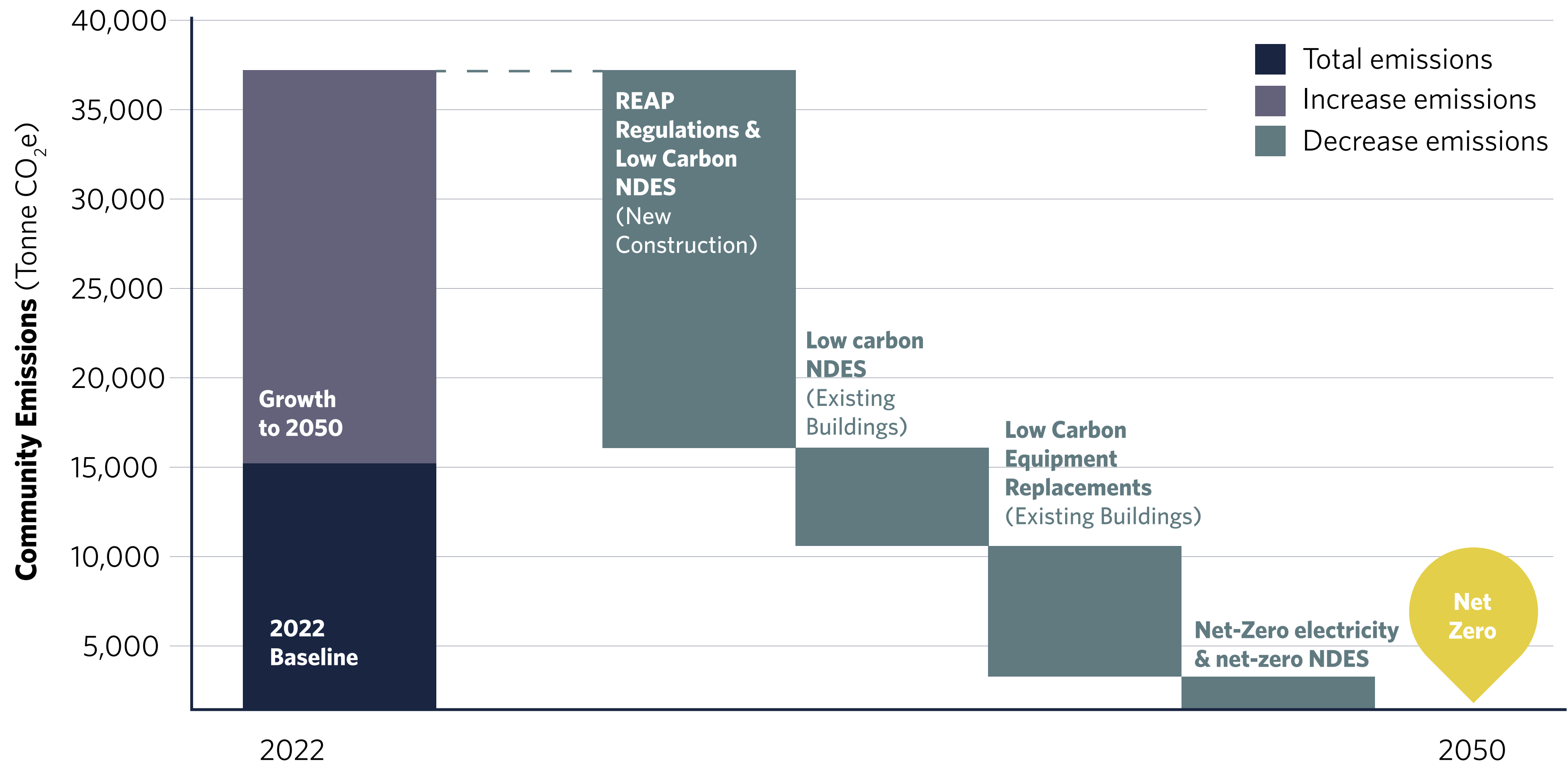
Established mandatory embodied carbon reporting requirement in **2020** and established mandatory guidelines for embodied carbon calculations in **2023**.

Since **2020**, REAP has included optional credits to support the use of wood construction, including responsibly sourced materials, and mass timber superstructure.

In **2022**, completed the Evolve project, a fully electric Passive House project that incorporated academic monitoring of outcomes into the project.

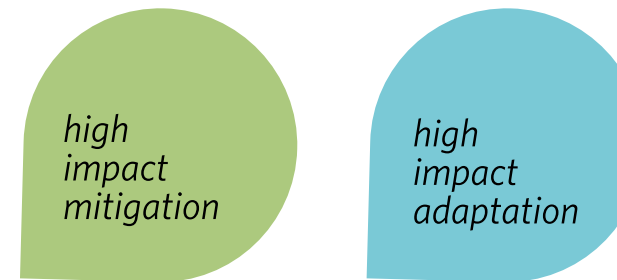
Leader in establishing energy benchmarking in multifamily buildings (founding member of Building Benchmark BC).

### Net-Zero Emissions Pathway - Buildings



# Action Highlights

## New Construction



### IN THE NEXT 1-2 YEARS:

- Update REAP in 2025 to require all new buildings be designed to meet:
  - The Zero Carbon Step Code Zero Carbon target to reduce operational emissions. ●
  - A Cooling Energy Demand Intensity target. ●
- 10% embodied carbon reduction.

### IN THE NEXT 3-5 YEARS:

- Complete Neighbourhood District Energy System (NDES) expansion in Wesbrook Place to provide low carbon heating and cooling to new Wesbrook Place homes. ●
- Explore opportunity for a total carbon (operating plus embodied) target for new buildings.
- Build capacity for design of efficient, low carbon and resilient buildings.
  - Share learnings from building benchmarking program.
  - Showcase successful projects at UBC and beyond.

### IN 6+ YEARS

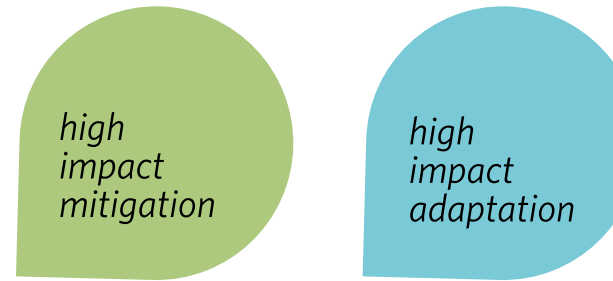
- Update REAP by 2030 to require minimum 40% embodied carbon reduction to align with or exceed the City of Vancouver target. ●
- Implement pathway to net-zero embodied carbon in buildings (before 2050).

## Co-benefits of actions

- ∞ **Health & Wellbeing**
- ♿ **Access for All**
- 💰 **Affordability**
- ⚙️ **Climate Leadership**
- 🎓 **Academic Connection**

# Action Highlights

## Existing Buildings



### IN THE NEXT 1-2 YEARS:

- Streamline the permitting process for in-suite heat pump installations.
- Produce educational materials (e.g. toolkits, guides, etc.) that identify incentives for building owners to install energy efficient equipment shared through UNA communication channels.

### IN THE NEXT 3-5 YEARS:

- Facilitate partnerships to develop demonstration projects to support low carbon heating and cooling system equipment replacements and upgrades for residents and building owners.
- Identify regulatory mechanisms to enable low carbon and resilient performance requirements for domestic hot water and space heating equipment replacements.
- Develop a plan to facilitate accelerated cooling upgrades in existing buildings. ●

### IN 6+ YEARS

- Fully transition the NDES to low carbon energy supply (aligned with Wesbrook Place completion, approx. 2030). ●
- From 2030, at time of replacement, require low carbon-only equipment for domestic hot water and space heating systems or connection to low carbon NDES. ●

## Co-benefits of actions

- ∞ **Health & Wellbeing**
- ♿ **Access for All**
- 💰 **Affordability**
- ⚙️ **Climate Leadership**
- 🎓 **Academic Connection**

## Equity Considerations

- Consider impacts on tenants and other residents with less agency to take action.
- Prioritize accelerated cooling supply to vulnerable community members.
- Identify how to support retrofits for lower income residents if other government incentive programs are no longer available.

**LEARN  
MORE****UBC's Residential Environmental Assessment Program (REAP)**

REAP is UBC's mandatory green building rating system, created to address the unique conditions of neighbourhood growth on UBC's campus and implement requirements that are best suited for our local context. All new residential buildings in the neighbourhoods must meet sustainability standards such as ensuring lower carbon impact, improved energy efficiency, meet thermal comfort requirements for future climate conditions and have air filtration systems to address things like wildfire smoke, and more.

To allow the design community and construction industry flexibility to develop cost-effective design approaches, REAP has adopted a stepped, performance-based approach rather than prescriptive requirements.

**Embodied Carbon Policy at UBC**

Embodied carbon is the greenhouse gas emissions associated with the production, transportation, construction, maintenance, replacement, and disposal of building and construction materials. Embodied carbon, combined with operational emissions arising from building operations (e.g. from energy use), define the whole lifecycle carbon impact of a building.

UBC is establishing a stepped approach to embodied carbon targets in REAP for all new residential construction on the Vancouver campus. This will support development of capacity in the design community and construction industry and allow supply chains for low carbon construction materials and practices to develop. UBC has established mandatory embodied carbon reporting in the current version of REAP and will establish a 10% reduction target in the next version of REAP by 2025.

**Actions you can take**

Install low carbon equipment in homes and buildings (e.g. heat pumps for heating and cooling).

# Transportation & Mobility





## Goal

Residents benefit from convenient and reliable transit and an expanded on-campus mobility network (e.g. shared bike programs and cycling infrastructure) that prioritizes active and sustainable modes for people of all ages and abilities. These initiatives better support residents in ensuring they get to where they need to go comfortably and safely, while reducing greenhouse gas emissions.

## Targets

**By 2035**, per capita transportation emissions are reduced by at least 25% from 2022 levels, supported by:

- UBC neighbourhood contributions to overall campus target of at least 66% of trips to and from UBC made by walking, cycling, rolling or transit.
- 12% of residents' light-duty vehicles are zero emissions vehicles.

**By 2050**, 100% of trips by UBC neighbourhood residents are made by walking, cycling, rolling, zero emission transit or zero emission vehicles.

## Highlights of Progress to Date

**40-50%** of neighbourhood homes are lived in by UBC students, faculty, or staff helping reduce travel for daily life.

Mandatory **EV charging infrastructure** in new buildings (REAP) and public EV charging stations in Wesbrook Place.

REAP requires developers contribute to a **low carbon development fund** to support low carbon mobility and REAP research projects.

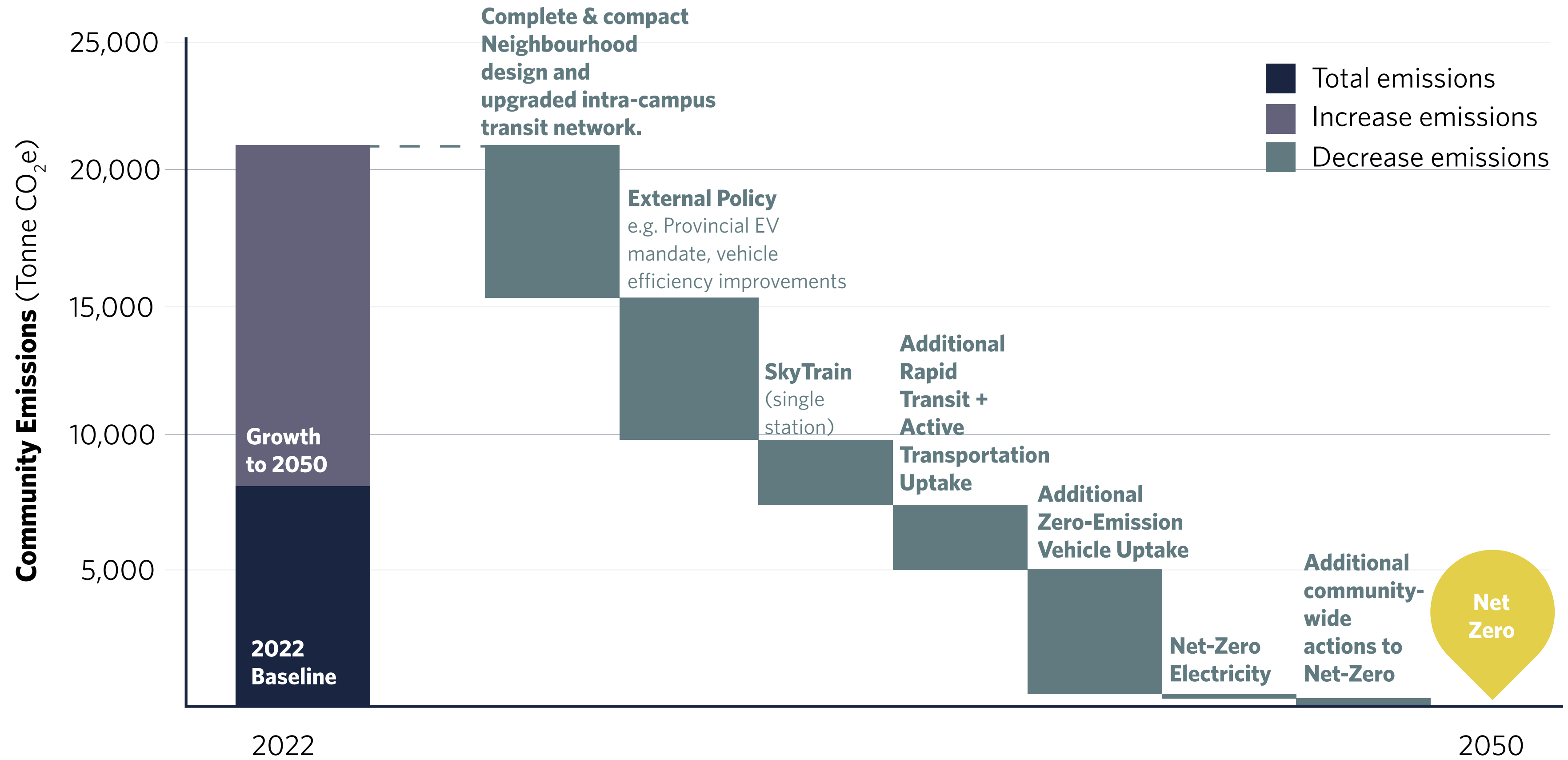
**Advanced bike storage** requirements for new buildings (REAP).

**Bike share expansion**, including the launch of UBC's on-campus dockless program (HOPR) in 2019 and expansion of the City of Vancouver's dock-based program (Mobi) in 2024.

**New rapid bus service** (route R4) along 41st Avenue in 2020 and transit priority along segments of Wesbrook Mall (2019 & 2020).



### Net-Zero Emissions Pathway - Transportation



# Action Highlights



## IN THE NEXT 1-2 YEARS:

- Continue to plan and advocate for SkyTrain. Plan for an expanded and upgraded intra-campus transit network including more frequent and convenient shuttle service.
- Support transition to zero emissions vehicles by expanding public EV charging infrastructure, including dedicated charging for car share, and providing resources to support retrofits of EV charging stations in existing buildings.
- Plan for resilient, safe and expanded active transportation networks, including sidewalks, connected greenways, and cycling routes through updates to UBC's Transportation Plan and Neighbourhood Plans.
- Expand bike share and car share programs.

## IN THE NEXT 3-5 YEARS:

- Expand and enhance cycling routes, sidewalks and transit stops to support safe and resilient transportation networks (e.g. have shaded and covered shelters at public transit facilities, shading along walking and cycling routes and public misting stations).
- Design transit-oriented neighbourhoods to support increased transit ridership, convenience and access.

*These will continue across the horizon of the plan.*

## IN 6+ YEARS

- Prepare for the arrival of SkyTrain on campus and establish an expanded and upgraded intra-campus transit network.

## Co-benefits of actions

- Community Connection**
- Health & Wellbeing**
- Access for All**
- Affordability**
- Climate Leadership**
- Academic Connection**

## Equity Considerations

- When setting parking policy and planning neighbourhood design, consider needs of people dependent on cars for accessibility purposes.
- Design roads to prioritize comfort and safety of our most vulnerable road users. Enhancing mobility for them will benefit all.
- Include feedback and look for opportunities to collaborate with persons with disabilities and vulnerable residents in transportation network design.

**LEARN  
MORE**

**TRAVEL MODE HIERARCHY**

NCAP prioritizes active and sustainable modes over less sustainable options while ensuring the safety and comfort of more vulnerable road users, such as people walking, rolling, biking or using another form of micromobility.

Everyone benefits from transportation networks designed to support vulnerable road users. Framing our work under this lens will help improve outcomes for the entire community.

**Travel Mode Hierarchy**

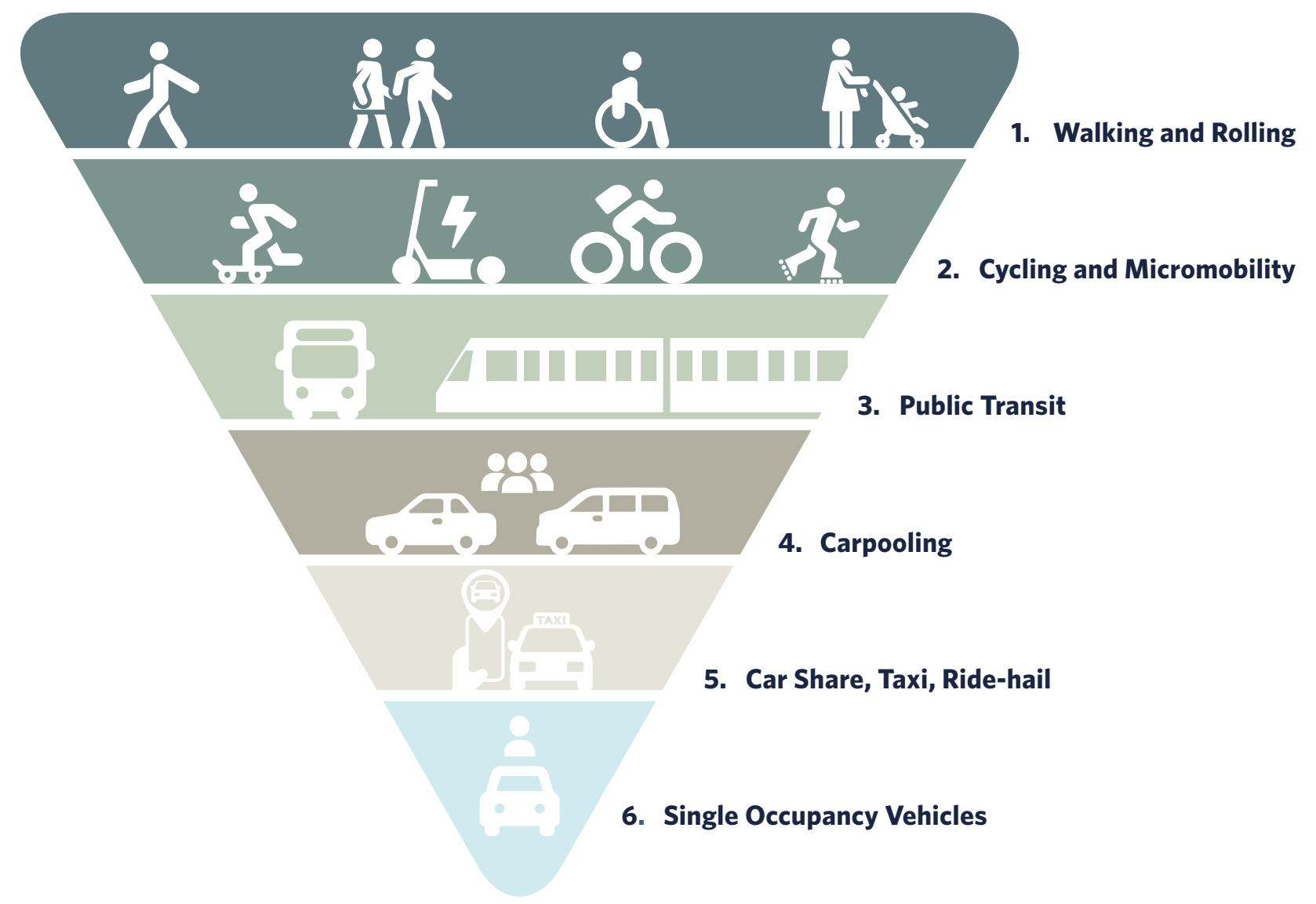


Figure 1: Travel Mode Hierarchy (Source: Campus Vision 2050)



**Actions you  
can take**

Use public transit.

Consider low carbon options for errands and shorter trips (e.g. cargo bikes or e-bike share).

Undertake retrofits to establish EV charging in existing buildings.

Consider purchasing a zero emissions vehicle or using zero emissions car share.



# Waste, Materials & Consumables



## Goal

Transition towards a zero-waste community by creating opportunities for residents to share, reuse, and repair, supporting the circular economy. Thoughtful building and neighbourhood design, along with community programming, make waste sorting for recycling and organics easy and efficient for all residents and visitors. Construction and demolition practices make efficient use of building materials and optimize their reuse and diversion from landfill.

## Targets

**By 2035**, per capita waste emissions are reduced by at least 30% from 2022 levels.

**By 2050**, UBC's residential neighbourhoods will have achieved net-zero emissions from solid waste.

## Highlights of Progress to Date

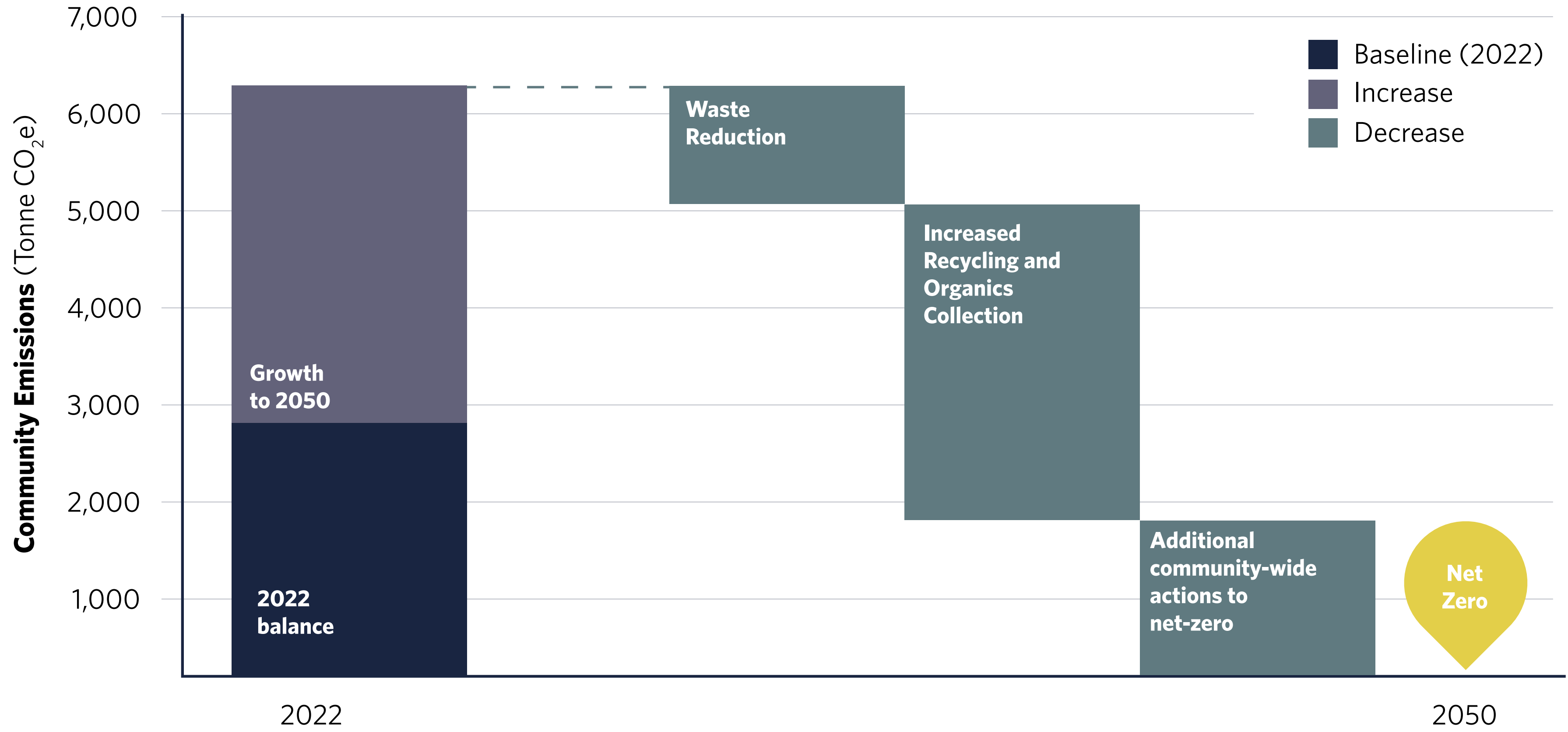
**REAP requirements** for recycling of construction materials and for recycling and organics facilities in buildings.

UNA offers free specialty recycling services for UNA residents and has recently expanded hours with additional staff and community volunteer support.

UNA has increased the number of **community yard sales** it runs each year. Yard Sales help build community connection and reduce environmental and economic waste.



### Net-Zero Emissions Pathway - Waste



## Action Highlights

### IN THE NEXT 1-2 YEARS:

- Support the UNA to facilitate awareness campaigns on waste reduction and diversion.
- Explore options to support UNA programming for community zero waste initiatives.
- Review and plan alongside the UNA on opportunities for future expansion of community recycling services.

### IN THE NEXT 3-5 YEARS:

- Require 90% diversion of construction and demolition waste in REAP (increasing from 85% currently).
- Explore how to expand and enhance the UNA Green Depot.
- Review and update REAP requirements for recycling and organics facilities in new neighbourhood buildings.

### IN 6+ YEARS

- Facilitate opportunities for expansion of community recycling facilities.
- Support the UNA to create community hubs and programming to support sharing, re-use and repair (e.g. clothing, bicycles, electronics, appliances).

## Co-benefits of actions

 **Community Connection**

 **Access for All**

 **Affordability**

 **Academic Connection**

## Equity Considerations

- Consider language and cultural barriers to recycling and organics collection



LEARN  
MORE**Broader impact of community waste**

NCAP's community emissions from waste are caused by organic materials such as food waste in landfills degrading to release methane, a potent greenhouse gas. These local emissions don't capture the full breadth of the global impact of disposing of items.

Besides local emissions from landfills, consumer products include embodied emissions that occur during manufacturing and transportation. When items are thrown out - whether in waste or recycling, the embodied emissions associated with that creation process are also thrown out. These consumption-based emissions likely don't occur locally, but they do impact the communities involved in production and contribute to global emissions.

Consumption-based emissions modelling from Metro Vancouver suggests that the embodied emissions in waste and recycling streams account for more than 80% of the overall impact of these items<sup>9</sup>. Understanding this broader impact of community waste helps highlight the importance of waste reduction and other zero waste initiatives.

This demonstrates the value of the zero-waste hierarchy - first reduce, then reuse, then recycle. Reducing consumption altogether, or reusing and repairing items you already have, has a tremendous impact on lowering the full breadth of emissions associated with

**Actions you can take**

Buy and sell second hand items and donate used goods. Embrace the sharing economy.

Compost food waste, yard trimmings, and soiled paper.

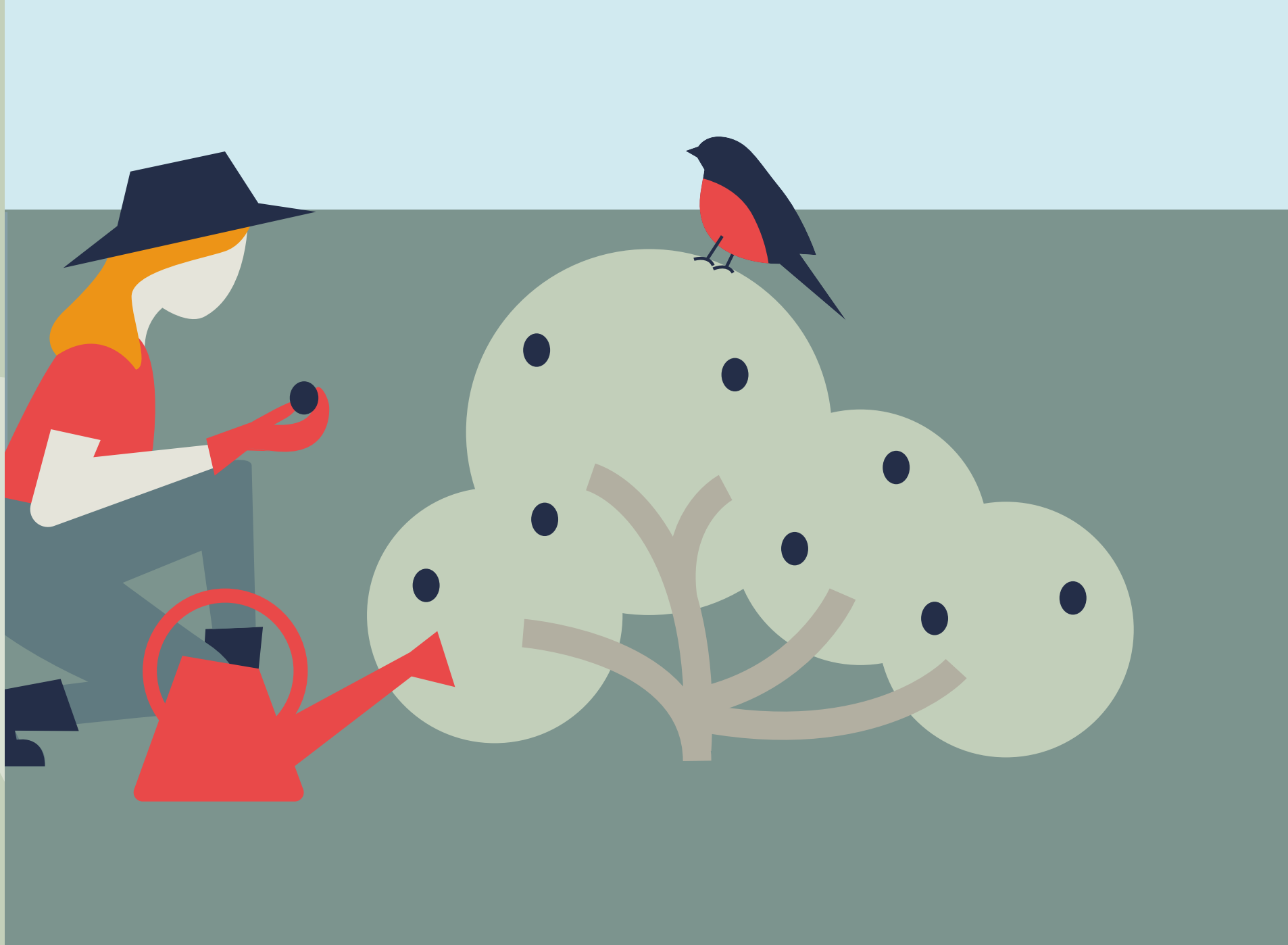
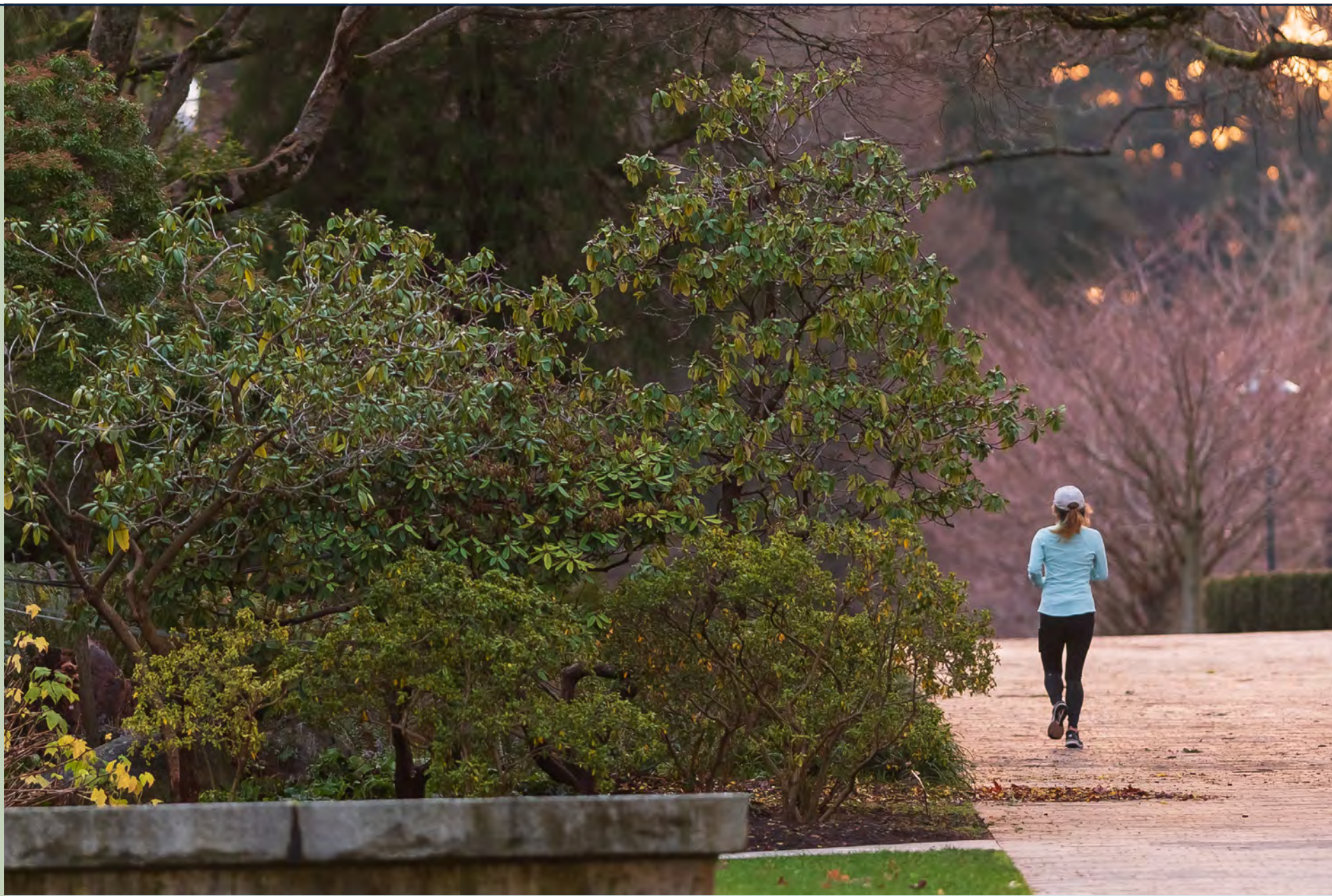
Learn how to properly dispose of different items using the

Use reusable food ware such as refillable coffee cups. Avoid single use items such as coffee cups, plastic wrappers, bags and utensils.

Recycle more items at the



# Ecology



## Goal

Trees, landscapes and other natural assets provide vital ecosystem services to help UBC's neighbourhoods adapt to a changing climate. Anchored by UBC's Campus Vision 2050 commitment to understand and incorporate Musqueam values into planning, climate adaptive planting practices support a network of resilient, connected green public spaces, courtyards, and corridors integrated with neighbourhood buildings. Neighbourhood urban ecosystems are well designed to provide welcoming and restorative places for the community to come together and build connections.

## Targets

Create quantifiable targets related to ecology, to support mitigation and adaptation.

- Supported through work over the next one to two years, including the Integrated Rainwater Management Plan, emerging Biodiversity Strategy, and amended and future Neighbourhood Plans.
- Targets will contribute to the overall campus target set in the draft updated Land Use Plan that commits to campus-wide net gain in tree canopy cover by 2050, compared to the current coverage of 36%.

## Highlights of Progress to Date

Musqueam and UBC co-developed an emerging framework to enhance **Musqueam values on campus**, which includes the following strategies:

- Planting of this Place: Increase native, ethnobotanical and informal planting;
- Reveal & Respect Water: Identify lost streams and reveal rainwater systems; and
- Indigenous Ways of Knowing: Create learning landscapes that highlight traditional and experiential knowledge.

REAP includes **biodiversity requirements**, including mandatory bird friendly building design, light pollution reduction, and climate resilient plantings.

**Research partnerships** have supported development of existing policy development for ecology and biodiversity, facilitated by the SEEDS program.

The UNA has five **community gardens** where residents can grow their own food and flowers, connecting with the UNA community and the natural world. The UNA has a garden partnership with SEEDS and other UBC academic research projects.

The UNA transitioned leaf blowers for public landscaping from April to September to **electric** in early 2023.



## Action Highlights

high  
impact  
adaptation

### IN THE NEXT 1-2 YEARS:

- Continue co-development of UBC-Musqueam Plant List to identify plants of cultural importance to Musqueam.
  - Context: This work will continue to evolve alongside UBC and Musqueam's relationship.
- Support nature-based solutions to climate action at the neighbourhood scale through updates to UBC's amended and future Neighbourhood Plans.
  - Potential updates include planting and soils guidelines, tree retention and planting locations to optimize shade and flood regulation.
- Identify opportunities to increase biodiversity and ecosystem services at site scale through future REAP updates.
- Continue supporting the UNA on sustainable landscape practices (e.g. operations, low carbon, energy efficient equipment, climate resilient replanting guidelines).
- Develop baseline data with academic partners related to ecosystem services supporting climate action (e.g. shade, urban heat island effect mitigation).
- Include future climate projections and localized climate impacts to natural systems in the Biodiversity Strategy. ●

### IN THE NEXT 3-5 YEARS:

- Set performance targets relating to neighbourhood shade coverage. ●
- Begin implementing the Integrated Rainwater Management Plan (IRMP), focusing on adaptive, green infrastructure that responds to seasonal variability and future climate conditions. ●
- Showcase different approaches to climate resilient plantings incorporating Musqueam and other Indigenous knowledge.

### IN 6+ YEARS

- Expand and enhance ecosystem services (e.g. shade, flood regulation, carbon sequestration). ●

## Co-benefits of actions

- 👤 **Community Connection**
- ∞ **Health & Wellbeing**
- 👤 **Access for All**
- 💰 **Affordability**
- 🎓 **Academic Connection**

## Equity Considerations

- Targets should aim to improve equity throughout neighbourhoods to provide similar levels of ecosystem services for all residents.
- Consider what habitats are provided by planting guidelines and what species would be supported.
- Consider how to support a diverse set of needs and preferences in neighbourhood landscapes (e.g. place making, cultural, sense of belonging).

LEARN  
MORE**Ecosystem services for climate action**

Ecosystem services describes the benefits ecosystems provide to human health, survival, and quality of life. Four different groups of services have been defined, and of these, regulating ecosystem services are most relevant to NCAP. Regulating ecosystem services are natural processes that moderate natural phenomena (e.g. water purification, pollination, climate regulation).<sup>10</sup>

NCAP is focused on the opportunities that regulating ecosystem services can provide for climate action – both to reduce emissions and to adapt to future climate conditions. Climate action taken through neighbourhood ecosystems also bring the co-benefits that ecological spaces on campus provide. UBC's focus through NCAP implementation will be to explore and establish targets (where feasible) that support the following ecosystem services:

- Trees providing shade;
- Natural systems reducing neighbourhood temperatures to mitigate the urban heat island effect;
- Mitigating damage from extreme weather events;
- Carbon sequestration;
- Regulation of water flow; and
- Erosion prevention and maintenance of soil fertility.

**Climate resilient plantings**

A resilient landscape can withstand the effects of climate change and benefit the entire ecosystem. Guidelines to support climate resilient plantings should include and consider the following:

- Plants suitable for future climate conditions;
- Planting guidelines to enhance ecosystem services;
- Consider planting palettes and composition to select complementary plants that will support each other and an increase in biodiversity while supporting the region's ecological character; and
- Opportunities for a variety of aesthetic and functional needs, including manicured and wilder landscapes.

**Actions you can take**

Plant a container garden on your patio or balcony, learn how with Metro Vancouver's

Enjoy community greenspaces.

Visit the  
for free with your UNA Card.

Engage your neighbours using the

# Climate Emergency Preparedness



## Goal

Residents are prepared for and well supported during extreme climate events such as heavy rainfalls, windstorms, wildfires and extreme heat. Through expanded resources, infrastructure, and proactive communication, residents feel safe and protected in their communities. Community-led social connectedness programs have strengthened ties between neighbours, creating a more resilient community network.

## Targets

**By 2030**, at least 50% of homes have active, low carbon cooling, reaching 100% before 2050.

- Supported by a passive-first approach to provide thermal comfort for new buildings and a plan to facilitate accelerated cooling upgrades in existing buildings.

## Highlights of Progress to Date

delivers emergency communications to campus stakeholders, including UNA members. Weather related alerts have been included since 2022. This system is a vital tool to support information sharing during climate emergency events.

UBC and the UNA collaborate on a variety of , including the program, which aims to create social connection opportunities for the community.

The UNA offers numerous **supports for newcomers** to the community including, social support programs, support services and groups, and English conversation and grammar programs.





**COOLING CENTRE**

## Action Highlights

high  
impact  
adaptation

### IN THE NEXT 1-2 YEARS:

- Support the UNA to develop educational tools and resources (e.g. maps, handouts, signage, web content) and programming (e.g. workshops, informational events) for residents to help prepare for climate emergency events supported by research collaborations with UBC's academic community.
- Continue to partner with the UNA to build programming that supports community connection and awareness.

### IN THE NEXT 3-5 YEARS:

- Develop comprehensive emergency response plan for local wildfire events.
- Support the UNA to expand cooling centres in the neighbourhoods.
  - For example, facilitate partnerships and identify funding to support UNA in developing a demonstration project to retrofit Old Barn Community Centre HVAC systems to decarbonize and add cooling and other resilience measures such as air filtration.

### IN 6+ YEARS

- Continue ongoing development of climate emergency response alongside UNA.

## Co-benefits of actions

-  **Community Connection**
-  **Health & Wellbeing**
-  **Access for All**
-  **Affordability**
-  **Academic Connection**

## Equity Considerations

- Communication barriers are a significant risk factor during heat and other climate events. Materials need to be prepared considering these differences and delivered through a variety of mediums to reach a more diverse group of community members.
- Consider targeted communication materials to support groups disproportionately at risk from climate events (e.g. people on certain medications are less tolerant to heat).
- Consider needs of different demographics (e.g. immunocompromised, seniors, youth, BIPOC, primary language, tenants).

**LEARN  
MORE****Social connection for climate action**

Isolation is one of the biggest risk factors during climate emergency events. For example, during British Columbia's 2021 heat dome event, [25%](#) of those who died lived alone. Knowing who your neighbours are and who's vulnerable will help community members better protect themselves and others. NCAP is supporting proactive actions to increase connections between community members to help everyone prepare together for extreme climate events. Beyond emergency preparedness, increasing social connection will contribute to improved wellbeing and happiness among neighbourhood residents.

Multi-unit housing, as is implemented in UBC's residential neighbourhoods, can offer unique opportunities to increase social connection (read this [article](#) by Happy Cities) through neighbourhood design that includes:

- walkable streets that allow people to meet their daily needs close to home;
- diverse housing options (e.g. mix of lower-rise and taller buildings) to meet different preferences, and;
- buildings with features that increase opportunities for social connection (e.g. such as elevator nooks, street level balconies, and shared terraces).

**Actions you can take**

Build better connections with neighbours to enable community-led support in emergencies.

Prepare for extreme weather events by accessing resources, preparing emergency kits, and planning how to respond to different climate emergency events.



# Neighbourhood Infrastructure



## Goal

Water and energy infrastructure servicing UBC's residential neighbourhoods is resilient and ready to respond to our changing climate. Upgraded systems support climate action and prioritize efficient, affordable and resilient services.

## Targets

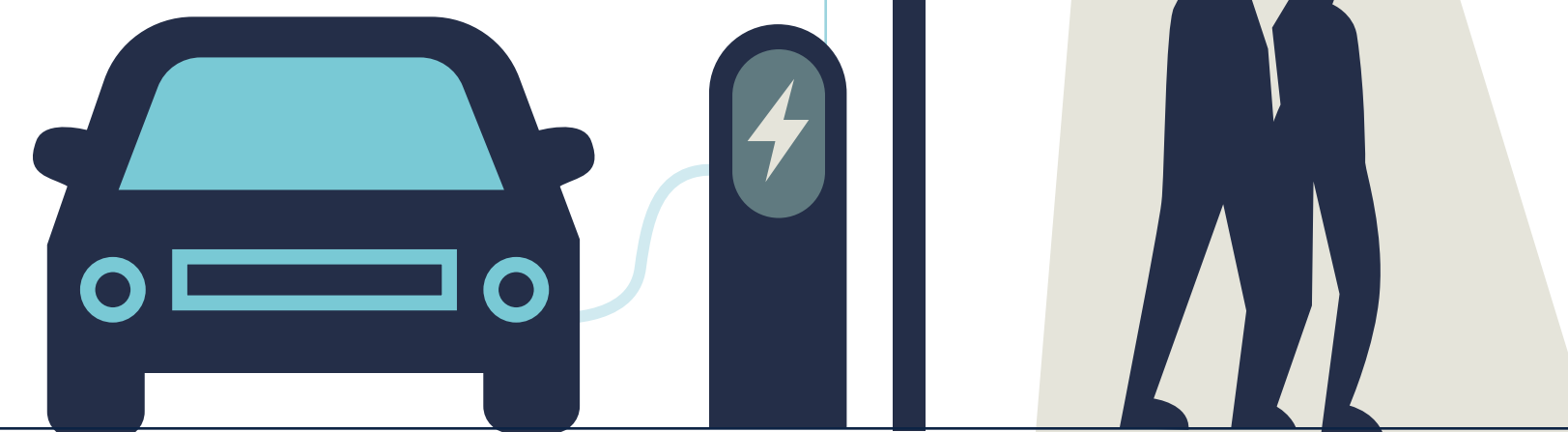
**By 2035**, at least 65% of neighbourhood energy supply is from low carbon sources<sup>11</sup> (electricity or low carbon district energy).

**By 2050**, 100% of neighbourhood energy supply is from net-zero sources<sup>12</sup>.

## Highlights of Progress to Date

**Neighbourhood District Energy System** is a centralized energy supply system that has been providing heat and domestic hot water to Wesbrook Place since 2015. The objective of the NDES is to reduce community greenhouse gas emissions by providing low-carbon thermal energy for residential neighbourhoods on the Vancouver campus.

**Compact community design** has reduced the amount of infrastructure, and its associated costs, needed to service the neighbourhoods.



<sup>11</sup> Low carbon district energy or electricity from BC Hydro (or electricity from an equivalent or lower emissions intensity source).

<sup>12</sup> Low carbon sources where the remaining associated emissions are balanced by actions that remove an equivalent amount of emissions from the atmosphere.



## Action Highlights

high  
impact  
mitigation

high  
impact  
adaptation

### IN THE NEXT 1-2 YEARS:

- Finalize plans and update agreements to convert NDES to low carbon energy supply.
- Finalize updates to the Integrated Rainwater Management Plan (IRMP) to ensure rainwater systems are adapted to future climate conditions.

### IN THE NEXT 3-5 YEARS:

- Complete NDES expansion in Wesbrook Place to provide 100% low carbon heating and cooling to new Wesbrook homes. ●
- Coordinate upgrades to low carbon electricity infrastructure to support climate action, including expanded EV charging, and low carbon heating and cooling systems.
- Begin implementing the IRMP focusing on adaptive, green infrastructure (e.g. bioswales, rain gardens, ponds) that improves the neighbourhood capacity to respond to intense rain events. ●

### IN 6+ YEARS

- Fully transition the NDES to low carbon energy supply (aligned with Wesbrook Place completion, approx. 2030). ●

## Co-benefits of actions



**Community Connection**



**Health & Wellbeing**



**Affordability**

## Equity Considerations

- District energy needs to be considered from an equity perspective (i.e. who pays for the system and who benefits).

LEARN  
MORE**Neighbourhood District Energy System (NDES)**

District energy systems centralize the production of thermal energy to provide heating and/or cooling to a network of interconnected buildings. The NDES has been providing heat and domestic hot water to new homes built in Wesbrook Place since 2015. Decarbonizing the NDES energy supply will decarbonize all the existing buildings serviced by the system and all future ones that connect. The original NDES concept envisioned a switch to 60% low carbon energy supply. NCAP will take this concept further and map out a plan to bring the NDES to 100% low carbon operations.

A timeline of key NDES milestones (note future dates and details are not confirmed and subject to updated agreements between Corix and UBC, as well as approvals processes at the BC Utilities Commission):

- **2015** - NDES begins operations, and two temporary plants provide thermal energy to heat homes and provide hot water.
- **In 3-5 years, approx. 2027** - Permanent NDES nodal plant will be installed to service the entire Wesbrook neighbourhood. The plant will provide the 1st phase of low carbon energy supply, including 100% low carbon energy for heating and cooling new Wesbrook buildings.
- **At Wesbrook Place completion, approx. 2030** - NDES will fully decarbonize energy supply, achieving 100% low carbon operations for all connected buildings (100% low carbon transition coincides with full Wesbrook Place buildout to support affordability.)

**Electrification for climate action**

NCAP's pathway to net-zero community emissions includes a move towards electrification. Electrified equipment, such as heat pumps and electric vehicles, provide energy efficient, low carbon options to serve resident's needs. They are a cornerstone of net-zero heating, hot water and cooling for our homes, and of net-zero mobility options.

Low carbon electricity, like that available in BC not only reduces greenhouse gas emissions, but also generates less air borne pollution. This offers direct local improvements to air quality as it removes or reduces the amount of locally combusted fossil fuels, such as natural gas in boilers for heating homes or hot water, and gasoline in cars.

Even with the benefits, electricity use is not without impacts. Whether from the impacts of electricity generation or from the resources to provide electrified equipment (e.g. EV batteries), electrification does have some negative consequences. To mitigate this, a move to electrify must also be paired with energy efficiency to minimize demand. Within NCAP, some examples of energy efficiency measures are commitments to increase operational energy performance requirements for new buildings, and EV charger load management requirements.

**Actions you can take**

Residents play a key role in helping to conserve energy and water use, lessening the impact on our infrastructure. Consider adopting the following tips and learn more about what you can do .

- **Dishwasher** - Wait until it's full before running it and turn off the 'heat dry' setting.
- **Laundry** - Wash with cold water and consider hanging laundry to dry.
- **Lighting** - Switch to LED bulbs and consider adding dimmer switches or timers.
- **Appliances and electronics** - Look for options with the ENERGY STAR certification.



## Compact Communities for Climate Action

Land use planning to create a compact community is key to achieving the climate action goals and targets of NCAP. A compact community where people study and work and have local access to community services such as daycare, community centres and shopping significantly reduces the need for resident car travel and ownership, reflected in our reduced per capita community emissions compared to the regional average. Campus Vision 2050 and the updated Land Use Plan ensure the continued design and construction of compact communities.

A compact community allows for an innovative district energy system that will deliver low carbon heating, hot water and cooling to Wesbrook Place buildings, and an integrated rainwater system that integrates nature-based design to increase resilience to the impacts of climate change.

A compact community requires substantially less neighbourhood infrastructure and is efficient in the use of materials required for homes compared to lower density neighbourhoods, which reduces the embodied emissions from materials used for building and neighbourhood infrastructure.

A compact community with strong community programming and services, provided by the UNA, enhances community connectedness contributing to increased social connectiveness that enhances safety during extreme weather. Finally, through intentional design, we can enhance biodiversity and incorporate ecosystem services, such as using natural infrastructure to reduce peak rainwater flows and provide shade.



# Plan Implementation



NCAP is a living plan, and will adapt and evolve over time, responding to new information, technologies, and a changing provincial and federal policy landscape. Our approach to implementation will reflect NCAP's guiding principles and be anchored by commitments to:

- Shared responsibility and collaboration
- Climate equity and justice
- Ongoing community dialogue
- Learning and research
- Monitoring and reporting

## Shared Responsibility and Collaboration

Climate action requires a community approach. Collaboration is key to achieving the ambitious goals set out within this plan. NCAP will be implemented in close collaboration with the University Neighbourhoods Association (UNA), UBC Properties Trust and with involvement and engagement with the community. Implementation planning will be coordinated through regular working sessions between staff from UBC, the UNA and UBC Properties trust.

Successful implementation of NCAP actions will require coordination and shared commitment to resourcing the plan. UBC, the UNA and UBC Properties Trust will provide dedicated staff resources to support NCAP action implementation. UBC will coordinate collaborative efforts to obtain external funding from Federal, Provincial, utility and other programs to help fund retrofits, infrastructure upgrades and support research projects that progress NCAP objectives. In addition, UBC will engage with outside partners such as the City of Vancouver and BC Hydro to support policy development.

## Climate Equity and Justice

Actions will be implemented through a climate equity lens that looks to improve outcomes for all, while keeping an eye on who benefits and who bears the costs, and how we can better support vulnerable community members.

The commitments below on ongoing community dialogue, monitoring and reporting, and our commitment to learning and adapting our plan in response, all support equitable implementation.



## Ongoing Community Dialogue

Ongoing dialogue and engagement with the community will be critical to successful implementation. Ongoing collaboration with the UNA will be central to this work, especially through the UNA's neighbourhood programming and communications channels. As actions are implemented, opportunities will be given to provide feedback on challenges and successes. This information will be used to refine our approach and inform additional actions, most especially under a climate equity lens.

NCAP will support and engage with community members through a variety of community focused actions, including community programming such as re-use and repair programs, communication resources, for example, to help residents navigate heat-pump retrofit process and incentives, and ongoing engagement through regular reporting on NCAP progress to the community.

## Learning and Research

Learning and research are integral to the successful implementation of NCAP, a unique opportunity provided by the association with the academic institution. Actions that identify opportunities for study have been identified for all scope areas. Coordination with UBC academics is supported by the UBC Sustainability Hub and the Campus and Community Planning SEEDS program, leveraging programs such as UBC's Campus as a Living Lab (CLL) program which provides a collaborative framework for faculty, staff, students and partners to address sustainability challenges on campus. Research will help us gain knowledge on innovative building and nature-based design strategies and insights into behavior such as transportation or consumption choices. Collaborative funding opportunities will be sought to support research initiatives.

In addition, Musqueam staff and knowledge holders are advising and working with UBC on a variety of projects to transform the campus with a stronger

Musqueam presence. We will look for ways to apply learnings from these projects to advance NCAP actions.

NCAP's technical development was strongly supported by Technical Working Groups, which brought together staff, academics, and other subject-matter experts to develop and refine NCAP's approach. Throughout implementation, we will look for opportunities to reconvene these groups to continue this process of sharing, learning and continued improvement.

## Monitoring and Reporting

Monitoring and reporting are key elements of implementation of NCAP. Progress on actions and community emissions will be tracked regularly and reported publicly. New construction will be required to meet operational energy and emission targets, and building performance will be tracked by a multifamily benchmarking program that was first in region when launched. Outcomes of implemented actions will be monitored (e.g., number of heat pump retrofits, quantity of e-waste collected), to gain insights into the effectiveness of programs and policies. To enhance learning, opportunities will be identified to monitor additional outcomes of implementation actions through research projects, in partnership with academics and students.

The NCAP will be reviewed and updated as necessary.

## Acknowledgements

NCAP benefited from contributions from many people, including UBC, UNA and UBC Properties Trust staff, UBC academics and outside experts. NCAP is also indebted to members of the campus community who provided input during community workshops or online surveys.

### Project Team

Michael White, AVP, Campus and Community Planning (C+CP)

#### Project Directors (C+CP):

Chris Fay, Director, Strategic Policy

John Madden, Director, Sustainability and Engineering

#### Project Management and Technical Leads (C+CP):

Kerry Shaw, Senior Neighbourhood Climate Action Planner

Ralph Wells, Community Climate and Energy Manager

### Steering Committee

Michael White, AVP, C+CP (Chair)

Chris Fay, Director, Strategic Policy, C+CP

Aubrey Kelly, President + CEO, UBC Properties Trust

Yale Loh, Treasurer

John Madden Director, Sustainability and Engineering, C+CP

John Metras, AVP, Facilities

Kerry Shaw, Senior Neighbourhood Climate Action Planner, C+CP

Siu Tse, Director, Engineering and Utilities, Facilities - Energy and Water Services

Ralph Wells, Community Climate and Energy Manager, C+CP

Paul Young, Director, Planning + Design, Properties Trust

### C+CP Staff Support

#### Strategic Advisors:

Janeen Alliston, Director, Engagement and Communications

Carole Jolly, Director, Community Development and Transportation

#### Engagement and Communications:

Madeleine Zammar, Manager, Engagement

Simmi Puri, Manager, Communications

Emma Luker, Engagement and Sustainability Planner

Kyle Vinson, Coordinator, Engagement and Communications

Saya Kawabe, Assistant, Communications & Engagement

Sofia Romo, Administrative Assistant

Ilona Boser, Administrative Assistant

Zainab Sayedain, Student Engagement Assistant

Sofya Babak, Community Engagement Crew

Emily Hansen, Community Engagement Crew

Hannah Reyes, Community Engagement Crew

**Technical Support:**

Jordan Chamberlin, Planning Assistant  
 Bud Fraser, Senior Planning and Sustainability Engineer  
 Lia Gudaitis, Senior Planner  
 Krista Falkner, Manager, Transportation Engineering  
 Adam Hyslop, Manager, Transportation Planning  
 Brittany Jang, Community Planner  
 Al Karimabadi, Chief Building Official  
 Jenalee Kluttz, Project Developer  
 Maximilian Kniewasser, Climate Action Planner  
 Simone Levy, Urban Design Planner  
 Jake Li, Green Infrastructure Engineer  
 Renée Lussier, Landscape Architect – Planner  
 Penny Martyn, Manager, Green Building  
 Joanne Proft, Associate Director, Community Planning  
 Liska Richer, Manager, SEEDS Program  
 Juan Luis Rivera Espinosa, Green Building Action Plan Research Assistant  
 Aviva Savelson, Senior Manager, Public Engagement  
 Gabriella Scali, Manager, Community Programs and Outreach  
 Georgia Stanley, Climate Response Applied Research Coordinator

**Project Advisory & Technical Support**

**UNA Staff:**

Paul Thorkelsson, Chief Administrative Officer  
 Sundance Topham, Chief Administrative Officer (outgoing)  
 Wegland Sit, Operations Manager  
 Robyn Chan, Sustainability Specialist  
 Chris Hakim, Corporate Services Specialist

**UBC Properties Trust Staff:**

Sean Ang, Development Manager  
 David Poettcker, Vice President of Development, Vancouver  
 George Poliusuk, Director, Property Management  
 Paul Young, Director, Planning + Design  
 Mark Zaturecky, Construction Development Manager

**Academic Advisors:**

Stephanie Chang, Professor, School of Community and Regional Planning (SCARP), Institute for Resources, Environment and Sustainability (IRES)  
 Haibo Feng, Assistant Professor, Department of Wood Science, Faculty of Forestry  
 Erica Frank, Professor, School of Population and Public Health, Faculty of Medicine  
 Melissa McHale, Associate Professor, Urban Ecology and Sustainability, Department of Forest Resources Management, Faculty of Forestry, Acting Academic Director, UBC Sustainability Hub  
 Charles Menzies, Professor, Anthropology Department  
 Matthew Mitchell, Assistant Professor, Urban & Agricultural Landscape Ecology, Department of Forest Resources Management, Faculty of Forestry  
 Jade Radke, MA student in the Behavioral Sustainability Lab at IRES  
 Adam Rysanek, Associate Professor, Environmental Systems, School of Architecture and Landscape Architecture (SALA)  
 Martino Tran, Associate Professor, SCARP, Tier 2 Canada Research Chair: Complexity and Sustainability  
 Qingshi Tu, Assistant Professor, Industrial Ecology/Sustainability Engineering, Department of Wood Science, Faculty of Forestry  
 Jiaying Zhao, Associate Professor, Department of Psychology, IRES, Canada Research Chair: Behavioural Sustainability, UBC Sauder Distinguished Scholar

**Student Researchers:**

Jocelyn Brady, Sustainability Scholar  
 Audrey Choong, UC3 Climate Justice-in-Action Fellow  
 Haley Magrill, Sustainability Scholar  
 Melissa Pais, Community Climate and Energy Coordinator

**UBC Staff Technical Advisors:**

Megan Badri, Research Technician/Project lead, Urban Innovation Research, UBC Sustainability Hub  
 Pablo Akira Beimler, Senior Project Manager, UBC Sustainability Hub  
 Debra Eng, Ancillary Energy Manager, Facilities - Energy and Water Services  
 Selina Liu, Energy Conservation Engineer, Facilities - Energy and Water Services  
 Hailey Maxwell, Manager, Emergency & Continuity Planning, Safety & Risk Services - Emergency Management  
 Colin Mingus, Climate and Energy Engineer, Facilities - Energy and Water Services  
 Linda Nowlan, Senior Director, UBC Sustainability Hub  
 Angelique Pilon, Director, Urban Innovation Research, UBC Sustainability Hub  
 Cassandra Torres, Advisor, Emergency & Continuity Planning, Safety & Risk Services - Emergency Management

**External Technical Advisors:**

Charling Li, City of Vancouver  
 Christy Love, RDH Building Science  
 Anthony Pak, Priopta  
 Zahra Teshnizi, City of Vancouver

**Corix NDES Working Group:**

Jeff Giffin, Regional Manager, Pacific Northwest  
 Paul Holt, Vice President, Engineering & Operations  
 Jason Owen, Director, District Energy Development  
 Shiva Rajan, Manager, Project Development - West  
 Ivana Safar, Vice President, District Energy Development

**Mandarin Translation and Engagement:**

Ying Zhou  
 Carina Ying  
 Chloe Xueqi Tan

**Production Support:**

Helen Eady, Q&A Creative (Final report design, graphics, and layout)  
 Mia Henson, (engagement graphics)  
 Paul Joseph, University Photographer, UBC Communications Brand and Marketing (photography)

## Glossary

**Baseline Emissions:** The reference point against which UBC's greenhouse gas (GHG) emissions will be measured going forward. Establishing this baseline is a first step in setting clear, measurable goals for emissions reduction, enabling UBC to track progress over time and adjust strategies as needed to meet sustainability targets.

**BC Energy Step Code:** BC's stepped building code requirements for energy efficiency for all building construction in the province. Local governments can establish higher energy step code targets than base code in their jurisdictions.

**BC Zero Carbon Step Code:** BC's optional stepped building code requirements establishing operational carbon intensity targets for all building construction in the province. Local governments can establish zero carbon step code targets in their jurisdictions.

**Campus as a Living Lab (CLL):** UBC's Campus as a Living Lab (CLL) provides a collaborative framework for faculty, staff, students and partners to address urgent global sustainability challenges. The CLL seeks to increase UBC's collective impact by scaling up projects, enhancing knowledge exchange, and catalyzing effective policy influence and action as an agent of change.

**Campus Vision 2050:** Campus Vision 2050 is a long-term plan for the campus that supports the needs of the university and balances the multiple interests of Musqueam and the UBC community.

**Carbon capture and storage:** A set of technologies that artificially sequester carbon (through neither geologic nor biological means). Implementing new carbon capture and storage technology is a popular climate mitigation strategy.

**Carbon offsets:** Purchasable reductions in an institution's net carbon emissions, obtained through the funding of emissions-reducing activity elsewhere in the world. Carbon offsetting is not prioritized due to its non-local and difficult-to-quantify impact.

**Carbon sequestration:** The process of capturing and storing carbon dioxide through both geologic and biological means. For example, the growth of a tree is an active process of carbon sequestration.

**Carbon sinks:** Long-term stores of carbon that lock away sequestered carbon dioxide. For example, trees that are left to grow over hundreds of years and are not cut down become effective carbon sinks.

**Circular economy:** An economic philosophy and structure that prioritizes reuse, repair, remanufacture, recycle, and other methods, to minimize waste and keep products in use for as long as possible.

**Climate Adaptation:** An approach aimed to mitigate the suffering and destruction of climate change through adapting ecological, social, economic and physical environments to withstand threats such as rising sea levels, severe storms, higher temperatures and changes in rainfall patterns.

**Climate Justice:** A holistic approach to climate action that acknowledges the ways in which climate change and its consequences differently affect underprivileged and marginalized populations, compounding and exacerbating the existing inequalities they experience.

**Climate Justice Lens:** Recognizes responsibility and accountability for causes of climate change, the inequitable burdens of climate change impacts and an awareness of intersecting vulnerabilities, systemic and structural injustices. Climate justice might generally be thought of as advocating for what is right, fair, appropriate or deserved in relation to climate change drivers and impacts, including thinking about climate justice as forms and processes of distributive justice, procedural justice and restorative justice.

**Climate Mitigation:** A human intervention to reduce the sources or enhance the sinks of greenhouse gases (GHGs).

**Climate Resilience:** The degree to which a socio-ecological system can withstand and adapt to the adverse effects of a changing climate.

**Community Energy and Emissions Plan (CEEP):** A document prepared by a local government and/or community that outlines: (a) the jurisdiction's historical energy sources, energy demand and resulting emissions (often referred to as an energy profile); (b) the jurisdiction's future energy and emissions targets; (c) the jurisdiction's strategy for meeting energy and emissions targets. In the UBC context, the CEEP applies to the residential neighbourhoods on the UBC Vancouver campus and complements the UBC Climate Action Plan.

**Cooling Energy Demand Intensity:** A measure of the amount of energy needed to cool a building.

**Ecosystem services:** These describe the benefits ecosystems provide to human health, survival, and quality of life.<sup>13</sup> Four different groups of services have been defined, these are:

- Provisioning – Products humans obtain from ecosystems (e.g. food, water, wood, medicine)
- Regulating – Natural processes that moderate natural phenomena (e.g. water purification, pollination, climate regulation)
- Cultural – Non-material benefits (e.g. recreation, aesthetic, spiritual)
- Supporting – Related to habitat functionality, survival (e.g. photosynthesis, water cycle)

**Embodied carbon:** These are the greenhouse gas emissions associated with the production, transportation, construction, maintenance, replacement, and disposal of building and construction materials.

**Energy and building benchmarking:** Processes that evaluate a building's energy use against its size and other characteristics. Benchmarking programs can help identify successes and candidates for energy efficiency improvements.

**Frequent Transit Development Areas (FTDA):** These areas are typically characterized by high-frequency transit services and are designated zones for development and transit-oriented growth. The goal of having these designated areas is to promote sustainable urban development by concentrating housing, commercials and other amenities within walking distance of public transit stops to help ease traffic congestion and reduce car dependency.

**Greenhouse Gas (GHG):** Gases emitted from fuel combustion and other sources, that contribute to the greenhouse effect and global warming. This includes carbon dioxide, methane, nitrous oxide, ozone, and chlorofluorocarbons.

**Green rainwater infrastructure:** An approach to rainwater management that uses natural systems to manage rainwater close to the source. This approach reduces flooding and runoff, and provides valuable ecosystem services to support climate adaptation. It mimics the natural water cycle and captures, stores, and cleans rainwater through a variety of green infrastructure systems, these can include:

- Bioswales long, relatively deep channels of plants, grasses, flowers, and customized soils that run parallel to large impervious surfaces such as parking lots or roads and can receive large quantities of rainwater providing filtration and slowing discharge to storm sewers
- Rain gardens absorb and filter rainwater from rooftops, sidewalks, and streets reducing flow of rainwater into waterways and recharging underground aquifers
- Green roofs absorb significant amounts of rainwater and slowly releases the runoff of water it can't absorb reducing flooding and erosion.<sup>14</sup>

**Intergovernmental Panel on Climate Change (IPCC):** The IPCC is an organization of governments that are members of the United Nations whose purpose is to provide governments at all levels with scientific information that they can use to develop climate policies. IPCC reports are also a key input into international climate change negotiations.

**Land Use Plan (LUP):** UBC's Land Use Plan sets the long-term direction for land use and transportation. The provincial government approves UBC's Land Use Plan.

**Low carbon energy supply:** Low carbon district energy or electricity from BC Hydro (or electricity from an equivalent or lower emissions intensity source).

**Low carbon district energy:** Achieves an emissions intensity of 11 kgCO<sub>2</sub>e/MWh or lower. This can be achieved through a variety of energy supply options, including electricity, waste heat or renewable natural gas. Design intent is for renewable natural gas (RNG) limited to peaking use only.

**Micro-mobility:** Small-scale and lightweight personal vehicles, such as bikes or scooters.

**Net-zero emissions:** Refers to achieving an overall balance between GHG emissions produced against GHG emissions removed from the atmosphere.

**Operational emissions:** Emissions that are generated mainly from the operations of buildings and the supply of energy.

**Passive-first heating and cooling:** Building design approach that uses passive design techniques, such as advanced insulation, high efficiency windows and external shading to reduce energy needed to heat and cool buildings.

**Renewable Natural Gas (RNG):** A biogas (or biomethane) that results from bacteria breaking down organic waste from sources such as landfills, agriculture and wastewater treatment facilities, and is upgraded to a quality similar to fossil natural gas. Because of its biological source, it is considered a carbon neutral energy source.

<sup>13</sup> Source:

<sup>14</sup> Source:



**Residential Environmental Assessment Program**

**(REAP):** A comprehensive, UBC-specific green building rating system for mandatory application to all multi-unit residential construction on the Vancouver campus.

**Social Ecological Economic Development Studies**

**(SEEDS):** UBC's SEEDS sustainability program creates applied research and interdisciplinary partnerships between students, faculty, staff and community partners to advance sustainability ideas, policies, and practices and create societal impacts by using the Campus as a Living Laboratory.

**Urban Heat Island Effect:** Term used to describe the higher temperatures experiences in urban areas compared to the surrounding rural areas. The compact building design and increased paved surfaces in urban areas trap heat much more effectively than natural ecosystems, where temperatures are reduced thanks to shade and cooling from evaporating moisture. Additionally, human systems that generate heat, such as from furnaces, air conditioners, and vehicles, are much more concentrated in cities.<sup>15</sup> UBC's Ecological Baseline report highlighted this effect through measures of land surface temperatures during the 2021 heat dome event. There was a 10oC temperature difference between the hottest and coldest places in campus seen, with the low temperatures seen in forests and naturalized areas and the higher temperatures in the more urban areas, such as artificial turf fields and residential areas.<sup>16</sup>

**Waste diversion:** Alternative waste processing methods that minimize waste going into landfills (e.g. organics collection, recycling).



<sup>15</sup> Source:

<sup>16</sup> Access the full Ecological Baseline report here:

# Appendices



# Appendix A - UN Sustainable Development Goals

The Neighbourhood Climate Action Plan helps to further advance UBC’s efforts to address the Climate action is considered foundational to deliver a stable and secure world for future generations.

NCAP sets forward a path for accelerated emissions reductions while also strengthening resilience and adaptive capacities to increasing severity and frequency of climate events. The commitment to climate action (SDG<sup>13</sup>) will also have simultaneous impacts towards addressing air quality and human health (SDG<sup>3</sup>), food security (SDG<sup>2</sup>), water resources (SDG<sup>6</sup>) and advance deployment of renewable and clean energy (SDG<sup>7</sup>). UBC campus and its neighbourhoods are exemplifying how land use contributes to advancing sustainable communities (SDG<sup>11</sup>). The NCAP focus on local ecology helps to enhance life of land through increased adaptive capacities and mitigation measures (SDG<sup>15</sup>). Climate action plays a central hub to strengthen resilience and reduce vulnerability to climate related hazards and natural disasters. The NCAP’s principle of ‘shared responsibility’ empowers individuals, the UNA and community groups to make informed decisions and use their collective knowledge, skills and capacities to achieve positive impact (SDG<sup>4,17</sup>).



Fig 2. Relation among targets of Climate Action and the UN SDGs <sup>17</sup>.

<sup>17</sup> Source: Filho, W.L., Wall, T., Salvia, A.L. et al. The central role of climate action in achieving the United Nations’ Sustainable Development Goals. *Sci Rep* **13**, 20582 (2023).

## Appendix B - The Making of a Plan

Highlights on the process, context, and principles applied to develop UBC’s Neighbourhood Climate Action Plan are summarized below.

### Project Phasing

NCAP was developed through four phases over a two-year period starting in summer 2022. Each phase built upon previous ones incorporating learnings from technical analysis and engagement.

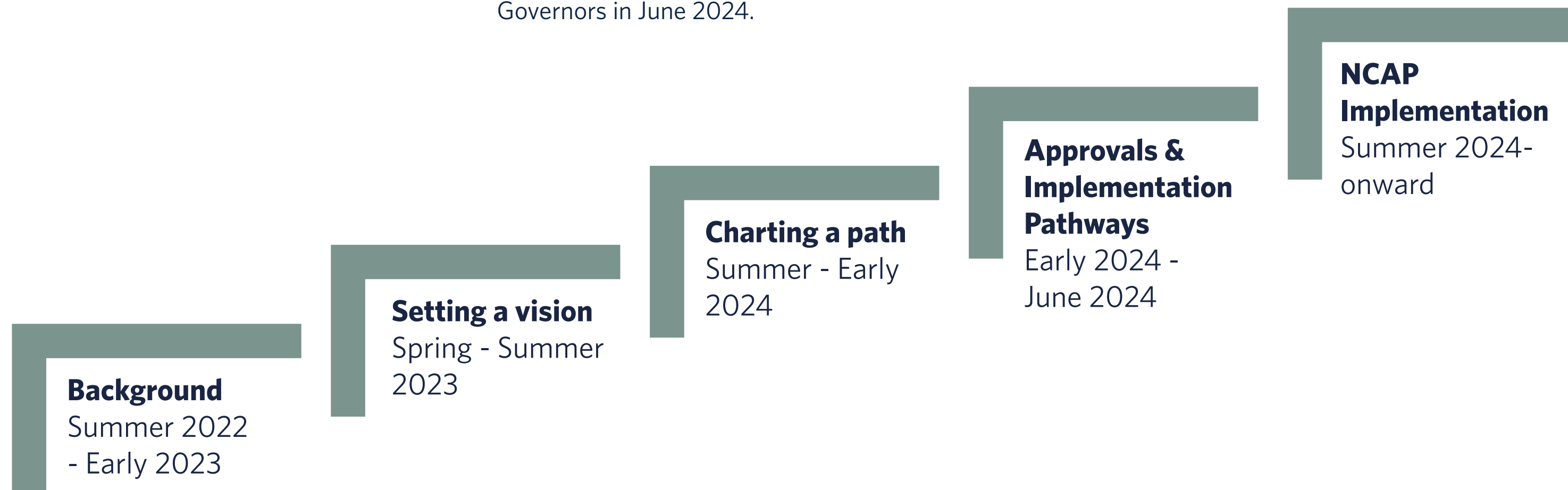
**Background:** In the first phase of NCAP development, the overall approach and scope were determined, and baseline energy and emissions analysis and climate projections were completed. Input from Campus Vision 2050 was used to help provide insights into community priorities.

**Setting a Vision:** In this phase, the NCAP Terms of Reference were completed and the overall NCAP goals and targets were defined.

**Charting a Path:** Technical Working Groups were established to develop draft goals and targets and initial key actions for the NCAP scope areas. NCAP “Emerging Directions” (draft goals, targets and key actions) were then shared for feedback through public engagement in the fall of 2023.

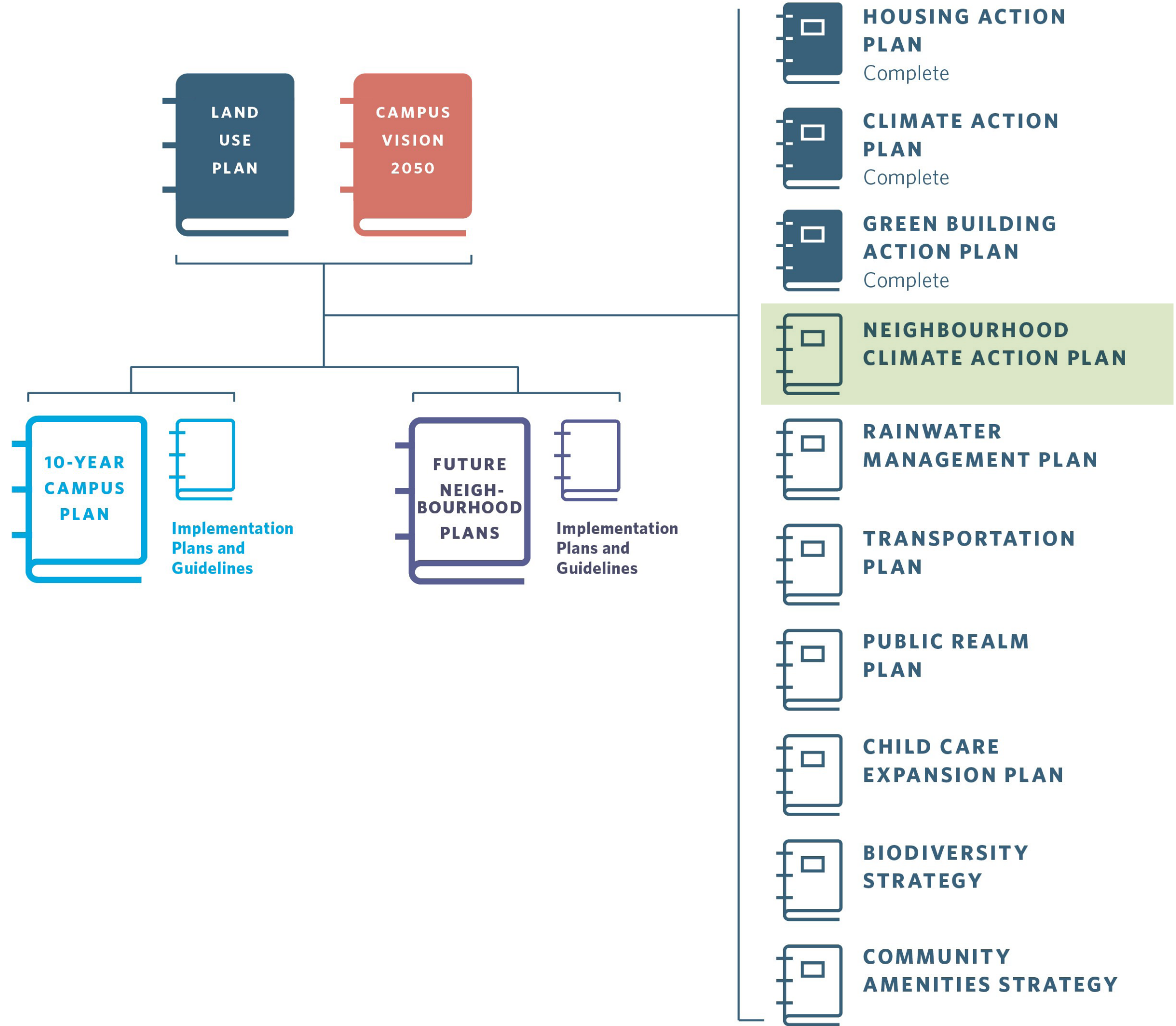
**Approvals and Implementation Pathways:** NCAP goals, targets were further refined and detailed actions were developed by the Technical Working Groups, incorporating feedback from fall engagement. The draft plan was shared in a second public engagement period in March 2024. Based on feedback from engagement, the plan was revised and submitted to the UBC Board of Governors in June 2024.

**NCAP Implementation:** NCAP Implementation begins immediately after Board of Governors approval. This process will be framed through ongoing collaborations with the UNA and UBC Properties Trust, a continued focus on equity, continued community dialogue, expanded academic partnerships and research, as well as ongoing monitoring and reporting.



### Planning Hierarchy at UBC

UBC’s unique planning hierarchy is anchored by Campus Vision 2050 and UBC’s Land Use Plan. These high-level, broad planning initiatives define the long-term, aspirational framework for physical growth and change on the campus. NCAP is one of several plans and strategies that will update existing commitments and policies to align with and support the implementation of Campus Vision 2050 and meets Land Use Plan commitments. Targets, actions and policies identified in NCAP will inform amended and future Neighbourhood Plans, as well as neighbourhood implementation plans and guidelines such as REAP.



## Guiding Principles

The Neighbourhood Climate Action Plan is shaped by five guiding principles that reflect the project's aspirations. These are foundational to the NCAP project approach. These principles informed how potential outcomes and pathways were assessed. The principles provided the framework to prioritize actions and resources, as well as guided the metrics used to evaluate the plan.

### Climate Justice and Equity

Climate change is a collective, global crisis whose impacts are felt disproportionately within regions, communities and even species. Climate justice considers a social justice framework to climate action responses and looks to equitably distribute both the costs and benefits.

A climate justice and equity lens will be applied during implementation of NCAP actions and will consider who bears the costs and who benefits from climate action. We will focus on equity to improve community outcomes, especially around health and affordability.

### Climate Leadership & Learning

"Inspiring people, ideas and actions for a better world."

UBC's 2018 [Strategic Plan](#) set forth this bold vision for UBC's next century. The vision also highlights UBC's capacity, and ongoing responsibility to realize this vision. UBC's goal is to serve as a local and global leader in advancing a sustainable and just society, with a focus on thriving campus communities.

Alongside CAP 2030, NCAP positions UBC as a leader in climate action and NCAP details how we achieve this bold vision within UBC's residential neighbourhoods.

NCAP will continue to integrate knowledge and learnings through innovative research partnerships that tap into UBC's academic expertise and Campus as a Living Lab approach, positioning UBC's residential neighbourhoods as a local and global leader in climate action.

### Shared Responsibility

NCAP sets climate targets, policy directions, and actions across a wide range of areas. Achieving our overall climate goals requires collaboration and coordination with the University Neighbourhoods Association (UNA), UBC Properties Trust (UBC PT), and neighbourhood residents. NCAP staff will work closely with staff from the UNA and UBC PT to implement NCAP actions and achieve our neighbourhood climate action goals.

Success will also rely on policy, regulation, and initiatives from other levels of government including Metro Vancouver, the Province of British Columbia and the Canadian government. Coordination with neighbourhood utility providers, including BC Hydro and Corix (as owner and operator of the Neighbourhood District Energy System), is critical to NCAP implementation.

### Community Connection

NCAP development relied on connection to and feedback from community members. This focus will continue through implementation through collaboration with the UNA and targeted ways to engage community climate champions.

A connected community is a resilient community. NCAP has defined actions that both promote strengthened connections and relationships within the community, and support mobilizing local residents to take climate action at the community level.

### Long-term Accountability and Governance

NCAP will ensure that neighbourhood climate action remains an active priority. Ongoing, regular reporting cycles will be established with a focus on transparency. The NCAP action matrix identifies who is responsible for implementing the actions, and highlights resourcing requirements needed to support its implementation. NCAP will be reviewed after five years, and a date will be established for plan renewal based on outcomes of the review.

## Technical Working Groups

Core to technical development of NCAP, including goals, targets and actions, was the establishment of technical working groups, that brought together staff from UBC, the UNA and UBC Properties Trust, academics, and other external subject matter experts. Technical working groups and members are listed in the following table.

Group Name	UBC Staff	Partner Staff	Academic	External Experts
<b>Low Carbon Mobility + Mode Shift</b>	Krista Falkner, C+CP Adam Hyslop, C+CP Kerry Shaw, C+CP Ralph Wells, C+CP	Robyn Chan, UNA Wegland Sit, UNA Paul Young, UBC PT		
<b>Embodied Carbon</b>	Megan Badri, UBC Sustainability Hub Penny Martyn, C+CP Angelique Pilon, UBC Sustainability Hub Juan Luis Rivera Espinosa, C+CP Kerry Shaw, C+CP Ralph Wells, C+CP	Robyn Chan, UNA Wegland Sit, UNA Paul Young, UBC PT Mark Zaturecky, UBC PT	Adam Rysanek	Anthony Pak, Priopta Zahra Teshnizi, City of Vancouver
<b>New Construction - Operational Energy, Emissions &amp; Adaptation</b>	Al Karimabadi, C+CP Maximilian Kniewasser, C+CP Penny Martyn, C+CP Colin Mingus, EWS Kerry Shaw, C+CP Ralph Wells, C+CP	Robyn Chan, UNA Wegland Sit, UNA Paul Young, UBC PT Mark Zaturecky, UBC PT	Adam Rysanek	Charling Li, City of Vancouver
<b>Waste Diversion + Zero Waste</b>	Bud Fraser, C+CP Penny Martyn, C+CP Kerry Shaw, C+CP Ralph Wells, C+CP	Robyn Chan, UNA Wegland Sit, UNA Sean Ang, UBC PT George Poliusuk, UBC PT Paul Young, UBC PT	Haibo Feng Qingshi Tu Jiaying Zhao Jade Radke	
<b>Existing Building Retrofits</b>	Jordan Chamberlin, C+CP Debra Eng, EWS Al Karimabadi, C+CP Selina Liu, EWS Penny Martyn, C+CP Kerry Shaw, C+CP Ralph Wells, C+CP	Robyn Chan, UNA Wegland Sit, UNA Mark Zaturecky, UBC PT	Haibo Feng	Christy Love, RDH Building Science
<b>Ecosystem Services</b>	Lia Gudaitis, C+CP Emma Luker, C+CP Renée Lussier, C+CP Simone Levy, C+CP John Madden, C+CP Kerry Shaw, C+CP Georgia Stanley, C+CP Ralph Wells, C+CP	Robyn Chan, UNA Wegland Sit, UNA Paul Young, UBC PT	Charles Menzies Matthew Mitchell	
<b>Climate Emergency Preparedness</b>	Brittany Jang, C+CP Hailey Maxwell, SRS Kerry Shaw, C+CP Cassandra Torres, SRS Ralph Wells, C+CP	Robyn Chan, UNA Wegland Sit, UNA Paul Young, UBC PT	Stephanie Chang Erica Frank	

# Appendix C – Engagement Summary

## What We Heard and How We Are Responding

UBC Campus + Community Planning has engaged with the community on the Neighbourhood Climate Action Plan (NCAP) through a community workshop and two phases of engagement:

- Early engagement community workshop on June 26, 2023
- Public engagement on NCAP Emerging Directions from October 17 - November 3, 2023
- Public engagement on Draft NCAP from March 5 - 22, 2024

Engagement summary reports for the above are available on the [NCAP website](#).

The following table provides a high-level overview of the top themes heard across engagement and the work underway to address this feedback.

What We Heard	How We Are Responding
<b>All Scope Areas</b>	
<p><b>Interest in diverse and creative types of education, training and centralized resources created for residents (especially youth) to increase community resilience and explain the why of NCAP actions (across all Scope Areas).</b></p>	<ul style="list-style-type: none"> <li>• Explainer boxes within report daylight the thinking behind NCAP's planning approach</li> <li>• NCAP commits to developing communications and engagement plans during implementation that will outline how information and progress will be shared with the community.</li> <li>• The detailed action matrix includes a range of actions across all scope areas for resource development. Describing key information to share on NCAP actions and what it means for community members</li> </ul>
<p><b>Interest in the equity implications of NCAP implementation and how the needs of vulnerable populations will be prioritized (e.g., seniors, non-native English speakers, folks with mobility challenges, renters vs. landlords)</b></p>	<ul style="list-style-type: none"> <li>• NCAP highlights equity considerations across all scope areas, including at the individual sub-action level. These considerations will be applied during implementation.</li> <li>• During Summer 2024, NCAP plans to develop an equity lens memo to expand upon the current considerations and further clarify how to keep equity prioritized during implementation.</li> </ul>
<p><b>Broad sentiments of climate anxiety and grief coupled with a desire to accelerate NCAP timelines to match the sense of urgency behind climate change adaptation - most notably for cooling and wildfire smoke ventilation upgrades for existing buildings</b></p>	<ul style="list-style-type: none"> <li>• Streamlining permitting and providing communication resources to support cooling retrofits in existing building</li> <li>• Implementing design requirements for future climate to prevent overheating and maintain air quality in new buildings</li> <li>• NCAP includes actions to develop a comprehensive emergency response plan for local wildfire events and expand cooling centres in the neighbourhoods.</li> </ul>
<p><b>Overarching desire to see incentives for climate friendly behaviour change and avoid passing costs onto renters or homeowners (e.g., monetary incentive for bikeshare use; subsidies for higher energy bills).</b></p>	<ul style="list-style-type: none"> <li>• Affordability is a key aspect of NCAP's climate equity lens. Opportunities to improve affordability will be integrated into implementation.</li> <li>• Some specific actions in NCAP include: <ul style="list-style-type: none"> <li>Operational performance requirements improve energy efficiency and reduce energy costs.</li> <li>Existing building equipment replacement requirements are designed to align with planned maintenance schedules to avoid costs at unexpected times</li> <li>One of the transportation sub-actions is "Study ways to improve access to active transportation through equity-oriented programming.", which intends to explore options to develop equity-oriented funding models.</li> </ul> </li> </ul>
<p><b>Concerns about NCAP transparency, governance (e.g., funding and resourcing), accountability, and potential long-term impacts (e.g., affordability).</b></p>	<ul style="list-style-type: none"> <li>• Full action matrix (draft and final) has been released to the public.</li> <li>• The information within this table is intended to help share how we're responding to engagement feedback</li> </ul>



What We Heard	How We Are Responding
<b>New Construction and Existing Buildings</b>	
<p><b>Desire for improved communication on how regulations (e.g., REAP) will be shifting, and interest in community collaboration on future REAP updates.</b></p>	<ul style="list-style-type: none"> <li>• NCAP actions include development of communication materials for REAP that target building owners and community members.</li> <li>• NCAP provides a roadmap of planned future regulatory updates (e.g., 40% reduction to embodied carbon in new construction)</li> <li>• There will be ongoing engagement on implementation of NCAP actions</li> </ul>
<p><b>Consider the language, knowledge, and physical barriers to the current retrofitting process (especially for seniors, renters and newcomers) and address these accessibility and inclusivity concerns to incentivize retrofitting</b></p>	<ul style="list-style-type: none"> <li>• NCAP commits to streamlining permitting and improving communication material to make retrofits for cooling easier to access.</li> <li>• An equity lens will be applied during implementation of NCAP actions to better identify and support residents who have stronger need or higher barriers to accessing equipment replacements</li> </ul>
<p><b>Call for all new buildings to be built using sustainable and green building technologies (e.g., passive heating and cooling) and low carbon materials (e.g., mass timber).</b></p>	<ul style="list-style-type: none"> <li>• Through REAP, all new buildings will require renewable, low-carbon energy supplied by the NDES, have strong energy efficiency requirements that support passive design, have embodied carbon requirements that ensure use of low-carbon building materials such as mass-timber</li> <li>• REAP incentivizes the use of renewable solar panels for on-site electricity production and use of mass timber</li> </ul>
<b>Transportation and Mobility</b>	
<p><b>Safety concerns surrounding specific intersections and routes for active transportation and car traffic (e.g., Wesbrook roundabouts, neighbourhood bike routes, pedestrian experience for disabled and older residents etc.)</b></p>	<ul style="list-style-type: none"> <li>• NCAP commits to plan for resilient, safe and expanded active transportation networks, including sidewalks, connected greenways, and cycling routes through updates to UBC’s Transportation Plan and Neighbourhood Plans in the next 1-2 years.</li> </ul>
<p><b>Desire for improved transportation accessibility, efficiency, and reliability (e.g., rain shelters at stops, frequent and reliable uninterrupted bus routes, affordability, etc.), especially for specific groups (e.g., disabled people, seniors, staff, students, young families and children, etc.).</b></p>	<ul style="list-style-type: none"> <li>• NCAP commits to expand and enhance cycling routes, sidewalks and transit stops to support safe and resilient transportation networks (e.g. have shaded and covered shelters at public transit facilities, shading along walking and cycling routes and public misting stations) in the next 3-5 years.</li> </ul>
<p><b>Need for local, accessible and affordable food options and amenities (especially culturally relevant food and groceries) to mitigate car traffic in and out of the neighbourhoods.</b></p>	<ul style="list-style-type: none"> <li>• Campus Vision 2050’s Community of Communities big idea proposes 3 new “Community Hearts” including grocery stores and other food options in future neighbourhoods / expansions. These will each be further detailed (including location and amount of retail) in neighbourhood plans. A small retail area including potential for a grocer is planned in Wesbrook Place South, a mid-sized grocer in Stadium Neighbourhood and also a grocer in the future Acadia Neighbourhood. During build-out, Properties Trust works with potential tenants and manages the leasing process.</li> </ul>

What We Heard	How We Are Responding
<b>Waste, Materials and Consumables</b>	
<b>Desire for accessible, transparent, and comprehensive information on community waste sorting responsibilities in a variety of languages.</b>	<ul style="list-style-type: none"> <li>• NCAP actions include development of options for community zero waste initiatives.</li> </ul>
<b>Desire for more recycling stations around the neighbourhood and build capacity for more Green Depot facilities (e.g., longer hours, more recycling options in residential units).</b>	<ul style="list-style-type: none"> <li>• NCAP actions include planning for expanding and enhancing the UNA Green Depot and facilitating opportunities to expand other community recycling facilities</li> </ul>
<b>Increase community awareness about waste sorting through fun and engaging community building initiatives for people of all ages, cultures, and abilities (e.g., community clean-up days, yard sales etc.)</b>	<ul style="list-style-type: none"> <li>• NCAP actions include development of options for community zero waste initiatives.</li> </ul>
<b>Build partnerships between UBC's Zero Waste initiatives and the UNA to identify reusable items especially during peak move-in and move-out seasons (e.g., furniture and books), and make them available to the wider community.</b>	<ul style="list-style-type: none"> <li>• UBC and the UNA will collaborate on zero waste initiatives and will explore opportunities to expand UBC programs to include UNA residents</li> </ul>
<b>Ecology</b>	
<b>Desire for more community connection through access to nature and green space (e.g., dog parks, gathering, community gardens).</b>	<ul style="list-style-type: none"> <li>• Community connection is one of NCAP's guiding principles. Green neighbourhood spaces offer this benefit.</li> <li>• As shown in Campus Vision 2050 under Restorative and Resilient Landscapes, UBC plans to create substantial new green spaces for social, recreational, research, and ecological benefit. This includes spaces and greenways within the residential neighbourhoods. Details on how this is implemented will be included in amended and future Neighbourhood Plans.</li> </ul>
<b>Address long waitlists for community garden space by adding additional plots for flowers, edible plants etc.</b>	<ul style="list-style-type: none"> <li>• The UNA currently has over 200 assigned community garden plots, plus the Old Barn Children's Garden. Space for community gardens is considered as part of the neighbourhood plan process, which can occur in public spaces (e.g. parks) as well as in private spaces (e.g. ground-level landscaping, podium rooftops, shared communal areas between buildings, etc.). Wesbrook Place has several new community gardens under development, including the new Research Park, and the Draft Stadium Neighbourhood Plan includes community garden spaces in the Ecological Park.</li> <li>• REAP currently includes an optional credit to support food growing opportunities. NCAP has added context to one of our actions to explore potential to further incentivize growing spaces at the site scale through REAP.</li> </ul>

What We Heard	How We Are Responding
<p><b>Tension with the goals/intent of this Scope Area and plans for population growth and development on campus (e.g., eagles nest coning)</b></p>	<ul style="list-style-type: none"> <li>The Campus Vision 2050 process confirmed the Vancouver campus must continue to grow in response to the acute housing crisis facing the UBC community and to meet the needs of the university. The Vision and Land Use Plan set out strategies and policies to ensure this growth happens in a way that lowers carbon emissions, and supports local ecology and biodiversity. Detailed plans and guidelines including the updated Integrated Rainwater Management Plan, an emerging biodiversity strategy, and updates to REAP (informed by NCAP) ensure land use decisions and development projects are consistent with the Vision and Land Use Plan commitments.</li> </ul>
<p><b>Desire to see multi-functional green spaces that encourage local wildlife to thrive (e.g., wildlife &amp; pollinator friendly gardens, preserved and enhanced tree canopy) and discourage invasive species.</b></p>	<ul style="list-style-type: none"> <li>Climate resilient plantings are a key component under the Ecology scope. The NCAP report includes an explainer box summarizing what NCAP is considering.</li> <li>NCAP includes actions to create guidelines and support climate resilient plantings at the neighbourhood scale, through amended and future neighbourhood plans and at the site scale through REAP updates.</li> </ul>
<p><b>Climate Emergency Preparedness</b></p>	
<p><b>Desire for more education and awareness building to ensure the safety of the neighbourhoods before, during or after climate emergencies (e.g., clear emergency plans, seasonal fire and earthquake drills, etc.).</b></p>	<ul style="list-style-type: none"> <li>Building and sharing resources with community members on a variety of climate emergency events is a key component of NCAP's work under this scope area.</li> <li>This strong community support will help inform priorities for UBC and the UNA during implementation.</li> </ul>
<p><b>Desire for increased community connection (e.g., increasing common, accessible, and third spaces within the neighbourhoods) so people can connect day-to-day and feel safe during future emergencies.</b></p>	<ul style="list-style-type: none"> <li>Community connection is one of NCAP's guiding principles. Across all scope areas, actions that help increase opportunities for connection have been highlighted for this co-benefit.</li> <li>Climate emergency resources developed during NCAP implementation will include information on the location and features of spaces that will support climate emergency response (e.g. cooling available in Wesbrook Community Centre).</li> </ul>
<p><b>Desire for establishing community leadership groups and student organizations to enhance general awareness and share climate action information, especially amongst youth.</b></p>	<ul style="list-style-type: none"> <li>NCAP has committed to prepare engagement and communications plans during implementation.</li> <li>During the development of these resources, NCAP will explore opportunities to coordinate future engagement and communications through existing or future organizations, especially ones that connect to vulnerable community members, as well as youth.</li> </ul>
<p><b>Neighbourhood Infrastructure</b></p>	
<p><b>Desire for fast, large-scale infrastructure upgrades to match the urgency of climate change (e.g., larger capacity energy grid, rainwater management solutions) and prepare for future population growth.</b></p>	<ul style="list-style-type: none"> <li>Coordination is ongoing with utility partners including BC Hydro and Corix to plan and install the energy infrastructure needed to support UBC's growing neighbourhood population.</li> <li>UBC's Integrated Rainwater Management Plan (IRMP) is currently being updated considering future climate projections. IRMP implementation will address rainwater infrastructure needs for the growth and changing climate conditions expected in UBC's residential neighbourhoods.</li> </ul>

## Appendix D – Technical Reports & Analysis

NCAP development was supported by several technical studies and analysis. Most notably this was used to support development of the community emissions profile, as well as the climate projections.

### Community Emissions Methodology Overview

Community emissions include the following:

- Energy use in buildings;
- On-road resident vehicle travel; and
- Direct emissions from decomposition of organic material in solid waste at the landfill.

The approach for preparing the baseline (2022) emissions was based on the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories<sup>18</sup> (GPC). Data sources and methodology for each sector are described below.

### Growth

Neighbourhood population and new building growth out to 2050 was based on growth projections developed through Campus Vision 2050 and included in UBC’s amended Land Use Plan from December 2023.

### Stationary Energy from Buildings

#### Historical Baseline and Business as Usual Projections

Operational energy use for all existing neighbourhood buildings was modelled for each individual building site. This was based on either:

- Historical benchmarking data
  - Full benchmarking data is available for 10 faculty and staff rental buildings from 2018 onward (or from date of building opening if later than 2018).

- Annual thermal energy usage for the 14 NDES connected buildings is also available. Additional electricity usage for plug loads in these buildings was estimated and included in the total building operating energy model.
- For each building, the benchmarked data was averaged to provide an estimate of the building operating energy performance.
- Archetype performance models of energy use intensity (EUI) developed by UBC’s Community Climate and Energy Manager
  - 10 different archetypes exist and are applied based on building type (low-rise multi-unit residential, high-rise multi-unit residential, commercial) and age (version of REAP, buildings pre-dating REAP)

For buildings with benchmarking data available, where available the actual annual data replaces the average performance estimate in the historical emissions baseline.

Building operational energy use is calculated as:

$$Energy_{Energy\ Source} (GJ) = Area (m^2) \times EUI_{Energy\ Source} (GJ/m^2)$$

Energy use was calculated for the following energy sources:

- Electricity
  - All buildings have some electricity usage
- Natural gas
  - Applicable to buildings built before the NDES was installed
- District energy
  - Applicable to buildings connected to the NDES<sup>19</sup>

Total emissions from stationary energy for buildings are calculated as:

$$Emissions (Tonne CO_2e) = Energy_{Electricity} (GJ) \times Emissions\ intensity_{Electricity} (Tonne\ CO_2e/GJ) + Energy_{Natural\ Gas} (GJ) \times Emissions\ intensity_{Natural\ Gas} (Tonne\ CO_2e/GJ) + Energy_{District\ Energy} (GJ) \times Emissions\ intensity_{District\ Energy} (Tonne\ CO_2e/GJ)$$

18 Source:

19 Note: Central and Focal buildings are supplied from the Academic District Energy System on UBC’s campus, and are modelled using ADES emissions intensity data

Emissions intensity factors for electricity and natural gas were taken from the City of Vancouver as referenced in the BC Energy Step Code. Emissions intensity factors for the NDES were taken from historical data, based on electricity and natural gas used by the NDES.

For the business-as-usual (BAU) projections, existing buildings were set to continue operating per the operational energy models defined above. New buildings were added using the results from the Neighbourhood Low Carbon Energy Strategy (NLCES) analysis for the baseline scenario. Operational energy use and emissions for existing and new buildings were combined to generate the overall buildings BAU projections.

UBC's NLCES included a detailed analysis of the interactions between building performance and NDES operations and explores how GHG intensity targets might impact future developments. The work included a detailed scenario analysis comparing different technical solutions to achieve buildings that are both low carbon and resilient for future climate conditions. The baseline NLCES scenario considered, NDES heating (space and hot water) and building level cooling systems, with the NDES achieving the 60% renewable energy supply target originally envisioned for the NDES.

#### *NCAP Projections*

For each existing building, a decarbonization and cooling retrofit option was applied based on the original building conditions.

- Cooling + Decarbonization
  - For existing buildings without cooling, this action estimates the impact of switching building heating systems to an electric heat pump, which offers both energy efficiency savings as well as a fuel switch from natural gas to electricity.
- Cooling + DE Connection/Decarbonization
  - For buildings in Wesbrook Place built to 'DE-ready' specifications, heating loads were converted to supply from the NDES and in-building cooling system (electricity) were added to the building operational energy use model.
  - An action was modelled to fully switch the NDES to low carbon operations for existing buildings in 2030, which reduces the emissions intensity factor for NDES energy use.
- Cooling + DE decarbonization
  - For existing DE connected buildings without existing cooling, in-building cooling systems (electricity) were added to the overall building operational energy use model.

- An action was modelled to fully switch the NDES to low carbon operations for existing buildings in 2030, which reduces the emissions intensity factor for NDES energy use.
- DE decarbonization
  - For existing DE connected buildings with existing in-building cooling systems, no changes were made to the building operational energy use.
  - An action was modelled to fully switch the NDES to low carbon operations for existing buildings in 2030, which reduces the emissions intensity factor for NDES energy use.

The 'retrofit' option was added at 30 years after initial occupancy of the buildings (to approximate normal equipment replacement cycles), or 2050, whichever came first.

For new buildings added after 2024, modelling followed the recommended pathway from the NLCES analysis. This scenario includes a moderate acceleration of BC Energy Step Code adoption (Step 4 adoption in policy in 2025 for low rise and 2027 for high rise), full low carbon energy supply, and combined heating and cooling systems.

**Transportation**

UBC retained Mott MacDonald to estimate neighbourhood transportation emissions. This work pulled data from a larger transportation modelling study completed for Campus Vision 2050. Three modelling scenarios were prepared:

1. Existing, 2021: this scenario utilized TransLink’s RTM v3.4, which reflects conditions in 2017.
2. 2050 with campus shuttles, no SkyTrain: this scenario utilized TransLink’s 2050 scenario using projected UBC 2050 population and employment obtained from the 30-Year Vision process. This scenario includes the two intra-transit campus shuttles identified in the draft 30-Year Vision.
3. 2050 with campus shuttles and SkyTrain: This scenario builds on the previous scenario by including the additional assumption of SkyTrain extension to UBC with one station at the UBC Trolley Loop.

For all three scenarios, vehicle-kilometers travelled (VKT) were estimated alongside the corresponding emissions.

For further details on the transportation modelling methodology, please refer to the summary report [here](#).

*Historical Baseline and Business as Usual Projections*

The Existing, 2021 modelling scenario prepared by the Mott MacDonald study was used to generate the historical baseline VKT per capita. This data was generated for all the different vehicle classifications and fuel types as outlined in the Mott MacDonald study.

Vehicle Classification	Fuel Type
Light-Duty Vehicle	Gasoline
Light-Duty Vehicle	Diesel
Light-Duty Vehicle	Hybrid
Light-Duty Vehicle	Propane
Light-Duty Vehicle	Electric
Light-Duty Truck	Gasoline
Light-Duty Truck	Diesel
Light-Duty Truck	Hybrid
Light-Duty Truck	Electric
Heavy-Duty	Gasoline
Heavy-Duty	Diesel
Heavy-Duty	Electric

Vehicle energy use for transportation are calculated as:

$$Energy (GJ) = \frac{VKT(km)}{100} \times Fuel\ Efficiency (L/100km) \times Fuel\ Energy\ Intensity(GJ./L)^{20}$$

Note: For electric vehicles, the calculation is slightly different as efficiency is reported as kWh<sub>electricity</sub>/100 km

The kWh electricity is then converted to GJ using standard conversion factors.

Total emissions for transportation are calculated as:

$$Emissions (Tonne CO2e)=Energy (GJ) \times Fuel\ Emissions\ Intensity (kgCO2e/GJ) \times 0.001\ Tonne/kg^{21}$$

For the BAU projections, a linear per capita change was assumed between the VKT given in the 2021 baseline and the 2050 with campus shuttles, no SkyTrain scenario. This scenario includes impacts from UBC’s land use planning, expanded intra-campus transit shuttles and the Provincial EV mandate. Vehicle types shifted over the modelled years to match the fleet composition data provided through the Mott MacDonald study.

*NCAP Projections*

The NCAP projections were prepared by building upon the 2050 with campus shuttles and SkyTrain scenario prepared by Mott MacDonald.

To estimate annual VKT, the annual rate of change from the BAU scenario was applied until the date marked for SkyTrain arrival (2033), at which point the linear annual rate of change was accelerated to match the 2050 with campus shuttles and SkyTrain scenario.

20 References for fuel efficiency and fuel energy intensity factors are included in the Mott MacDonald summary report.

21 References for fuel emissions intensity factors are included in the Mott MacDonald summary report. Electricity emissions intensity is consistent with the value used for the buildings modelling.

The 2050 with campus shuttles and SkyTrain scenario was not sufficient to reach net-zero transportation emissions and additional actions were layered on top to prepare the full NCAP projections. These included:

- Vehicle efficiency improvements
  - Assumptions on annual fuel economy improvements for new vehicles were taken from the 'Domestic Climate Policy Assumptions' prepared by Canada Energy Regulator<sup>22</sup>.
  - These improvements were applied to fuel efficiency values for the percentage of new vehicles coming on line each year.
    - The Mott MacDonald modelling for fleet composition assumes 1% of the vehicle fleet is replaced every year with new vehicles.
- Additional mode shift actions
  - To estimate additional mode shift to active transportation or public transit from vehicles. This would be supported by a second SkyTrain station close to the neighbourhoods and/or additional rapid transit lines.
  - Target was set for additional VKT reduction by 2050 and applied incrementally from 2035 through 2050.
- Additional zero emission vehicle (ZEV) uptake
  - This modelled additional ZEV uptake over what is expected due to the Provincial EV sales mandate.
  - This action further pushed the fleet composition towards electric vehicles.



**Waste**

*Historical Baseline and Business as Usual Projections*

past neighbourhood waste. The report summarizes municipal solid waste, recycling (includes organics), and disposal data for residential, commercial/institutional, and construction and demolition waste streams.

The following data points were gathered for 2007 through 2021:

- Total Waste Generated Rate (tonnes/capita)
- Disposal Rate (tonnes/capita) – waste to landfill
- Recycling Rate – percent diversion to recycling and organics

To calculate total historical tonnages (waste to landfill, and diverted), the per capita rates were multiplied by the historical UBC neighbourhoods’ population.

*Waste to Landfill (tonne)=Disposal.Rate (tonne/capita)×Population*

Historical solid waste emissions intensity factors were obtained from Provincial data (years 2007 through 2020).

Total emissions for waste are calculated as:

*Emissions (tonne CO2e)= Waste to Landfill (tonne)×Solid Waste Emissions Intensity (tonne CO2e)/(tonne Solid Waste)*

For the BAU projections, the 2021 waste generation and diversion rates, as well as the 2021 waste emissions intensity were assumed to apply out to 2050. These rates were applied against

the projected changes to the UBC neighbourhood population to estimate emissions from solid waste out to 2050

*NCAP Projections*

To estimate contributions from NCAP actions, three targets were set. These targets were applied against the BAU projections to estimate the net-zero emissions pathway.

Waste Reduction Target: this target estimates the benefit of zero waste initiatives that reduce the overall tonnage of waste generated (e.g. reuse, repair, buy-less). The reduction is applied against the Total Waste Generated Rate (total waste including recycling and organics).

Organics and Recycling Diversion Targets: these targets estimate the benefit of improved waste separation actions. These are applied against the Disposal Rate to divert additional tonnages (compostable organics or recyclables) out of the stream going to landfill.

Solid waste composition data was pulled from Metro Vancouver’s 2021 . The study includes a detailed breakdown of 172 different waste composition streams, including information on whether the stream could be recycled or sent to the green bin. This data was applied to the overall Disposal Rate to prepare an estimated composition of neighbourhood solid waste.

Emissions intensity based on composition was estimated using the methane commitment estimate method described in the . Waste emissions are caused by ‘degradable organic content’ (DOC) in solid waste, which decomposes to release methane at the landfill.

Based on data in the Metro Vancouver composition study, the 172 different waste categories were reviewed and where applicable assigned to an appropriate DOC category and marked as divertible to recycling or organics. The waste marked as divertible through improved recycling or organics diversion was reduced based on the set targets for NCAP. As diversion improved, the emissions intensity was recalculated based on the revised waste composition.





## Adaptation Baseline

The University of British Columbia completed a Climate Change Adaptation Vulnerability and Risk Assessment (UBC VRA) to identify and prioritize the impacts of a changing climate and extreme weather on the community's built, social, natural, and economic systems.

The work undertaken as part of this project, along with subsequent adaptation action planning work, will enable UBC Vancouver to minimize the negative impacts of climate change by addressing locally identified risks while seizing any local opportunities to increase resilience.

The VRA process completed during NCAP development followed

program focused on resilience and adaptation. The VRA included the following steps:

- Analyzing localized climate science projections
- Identifying impacts to the community
- Refining and prioritizing impacts using both a vulnerability assessment and a risk assessment

UBC's VRA was designed to be cross-institutional and involve broad community participation in order to fully consider a system-understanding of the climate change impacts to the UBC Vancouver community. A network of community members, organizations, UBC staff and stakeholders were assembled to participate in the process as workshop participants. Key milestones in the work to complete the VRA are listed below:

- UBC Climate Science Report
  - Report summarizes localized climate change projections
  - Access a copy of the UBC Climate Science Report [here](#).
- Workshop 1 (Sept 2023)
  - Workshop participants identified potential impacts to UBC Vancouver based on the localized climate projections.
- Vulnerability Survey (online, Nov 2023)
  - Workshop participants evaluated UBC's current sensitivity and adaptive capacity to the impacts
- Workshop 2 (December 2023)
  - Workshop participants assessed the risk of the impacts

This assessment has led to a refined list of 26 high-priority impacts, which will be addressed in future climate adaptation planning processes. The higher risk impacts include:

- Wildfire damage to natural systems resulting in ecosystem changes
- Flooding damage to buildings and infrastructure
- Higher temperatures and extreme heat events resulting in negative health impacts including increased mortality for vulnerable populations
- Drought resulting in limited available water to establish and maintain plants

- Higher temperatures and extreme weather causing damage to trees and natural features, resulting in a loss of biodiversity and ecosystem goods and services

The VRA process and outcomes are summarized in the VRA Summary Report is located [here](#).

## Other Studies - Equity Lens

Early work to inform NCAP's climate equity focus was supported by three different student research projects, one of which was led by UNA staff and funded through UBC's Sustainability Hub. The results from these studies have been vital tools in shaping NCAP's response and defining our equity considerations for implementation.

### Climate Justice in Transportation Planning at UBC

*Prepared By: Audrey Choong, University Climate Change Coalition (UC3) Fellow 2023*

Topic area was explored over the fellowship and three documents were prepared:

- Policy Brief on Climate Justice in Transportation Planning
- Sub-Report on Transportation Planning Practices, Processes and Initiatives at UBC
- Final Report

The Final Report aims to strengthen relationships between research and campus policy, and draw explicit connections between various stakeholders, resources and initiatives. In the process, it seeks to recognise the disproportionate risk, impacts, and burdens of transportation planning and transportation-related initiatives on systemically marginalised groups within the UBC community. Finally, it aspires to identify critical opportunities for and limitations to achieving equity, accessibility and resilience in developing sustainable transportation systems, plans and planning processes at UBC.

[Access the documents](#)

### Applying a Climate Justice Lens to Heat Pump Retrofits in UBC Neighbourhoods

*Prepared By: Haley Magrill, 2023*

This project aims to apply a climate justice lens to the goal of heat pump retrofits in UBC neighbourhoods. Includes original data collection and analysis about the community's experience dealing with extreme heat, as well as barriers that are preventing community members from accessing in-home cooling. Recommendations aim to refocus the conversation of heat pump retrofits on those who are most vulnerable to the impacts of extreme heat, and remove barriers to accessing in-home cooling.

[Access the full document](#)

### Relationship-building and Heat Response: Opportunities to Decolonize the University Neighbourhoods Association in the Context of Heat Wave Response

*Prepared By: Jocelyn Brady, 2023*

This project aims to identify actions for the University Neighbourhoods Association (UNA) to undertake, to develop a heat event response as well as longer-term actions to support climate justice and equity goals by relationship-building with x̣ṃəθ̣ḳʷəỵəm (Musqueam). Suggestions include actions on land use, policy change, relationship-building, internal work to reflect and un/learn at UNA, and quick actions to bolster indoor and outdoor public spaces in UNA neighbourhoods during heat events.

[Access the full document](#)

