

SFU

MORRIS J. WOSK
CENTRE FOR DIALOGUE

URBAN RESILIENT FUTURES INITIATIVE

Zero-Emission
Building Retrofit Task
Force Final Report



Vancity



About the Urban Resilient Futures Initiative

The Urban Resilient Futures Initiative puts people at the centre of climate action. Stewarded by Simon Fraser University's Morris J. Wosk Centre for Dialogue in partnership with the City of Burnaby and Vancity, the initiative is working with Burnaby residents and stakeholders to accelerate a just transition to a resilient, low-**carbon**¹ future.

Planned activities include a Zero-Emission Building **Retrofit**² Task Force, Neighbourhood Climate Action and Awareness Projects, and a Citizens' Assembly on Livable and Resilient Neighbourhoods. The result will be a community-driven vision and actions that are rooted in local context, values and climate science.

This work will also serve as a proof of concept for how municipal governments across Canada that face barriers in reducing their **carbon** emissions can engage their urban populations.

More information: sfu.ca/dialogue/programs/urban-sustainability/urban-resilient-futures.html.

Purpose

The purpose of this report is to present the Zero-Emission Building Retrofit Task Force's recommendations to City Council for how the City of Burnaby can reduce **carbon emissions** from buildings through retrofits.

Citation

Any works referring to this material should cite:

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Cover photo by: [Alfred Shum](#), Writ3Click Photography.

Bolded words: See the definition in the glossary (Appendix A).

Acknowledgments

Simon Fraser University's Morris J. Wosk Centre for Dialogue would like to acknowledge its partners at the City of Burnaby and Vancity for sharing their knowledge and expertise throughout this work.

The Centre and its partners would also like to warmly thank all the Burnaby community members, residents and stakeholders who gave their time to participate in the various programming activities and who shared their experience and input to help shape climate action in their city.

The Centre would like to extend special thanks and recognition to the following individuals for their advice and expertise:

From the City of Burnaby:

- Erica Lay – Manager, Climate Action and Energy
- Darseen Pooni – Officer, Climate Action and Energy
- Fiona Beales – Officer, Climate Action and Energy
- Joanna Cheng – Officer, Climate Action and Energy
- Dipak Dattani – General Manager, Corporate Services
- Lee-Ann Garnett – Deputy General Manager, Planning and Development
- Carl Isaak – Director, Community Planning

From Vancity:

- Anita Cheng – Director, Stakeholder Relations
- Krystal Renschler – Manager, Member and Stakeholder Engagement
- Mandeep Sidhu – Consultant, Climate Strategy and Performance
- Jennifer Tan – Senior Consultant, Climate Strategy and Performance
- Michelle Bonner – Manager, Community Investment

¹ Carbon dioxide, or CO₂, is the most prevalent of the greenhouse gases. See the full definition in the glossary (Appendix A).

² Retrofitting is the process of modifying something after it has been built. See the full definition in the glossary (Appendix A).

About Simon Fraser University's Morris J. Wosk Centre for Dialogue

Simon Fraser University's Morris J. Wosk Centre for Dialogue seeks to foster shared understanding and positive action through dialogue and engagement. Through processes such as [Canada's World](#), the [Citizen Dialogues on Canada's Energy Future](#), [Carbon Talks](#) and [Your Voice. Your Home. Meeting the Housing Needs of Burnaby Residents](#), the Centre has engaged hundreds of thousands of citizens and stakeholders to create innovative solutions for climate change and other critical issues.

We would like to acknowledge that at the Simon Fraser University Vancouver Campus, we live and work on the unceded traditional territories of the Squamish, Tsleil-Waututh and Musqueam First Nations.



About Vancity

Vancity is a values-based financial co-operative serving the needs of its more than 543,000 member-owners and their communities in the Coast Salish and Kwakwaka'wakw territories, with 55 branches in Metro Vancouver, the Fraser Valley, Victoria, Squamish and Alert Bay. With \$28.2 billion in assets plus assets under administration, Vancity is Canada's largest community credit union. Vancity uses its assets to help improve the financial well-being of its members while at the same time helping to develop healthy communities that are socially, economically and environmentally sustainable.

Our branches and offices are situated on the territories of the Coast Salish and Kwakwaka'wakw people.



About the City of Burnaby

Burnaby is a great place to live, learn, work and play. We are committed to strengthening our overall well-being and growing into the future as a livable, vibrant and sustainable community. Burnaby works to facilitate an engaged and active citizenry, a healthy economy and respect for the natural environment.

We recognize that the City of Burnaby is on the ancestral and unceded homelands of the hən̓q̓əmin̓əm' and Skwxwú7mesh-speaking peoples.



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Executive Summary

ZERO-EMISSION BUILDING RETROFIT TASK FORCE

Buildings are responsible for more than a third of all **carbon emissions** within Burnaby city limits. Retrofitting existing buildings to produce zero emissions is one of Burnaby's seven "Big Moves" to accelerate climate action and will be an essential part of achieving the City of Burnaby's commitment to **carbon neutrality** by 2050.

The Zero-Emission Building Retrofit Task Force (Task Force) met from March to June 2022 with a mandate to make recommendations to Burnaby City Council for "quick starts" and long-term actions to shape Burnaby's Zero-Emission Building Retrofit Strategy. This work was facilitated by Simon Fraser University's Morris J. Wosk Centre for Dialogue in partnership with the City of Burnaby and Vancity as part of the Urban Resilient Futures Initiative.

The 16 Task Force members (Table 1) reflect a range of expertise, perspectives and sectors, including city council, finance, construction and trades, residential and commercial building owners and operators, tenants, individuals reflecting the needs of impacted residents and other relevant stakeholders.

Table 1: Members of the Zero-Emission Building Retrofit Task Force (in alphabetical order by last name)

ORGANIZATION	INVITED MEMBER
Kambo Energy Group (Empower Me program)	Yasmin Abraham, Vice-President, Business Development and Co-Founder
Burnaby Intercultural Planning Table	Ana Maria Bustamante, Local Immigration Partnership Coordinator
Community Energy Association	Maya Chorobik, Director of Climate Leadership
BC Non-Profit Housing Association	Ian Cullis, Director, Asset Management
Homebuilders Association Vancouver	Diana Dilworth, Director of Government Relations
BCIT	Alexandre Hébert, Manager, Zero Energy/Emissions Buildings Learning Centre
City of Burnaby	Mike Hurley, Mayor and Chair of the Executive Committee of Council
Condominium Home Owners Association of BC	Tony Gioventu, Executive Director
Vancouver Regional Construction Association	Donna Grant, President

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City of Burnaby	Alison Gu, Councillor
City of Burnaby	Joe Keithley, Councillor and Chair of the Environment Committee
Disability Alliance of BC	Karen Martin, Project Coordinator
Vancity	Emily Pearson, Senior Consultant, Climate Strategy and Performance Team
Shades of Sustainability	Jocelle Refol, Co-Founder
Building Owners and Managers Association of BC	Zach Segal, Director of Government Relations
SFU City Program	Andy Yan, Director

CHALLENGES AND OPPORTUNITIES FOR RETROFITS IN BURNABY

With research support from City of Burnaby staff, Task Force members studied relevant background information to support the development of their vision and recommendations. Eliminating emissions from Burnaby's 37,000 buildings by 2050 would require an average of 1,400 building **retrofits** annually over the next 27 years. Among the existing building stock, single-family houses, two-family houses and townhouses in Burnaby are responsible for 38 per cent of total building emissions, while retail and office buildings account for 36 per cent of building emissions. Low-rise and high-rise multi-family buildings are responsible for 10 per cent of building emissions while accounting for 55 per cent of the total units in Burnaby.

Retrofitting existing buildings can include measures for increased energy efficiency and fuel switching to zero-emission energy sources. Barriers to **retrofits** can include a lack of awareness that **retrofits** are required, a sense of overwhelming complexity about the retrofit process, the existence of upfront costs to the homeowner or occupant before they even know if they can proceed, a lack of qualified people to carry out **retrofit** work and challenges meeting requirements to access existing rebate programs.

Retrofits can also protect people and buildings against extreme weather events such as prolonged heat, floods and wildfires, and can result in improved indoor air quality through fuel switching from **natural gas** combustion to electric heating, **cooling** and cooking. Vulnerability to climate change hazards increases for people with existing health issues, seniors (65+), youth and children, people with disabilities and people who are pregnant. People with less adaptive capacity or less ability to access resources, networks or infrastructure in the face of climate shocks or stressors include (but are not limited to) those who are on a lower or fixed income, have limited physical mobility or reside in a difficult physical environment.

VISION AND RECOMMENDATIONS

Prior to developing its recommendations, the Task Force outlined its vision for a low-**carbon** and energy-efficient future. This included emission reductions at the speed and scale necessary for Burnaby to reach its targets through measures to adopt clean energy sources, increase energy efficiency and support gentle densification. The Task Force vision also calls for centring reconciliation with Indigenous peoples, increasing resilience to climate impacts such as heat waves and wildfire smoke, advancing equity for those most vulnerable to climate impacts as well as for lower-income residents and supporting co-benefits for the community. To catalyze action, the Task Force emphasized efforts to increase communications, tailor approaches to different building contexts, expand the **retrofit** workforce, reduce complexity, collaborate across governments and measure progress over time.

In total, the Task Force produced eight high-priority recommendations (Table 2) and 12 regular-priority recommendations (Table 3) to inform Burnaby's Zero-Emission Building Retrofit Strategy.

Table 2: Summary of high-priority recommendations

NUMBER	RECOMMENDATION
1	Provide retrofit subsidies and incentives that increase affordability for residents living in energy poverty and/or that reduce the impacts of climate change for vulnerable residents (e.g., seniors and people with disabilities during heat waves).
2	Create or join a "one-stop shop" concierge service for different building (and ownership) types to navigate the retrofit process, including planning, applying for financing and grants, paperwork, inspections and contractor management.
3	Launch a multilingual awareness and education campaign to explain the benefits and necessity of retrofits and the availability of concierge services, and encourage participation in retrofit programming. The campaign could potentially include success stories, demonstrations and resources for a range of building types and circumstances.
4	Optimize the permitting process for all building types in ways that incentivize climate-friendly retrofit options such as heat pumps (e.g., fast-track permitting, streamlined processes) and discourage the use of fossil fuel gas (e.g., trigger contractors to present low- carbon choices to building owners during the application process).
5	Provide rules or resources to both landlords and tenants to mitigate tenant disruptions or evictions during retrofits .
6	Review City bylaws (e.g., noise, permitting) and clarify, adapt or simplify them to facilitate retrofits .
7	Accelerate the adoption of higher standards for the BC Energy Step Code (and upcoming carbon pollution standard) in Burnaby to increase the emission performance of new buildings and reduce the need for future retrofits .
8	Retrofit all City-owned buildings to lead by example, showcase solutions and stimulate the retrofit market.

Table 3: Summary of regular-priority recommendations

NUMBER	RECOMMENDATION
9	Build the capacity of contractors in Burnaby to offer heat pumps and other retrofit services, shaped by an initial needs assessment and leading to training programs and other forms of engagement.
10	Hold a large-scale retrofit pilot or participate in an existing accelerator/incubator program to identify innovative practices and stimulate the local retrofit market.
11	Add green space and trees around buildings in underserved parts of Burnaby, which are often the same locations where non-profit housing and those residents who are most vulnerable to heat waves are located.
12	Pilot new and innovative financing models that: <ul style="list-style-type: none"> i) promote retrofits for rentals, non-market housing, and other buildings not well-served by current methods (e.g. stratas), while taking care not to place additional debt on residents who can't afford it. ii) implement pending provincial property assessed clean energy (PACE) legislation to allow property owners to borrow the upfront costs for retrofits and pay back the loan on their property tax bill, with any remaining debt transferred to future owners if the property is sold, while taking care to include consumer protections that protect lower-income households.
13	Ask the provincial government to amend the Strata Property Act to: <ul style="list-style-type: none"> i) require an evaluation of zero-emission retrofit options as part of depreciation reports. ii) require energy-saving upgrades in strata buildings at appropriate milestones, including when equipment or components have reached the end of their usable lifespan. iii) add a requirement for energy reports (a.k.a. depreciation reports) to identify potential energy upgrades and pathways to building electrification.
14	Mail every building owner in Burnaby customized information about how their home or building is able to be retrofitted, with individualized communications similar to property assessments.
15	Provide targeted information to “the right people at the right time” to influence building owners to retrofit at key milestones (e.g., point-of-sale, mortgage refinancing, new builds, equipment failure, having children), working with realtors, financiers, tradespeople and others.
16	Explore ways, such as through large-scale procurement or partnerships, to create training and employment opportunities for under-represented groups so they benefit from the growing retrofit economy. In addition, the City of Burnaby should ensure that retrofit solutions are designed and delivered by the communities they serve.

NUMBER	RECOMMENDATION
17	Ask the provincial government to introduce mandatory energy benchmarking and regulate emissions from existing buildings, starting with buildings over 50,000 square feet (4,645 square metres), in a manner that ensures a uniform approach across municipalities.
18	Eliminate the use of natural gas fireplaces in City of Burnaby—owned buildings. Include signage explaining why these have been turned off.
19	Seek out appropriate buildings that can be retrofitted and connected to the City of Burnaby’s pending district energy system.
20	Decrease the emissions intensity per resident by finding ways to accommodate additional population density within existing single-family homes and along transit corridors.

NEXT STEPS

Task Force spokespeople will present their final recommendations to Burnaby City Council in summer 2022. The City has committed to publicly respond to these recommendations as it develops its Zero-Emission Building Retrofit Strategy, estimated to be ready in spring 2023. The Task Force will reconvene in 2023 to review the City of Burnaby’s draft **retrofit** strategy and provide feedback on the strengths and weaknesses of the strategy and the extent to which it satisfactorily implements the Task Force’s recommendations.

Section 1: Introduction and Context

TASK FORCE PURPOSE

Buildings are responsible for more than a third of all **carbon emissions**³ within Burnaby city limits. Many existing commercial and residential buildings will still be present for decades to come, meaning that **retrofits** will be an essential part of achieving the City of Burnaby's commitment to **carbon neutrality**⁴ by 2050. Burnaby has therefore identified zero-emission building **retrofits** as one of seven "Big Moves" to accelerate climate action and has begun to discuss and research pathways forward in consultation with the City's Environment Committee.

Taking place under the auspices of the Urban Resilient Futures Initiative, the Zero-Emission Building Retrofit Task Force (Task Force) aims to play a key role in advancing the City of Burnaby's **retrofit** agenda, with a mandate to:

- Make recommendations to Burnaby City Council for "quick starts" and long-term actions to shape Burnaby's Zero-Emission Building Retrofit Strategy, with a goal to accelerate **carbon emission** reductions through the creation of a robust market to **retrofit** commercial and residential buildings, as well as to examine how different policy options can improve outcomes for equity-seeking communities and residents who face heightened vulnerability to the impacts of climate change.
- Identify actions the City and community groups can take to advance shared **retrofit** goals and incubate demonstration projects for innovative practices in areas such as awareness, construction and financing.
- Inform the design of a **retrofit** awareness campaign that will be carried out under the auspices of the Urban Resilient Futures Initiative.

CITY OF BURNABY CLIMATE COMMITMENTS

Reducing **carbon emissions** is essential to climate change mitigation—to make future climate change less severe. In 2019 the City of Burnaby joined jurisdictions around the world in declaring a climate emergency. As part of this declaration, Burnaby set out new **carbon emission**⁵–reduction targets for the City to make significant emission reductions. These targets correspond with targets set out by other orders of government and align with the United Nations Intergovernmental Panel on Climate Change scientific reports.

³Carbon dioxide, methane and nitrous oxide that are produced directly, by burning fossil fuels, or indirectly, through the consumption of electricity. See the full definition in the glossary (Appendix A).

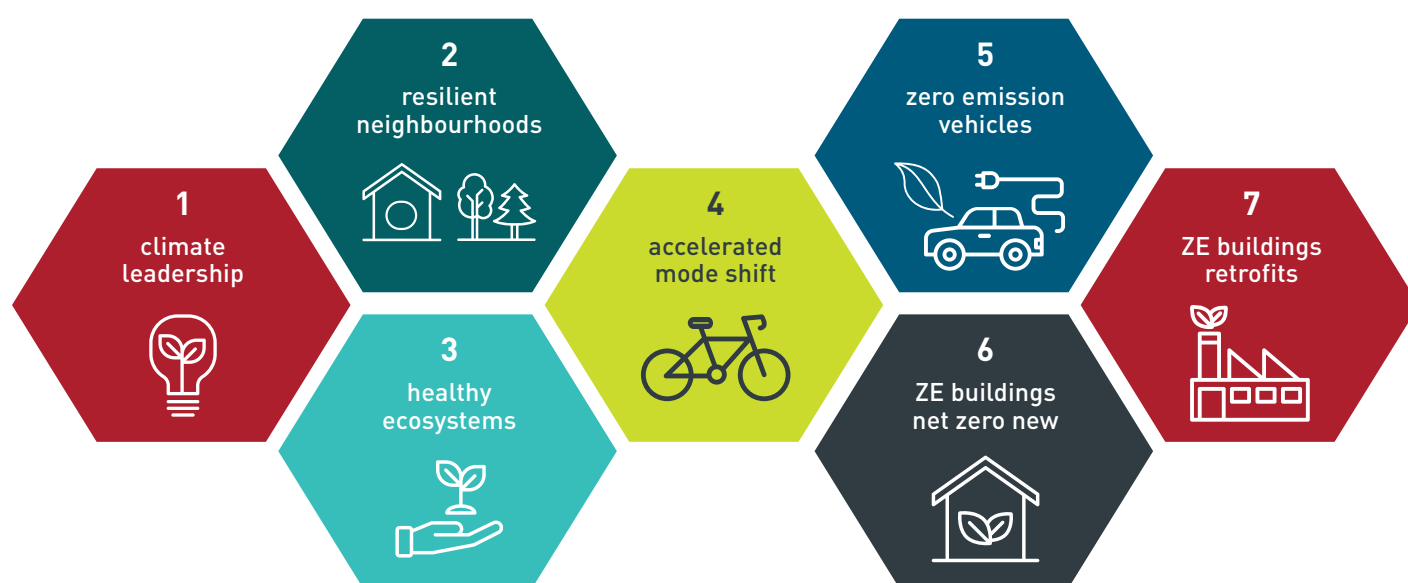
⁴Carbon neutrality is a state of net-zero greenhouse gas emissions, which can be achieved either through emitting no greenhouse gases or by offsetting emissions.

⁵Throughout the City's work, Burnaby refers to carbon emissions, which encompasses greenhouse gas emissions; this is to simplify and align with existing community-facing documents.

The City of Burnaby's climate emergency declaration committed to the following targets, as reductions below the City's 2010 emissions levels:

- 45 per cent reduction by 2030.
- 75 per cent reduction by 2040.
- **Carbon** neutral by 2050.

Figure 1: City of Burnaby's seven Big Moves towards climate action



Following the declaration of a climate emergency, the City of Burnaby adopted the City's climate action framework, analyzing the major sources of the City's emissions, and laying out seven key areas of transition, or "Big Moves," to guide the City's action toward **carbon neutrality** (see Figure 1). These include Big Move 6, to ensure that by 2030, most new buildings in Burnaby are net-zero emissions at occupancy, and Big Move 7, to work with all levels of government to achieve net-zero emissions from existing homes and buildings. Big Move 7 is the focus of the Task Force.

Section 2: Task Force Process

The Morris J. Wosk Centre for Dialogue designed and facilitated the Task Force in collaboration with the City of Burnaby and Vancity. This work took place as part of the Urban Resilient Futures Initiative, an initiative to engage Burnaby residents and stakeholders to accelerate climate action and to co-create a new, locally developed narrative for a resilient, low-**carbon** future. The City of Burnaby supported the Task Force with staff playing a lead role in research and supplying municipal government context. Vancity also sat on the Task Force to provide expertise in values-based banking and financing for the commercial and residential sectors.

COMPOSITION

Table 4 below lists the 16 Task Force members with representation from the City of Burnaby, Vancity, the construction and trades sectors, residential and commercial building owners and operators, tenants, individuals reflecting the needs of impacted residents and other relevant stakeholders.

Table 4: Task Force composition (in alphabetical order by last name)

ORGANIZATION	INVITED MEMBER
Kambo Energy Group (Empower Me program)	Yasmin Abraham, Vice-President, Business Development and Co-Founder
Burnaby Intercultural Planning Table	Ana Maria Bustamante, Local Immigration Partnership Coordinator
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Homebuilders Association Vancouver	Diana Dilworth, Director of Government Relations
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Shades of Sustainability	Jocelle Refol, Co-Founder
Building Owners and Managers Association of BC	Zach Segal, Director of Government Relations
SFU City Program	Andy Yan, Director

The Morris J. Wosk Centre for Dialogue designed and facilitated the Task Force in collaboration with the City of Burnaby and Vancity. The City of Burnaby supported the Task Force with staff playing a lead role in research and supplying municipal government context. Vancity also sat on the Task Force to provide expertise in values-based banking and financing for the commercial and residential sectors.

TERMS FOR TASK FORCE MEMBER PARTICIPATION

By accepting the invitation to participate, Task Force members committed to:

- Participate in seven half-day online meetings from March to June 2022.
- Vote on the approval of the final report and recommendations for public release.
- Assign spokesperson(s) to present final recommendations to Burnaby City Council and liaise with news media about recommendations.
- Reconvene once in 2023 to provide feedback on the City's draft Zero-Emission Building Retrofit Strategy and give further advice on ways to engage building owners and residents.
- Be eligible to receive accessibility supports to reduce barriers to participation such as reimbursement of special child care arrangements or closed captioning.
- Be eligible to receive an honorarium of \$200 per meeting, except where already financially supported to participate through existing paid employment.

The full terms of reference are included in Appendix B.

GOVERNANCE

The Urban Resilient Futures Initiative is overseen by a steering committee composed of Simon Fraser University’s Morris J. Wosk Centre for Dialogue, the City of Burnaby and Vancity.

The steering committee assigned a tripartite secretariat to advise on Task Force meeting design, debrief Task Force meetings, discuss outcomes and plan next steps.

Members of the secretariat included:

City of Burnaby

- Erica Lay – Manager, Climate Action and Energy
- Darseen Pooni – Officer, Climate Action and Energy
- Fiona Beales – Officer, Climate Action and Energy
- Joanna Cheng – Officer, Climate Action and Energy

Simon Fraser University’s Morris J. Wosk Centre for Dialogue

- Robin Prest – Program Director and Task Force Lead Facilitator
- Julie Bezard – Analyst, Dialogue and Engagement

Vancity

- Anita Cheng – Director, Stakeholder Relations

TASK FORCE PROCESS

Simon Fraser University’s Morris J. Wosk Centre for Dialogue designed and facilitated the Task Force in partnership with the City of Burnaby and Vancity.

The mandate of the Task Force was to recommend quick starts and long-term actions to shape Burnaby’s Zero-Emission Building Retrofit Strategy, with an additional goal to examine how different policy options can improve outcomes for equity-seeking communities and residents who face heightened vulnerability to climate change impacts.

The Task Force provided strategic advice to the City of Burnaby on building **retrofits** through an intense process rolled out over seven half-day online meetings from March to June 2022, structured into phases, starting with providing context, establishing shared goals and setting levels, followed by generating ideas and finally prioritizing and refining proposed recommendations. Table 5 below lists the topics covered at each meeting of the Task Force.

Table 5: Task Force meeting topics

Meating 1:	Introduction and context
Meating 2:	Understanding retrofits , barriers and co-benefits

Meeting 3:	Energy sources, vision and trade-offs
Meeting 4:	Prioritizing actions and validating vision
Meeting 5:	Confirming shortlisted recommendations
Meeting 6:	Refine and finalize priority recommendations
Meeting 7:	Ratify recommendations, identify spokespeople and confirm next steps

Speakers and presenters included:

- Emily Pearson, Vancity – homeowner journey mapping
- Roberto Pecora/Mariko Michasiw, ZEBx/B2E – unpacking the roles of building electrification and energy efficiency
- Alex Boston, Renewable Cities – housing and land use, unpacking the role of **natural gas**⁶
- James Lota, General Manager, Lands and Facilities, City of Burnaby – Burnaby’s district energy systems
- Wilma Leung, Senior Manager, Technical Research and Education, BC Housing – Mobilizing Building Adaptation and Resilience (MBAR) program

At each meeting, City staff also provided context about discussion topics. City staff also explained how City jurisdiction fits within that of other levels of government. City staff contributions included information in the following areas:

- Current state: City commitments, nature of the problem, types of buildings and ownership structures, emissions data, implications for existing buildings.
- Stakeholder map of which residents/users are impacted by climate change and how they are impacted.
- Outline of typical **retrofit** phases, barriers and decision points and actors.
- Summary of current actions and road maps by other government actors.
- Overview of Burnaby’s jurisdiction.
- Environmental scan of actions in other municipalities.
- Cross-referenced draft Task Force recommendations against emissions sources, stakeholder personas and typical **retrofit** barriers.

⁶ A mixture of gaseous combustible hydrocarbons made up mostly of methane but also smaller amounts of ethane, propane and butane. See the full definition in the glossary (Appendix A).

The Task Force recommendations were generated and refined through an iterative process involving collecting notes at interviews and during the Task Force meetings, followed by prioritization exercises and a final Task Force approval of the recommendations. The City of Burnaby provided Burnaby-specific data and contextual synthesis to inform and align with the Task Force facilitation process and to complement the existing knowledge and expertise of Task Force members.

As outlined in Section 6: Next Steps, the City of Burnaby will build upon the Task Force's recommendations to develop its Zero-Emission Building Retrofit Strategy. The Task Force will reconvene in 2023 to review the City's draft **retrofit** strategy and provide feedback.

EFFORTS TO INCORPORATE RECONCILIATION

The City of Burnaby is on the ancestral and unceded homelands of the hən̓q̓əmin̓əm̓ and Skwxwú7mesh-speaking peoples. In 2016, the City of Burnaby approved a motion to implement the Truth and Reconciliation Commission of Canada's Calls to Action, with particular focus on Calls to Action #43, #47, #55, #57, #75, #77, #87 and #88.⁷ This work has included taking steps to form government-to-government relationships with local First Nations, coordinating and prioritizing reconciliation efforts including the creation of a new manager of Indigenous relations position, taking action in the community and increasing organizational cultural competency.

As part of its mandate, the Urban Resilient Futures Initiative is committed to advancing reconciliation in the context of climate action. When the Task Force secretariat began researching the terms of reference for the Task Force, we interviewed several Indigenous experts, institutional representatives and knowledge keepers in Burnaby to identify relevant points of connection. The secretariat learned that there were no existing Indigenous housing societies or operators or Friendship Centres within city limits, and although this is changing with upcoming housing developments, this absence of current Indigenous housing operators made the link between **retrofits** and reconciliation more difficult to establish. Several individuals suggested that workforce employment programs that provide opportunities for Indigenous residents could be an additional opportunity to connect **retrofits** with the process of reconciliation. This opportunity is in part reflected in Recommendation 16 of this report. We recognize that this recommendation remains incomplete, and that last-minute circumstantial challenges that prevented invited Indigenous experts from participating in or presenting to the Task Force have likely reduced the specificity and depth of recommendations related to reconciliation in this report.

After it receives the Task Force recommendations, the City of Burnaby will be developing a **retrofit** strategy and has confirmed its intention to identify ways to strengthen the relationship between this strategy and the City's commitment to reconciliation. The secretariat also recognizes that the invitation to join a **retrofit** task force with a pre-established and narrow purpose may not be an optimal process for hearing and responding to the priorities of local First Nations and urban Indigenous peoples. The City's upcoming official community planning process will provide a stronger opportunity for open-ended conversations about reconciliation and will continue to support the emergence of these important conversations.

⁷For more details, please refer to the City of Burnaby's website at burnaby.ca/our-city/diversity-and-inclusion/indigenous-peoples-and-reconciliation or the Truth and Reconciliation Commission of Canada Calls to Action at gov.bc.ca/assets/gov/british-columbians-our-governments/indigenous-people/aboriginal-peoples-documents/calls_to_action_english2.pdf

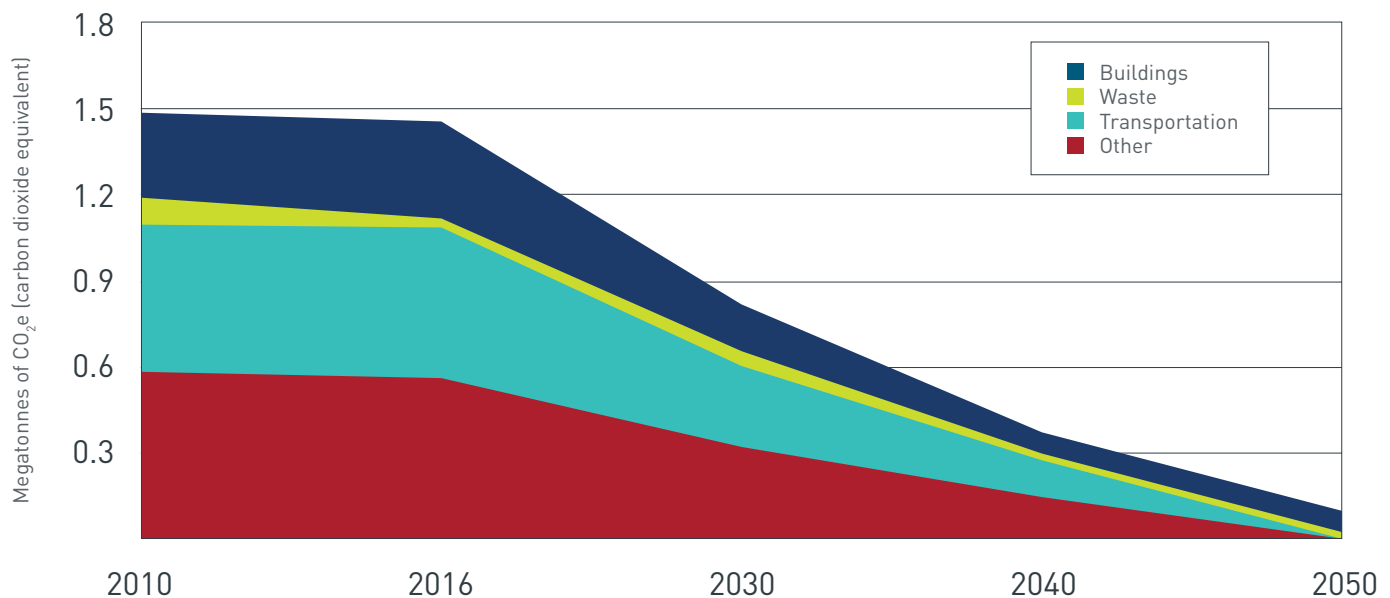
Section 3: Understanding Retrofits—Challenges and Opportunities in Burnaby

CARBON EMISSIONS FROM BUILDINGS IN BURNABY: SITUATIONAL ANALYSIS

City Emission Sources

In Burnaby, buildings account for over one-third of the City's total emissions (Figure 1). The application of green building policies and the adoption of **BC Energy Step Code**⁸ requirements and **low-carbon energy systems**⁹ will serve to stem emissions from new and future buildings in the City. However, there are approximately 37,000 buildings in Burnaby,¹⁰ the majority of which are between 10 and 70 years old. These buildings were built during a time with different technologies and where **carbon emissions** and energy efficiency may not have been top of mind. To reach the City's goal of **carbon neutrality** by the year 2050, existing buildings in Burnaby should be **retrofit** to reduce **carbon emissions**. This means that over the next 27 years, about 1,400 buildings need to be **retrofit** on average each year.

Figure 1: City of Burnaby's carbon emissions and carbon neutral 2050 scenario



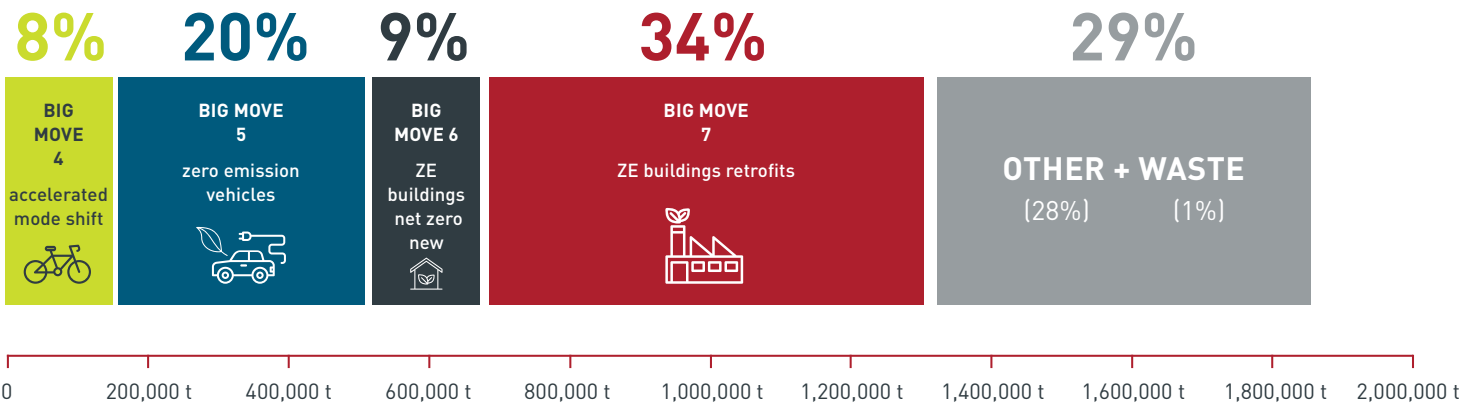
⁸See the definition in the glossary (Appendix A).

⁹A low-carbon energy system means a highly efficient, professionally operated and maintained mechanical system that supplies a building's space heating and cooling and domestic hot water heating demand primarily from renewable energy sources, at a carbon intensity that is low enough so that when applied to modelled building energy use, the development satisfies the City's defined greenhouse gas limits as outlined in the green building policy.

¹⁰City of Burnaby Planning and Development Department, 2022.

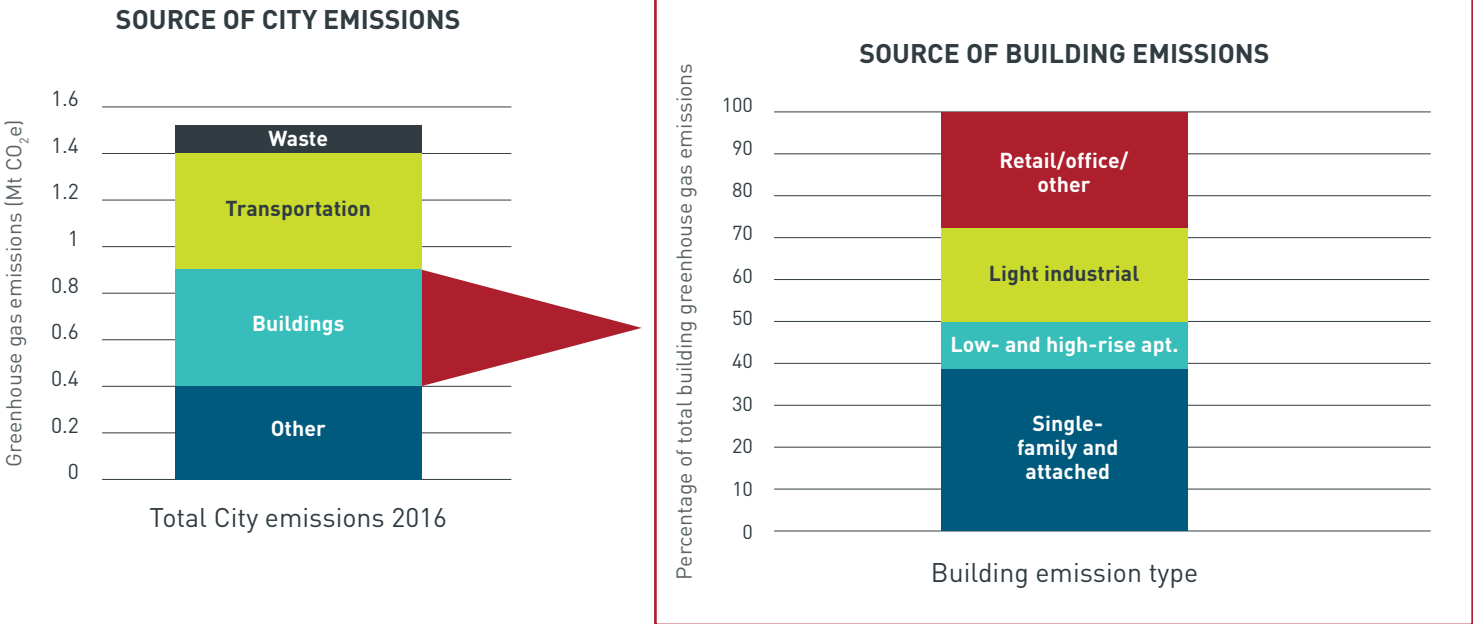
Carbon reduction modelling for the City’s climate action framework identified that retrofitting existing buildings is the single biggest opportunity to make the emission reductions necessary to reach **carbon neutrality** by 2050 (Figure 2). A transition to **low-carbon energy systems** will directly reduce community emissions and could account for 34 per cent of all emission reductions.

Figure 2: Allocation of carbon emission reductions by Big Move, to 2050



THE RETROFIT CHALLENGE

Drilling down into Burnaby’s building emission sources, single-family homes and **attached buildings**¹¹ are the largest source of emissions (38 per cent) from buildings, with retail as the second-largest source of emissions (36 per cent).



¹¹ Attached buildings refer to two-family homes and townhomes.

BUILDING MAKEUP

Delving into the variety of building types in Burnaby gives us a better sense of how emissions are distributed and the complex ownership structures that can influence **retrofit** decision-making.

Single-Family and Attached Buildings

Single-family and attached homes represent a large opportunity for retrofitting and emission reduction. This category consists of single-family homes, two-family homes (or duplexes) and townhomes.

This sector is the most abundant building type in Burnaby, with more than 30,000 single-family houses, two-family houses and townhouses, of which approximately 3,200 have a home rental business licence.¹² This category of buildings is responsible for nearly 40 per cent of building emissions.

Low-Rise and High-Rise Buildings

Multi-family buildings include low-rise buildings, high-rise buildings, mixed-use (commercial and residential) buildings and parcels that are made up of a combination of these two building types. Multi-family buildings are made up of several different owner structures, such as stratas, rentals, co-operatives, not-profit housing and senior living facilities. Of the low-rise and high-rise units in Burnaby, there is a nearly 50/50 split between rentals and strata buildings.

Low-rise and high-rise buildings make up only two per cent of buildings in Burnaby. They account for 55 per cent of the number of units and are responsible for 10 per cent of emissions.

Commercial Buildings—Retail, Office, Light Industrial and Others

Commercial buildings do not have a residential component. Different types of commercial buildings include:

- Industrial spaces (such as manufacturing facilities, warehouses and flex facilities).
- Retail spaces (such as malls, shopping centres and stand-alone commercial units like banks and fast-food chains).
- Office buildings (owned and leased).
- Institutions (such as hospitals, government buildings, schools and corrections facilities).
- Hotels.
- Restaurants.

Commercial and light industrial buildings are characterized by having fewer units but often a large physical footprint and sometimes specific higher-intensity heating or **cooling** needs that are tied to the commercial use. Retail, office and light industrial buildings make up 15 per cent of buildings in the City of Burnaby in number, but they are responsible for nearly 50 per cent of building emissions—in part due to the larger area footprint of these buildings. Retrofitting these buildings is an opportunity to tackle larger proportions of emissions for every building that is retrofit.

¹² City of Burnaby home rental business licence data, 2022.

THE RETROFIT OPPORTUNITY

The City's climate action framework lays out the development of a city-wide Zero-Emission Building Retrofit Strategy as a quick start in Big Move 7, Zero-emission buildings—**retrofit**.

The variety of building makeups, emission distribution and ownership structures in Burnaby, as in other municipalities, means that tailored solutions will be required to advance the City's building **retrofit** and **carbon emission** goals.

Recognizing that the average life cycle of boiler and furnace units is around 10 years and that the average age of the City's building stock ranges from 10 to 70 years, the replacement cycle of existing boiler and furnace units presents a great opportunity for **retrofits** and upgrades to advance the City's building **retrofit** and **carbon emissions** goals.

CHALLENGES AND OPPORTUNITIES OF RETROFITS IN BURNABY

Retrofitting is the process of modifying something after it has been built. There are five main types of building **retrofits** related to energy efficiency and emissions: replacing windows, improving insulation, reinforcing airtightness (how much air escapes from a building), installing more efficient space and water heating equipment (such as **heat pumps**¹³) and fuel switching away from fossil fuels. Different building types require different combinations of **retrofits** and fuel switching to optimize performance improvements. Many low-**carbon** energy source and energy-efficiency **retrofits** are supported by provincial and federal government grants and incentives.

Retrofitting existing buildings for energy efficiency and to reduce **carbon emissions** also presents co-benefits for the health and well-being of these buildings' occupants—for example, by improving indoor air quality when switching from **natural gas** combustion to electric heating, **cooling** and cooking.

These **retrofits** can include upgrades that protect people and buildings against extreme weather events such as prolonged heat, floods and wildfires. **Electric heat pumps** bring a solution due to efficiently providing both heating and **cooling**.

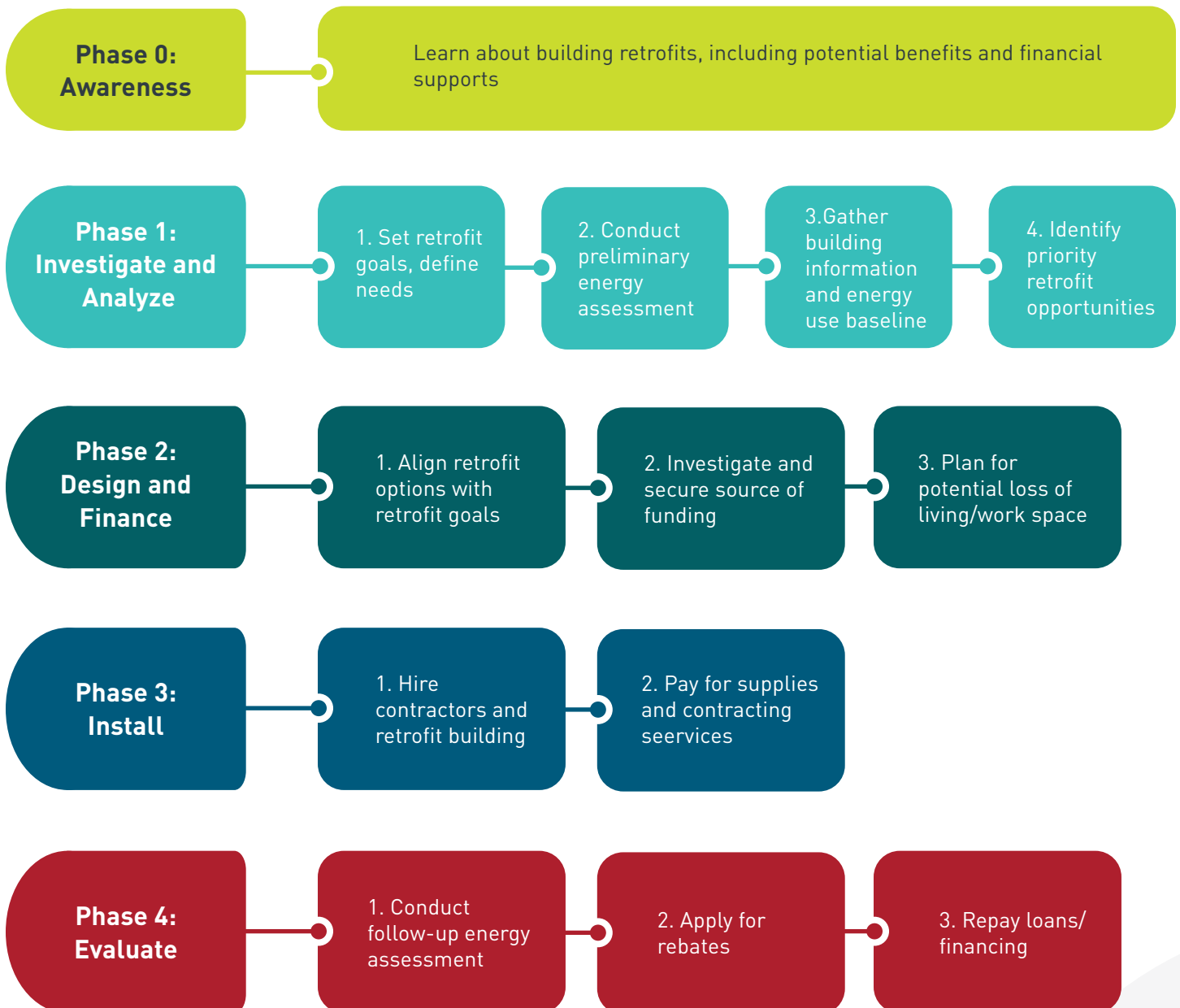
However, the process of identifying and implementing **retrofit** actions in a building is not straightforward, and those who benefit or are most impacted by the execution of **retrofits** are varied. This section walks through the basic steps of a low-**carbon** and energy-efficiency **retrofit** process and identifies a number of barriers and impacts to stakeholders as they go through the **retrofit** process.

¹³ A heat pump is a home heating and cooling device that is energy efficient because it transfers (or pumps) heat into or out of a home. See the full definition in the glossary (Appendix A).

PHASES OF A TYPICAL RETROFIT

The building **retrofit** process consists of four phases, plus a preparation phase (Figure 3). In phase 0, people learn about **retrofits** and their potential benefits. Phase 1 determines what needs to be retrofitted and the energy use baseline, phase 2 deals with designing the appropriate **retrofit** and finding financing, phase 3 describes the installation of the **retrofit** and the types of services rendered and phase 4 determines the post-**retrofit** energy use.

Figure 3: Building retrofit process



BARRIERS TO RETROFITS IN BURNABY

Table 6 summarizes some of the barriers owners and occupants may come across as they progress through the **retrofit** phases. The type of barriers to **retrofits** will vary based on building and ownership type, and the magnitude of these barriers will depend on what **retrofits** are undertaken. These barriers may include not being aware that a **retrofit** is required, the process being overwhelming and complex, the existence of upfront costs to the homeowner/occupant before they even know if they can proceed, a lack of qualified people to do the work and challenges meeting some of the rebate requirements.

Table 6: Barriers to retrofits

PHASE	BARRIER
Phase 0	<ul style="list-style-type: none"> • Many owners are not aware they will have to retrofit their buildings. • There are different, sometimes competing messages about retrofits from different governmental and private agencies. There is low motivation to change home heating systems overall. • Natural gas is currently cheaper than electricity, month to month.
Phase 1	<ul style="list-style-type: none"> • The retrofit process (e.g., hiring contractors, applying for rebates) is overwhelming and too complex for non-experts. • Energy assessments are a requirement for applying for some incentives, but there may not be enough qualified energy advisors¹⁴ to perform the required volume of work. • Even after an energy assessment, homeowners may not be sure what the best course of action is. Homeowners are generally left to figure it out themselves. • Incentives are generally determined based on who pays the energy bill. Therefore, there are few incentives for property owners who do not pay utilities (i.e., whose tenants pay utilities). • Tenants may not have a voice in whether a retrofit will happen or not. • There are complex decision-making structures for certain buildings. • Every home is unique; there is no one-size-fits-all approach.

¹⁴ Independent experts in energy efficiency for homes. See the full definition in the glossary (Appendix A).

PHASE	BARRIER
Phase 2	<ul style="list-style-type: none"> • Homeowners have to make upfront investments in energy assessments and contractors before they know if they qualify for rebates. There is a lack of financing options for these upfront costs. • Moving to electricity from gas can increase energy costs or push people into energy poverty.¹⁵ • Lower-income households cannot afford upgrades and/or do not want more debt through financing. • There is little or no market readiness for the required technology. • There may be additional barriers to switching from gas to electric heating including upgrading electric panels or dealing with mould or asbestos abatements that aren't covered by rebates.
Phase 3	<ul style="list-style-type: none"> • There are not enough qualified contractors to perform the required volume of work. There is also a shortage of products for installation. • Building occupants may be displaced during the installation and have nowhere else to go, or a retrofit may increase rent for tenants to an unaffordable level, leading to "renovictions".
Phase 4	<ul style="list-style-type: none"> • It is difficult to meet the requirements to receive rebates. • The low cost of energy in BC makes payback based on energy savings (return on investment) slow for building owners and managers.

¹⁵ Refers to the experience of households or communities that struggle to adequately heat and cool their homes and power their lights and appliances. See the cut-out box on page 31 and the full definition in the glossary (Appendix A).

HOW ARE PEOPLE IMPACTED BY BUILDING RETROFITS AND CLIMATE CHANGE?

Building **retrofits** can be linked to climate change mitigation and climate change adaptation by contributing to decreased **carbon emissions**, which is climate change mitigation, and by making buildings more comfortable and safer for a building's occupants in the face of current and projected changes in climate, which is adaptation.

When we centre people in the consideration of building **retrofits**, the **retrofits** can have both positive and negative impacts, that often intersect, or amplify, one another. Some people or groups of people may be more impacted than others by building **retrofits**. This will depend on a person's vulnerability to climate change, which is a factor of a person's sensitivity to climate change, their adaptive capacity, and their exposure to climate change hazards. People with existing or high vulnerability to climate change are often living in older, less efficient and/or lower-quality building stock with higher energy bills to begin with.

VULNERABILITY TO CLIMATE CHANGE

People across Burnaby are currently impacted by these changes in our climate and will be in the future, too. Some people will be more impacted by climate change than others. People may also have a combination of factors, rather than just one, that make them more vulnerable to climate change.¹⁶

Communities or people that are at higher risk or more vulnerable to climate change include:¹⁷

People with more exposure to climate change hazards (like extreme heat or precipitation events)—**for example:**

- People who work outside (e.g., in heat or extreme weather events).
- People who have insecure shelter or are experiencing homelessness.
- People who live in hotter neighbourhoods (e.g., those areas with fewer trees and more pavement).
- People who live close to a flood plain or at low elevation close to a shoreline (e.g., that may be at risk of flooding or sea level rise).

People who are more at risk because they may be more sensitive to climate change hazards:

- People who are immunocompromised or have chronic health conditions.
- People living with pre-existing illnesses (especially cardiovascular, respiratory or renal disease).
- Seniors (over 65).
- Youth and children (under five years old).
- People with disabilities.
- People who are pregnant.

People with less adaptive capacity—with less access to resources, social and technical skills or strategies that will help them to prepare for or respond to environmental, social or economic changes related to climate change.¹⁸

Adaptive capacity is dependent upon many factors, including:

- Income and social status (e.g., those with a fixed/limited income).
- Physical environment (e.g., those living or working in environments without adequate heating or **cooling** for climate-related events).
- Physical mobility (e.g., those unable to change their environment such as seeking out a place with **cooling** during extreme heat events, or with no access to alternative spaces that meet their physical needs).
- Education and literacy (e.g., those low level of education or literacy or non-English speaking individuals).
- Social supports and coping skills (e.g., those requiring additional aid from others for basic needs and having specific coping mechanisms).
- Employment and working conditions (e.g., those with limited employment opportunities and flexibility or those who work outdoors).

Adaptive capacity and vulnerability are also influenced by structural, historical and existing inequities, including (but not limited to) those related to:

- Racism.
- Poverty.
- Disability.
- Colonialism.
- Sex and gender.
- Access to health care and other social services.

¹⁶ Government of Canada. [Who is most impacted by climate change](#). January 24, 2022.

¹⁷ Vancouver Coastal Health, Fraser Health, UBC. [Community Health and Climate Change: Mapping Exposure, Sensitivity, and Adaptive Capacity to Four Health-Related Climate Hazards, Results from a Preliminary Study](#). July 2021.

¹⁸ Yu J, Castellani K, Yao A, Cawley K, Zhao X, Brauer M. Mapping spatial patterns in vulnerability to climate change-related health hazards. University of British Columbia; 2020.

PERSONAS

The building **retrofit** barriers outlined in Table 6 will have greater impacts for those who have existing vulnerabilities and less adaptive capacity. To work through the impacts of building **retrofits**, seven key personas¹⁹ were created to represent residents and stakeholders from a range of demographics and with different climate vulnerabilities and socioeconomic statuses. Each persona illustrates the array of challenges, co-benefits and experiences that they will face during the building **retrofit** process.



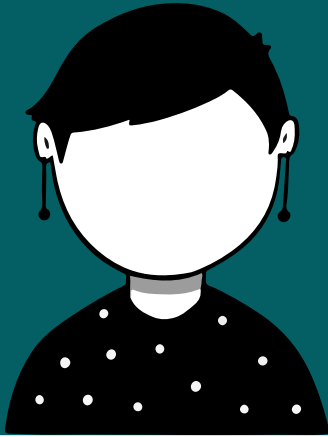
Emmanuel and Jeffery

High-income single-family homeowners

50-year-old Emmanuel lives with his husband Jeffery and their two kids in a single-family detached home in the Burnaby Heights area. The household makes around \$150,000 a year; they are having trouble navigating the rebate process and don't know where to start to ensure they are eligible for incentives.

Retrofit impacts: Single-family homeowners will see various financial benefits including increased property values and decreased energy costs. They will also have improved temperature and/or lighting (visual) comfort as well as a feeling of accomplishment in helping to reduce their **carbon emissions**. Homeowners will be hit with the upfront costs of retrofitting and the potential for displacement while **retrofits** occur.

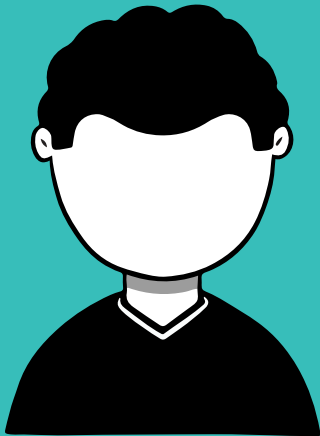
¹⁹ These personas have been designed using images from [Freepik.com](https://www.freepik.com).

**Ester**

Senior with health concerns and mobility issues and on a fixed income

Ester, 78 years old, lives alone on a fixed income in an assisted living facility near Deer Lake Park, which currently does not have any **air conditioning**. Ester has various health concerns and difficulty getting around on her own. She does not believe in climate change.

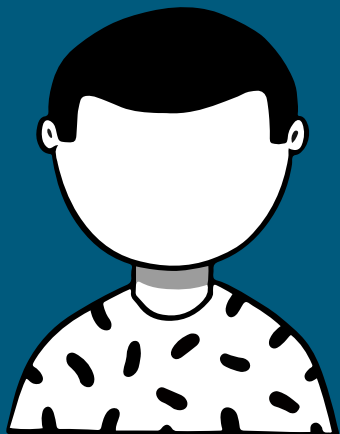
Retrofit impacts: Tenants may experience a decrease in their energy costs, improved lighting and/or thermal comfort and values alignment by renting in a building that is sustainable. They may also encounter increased rent and displacement while renovations occur or risk “renoviction” in the face of increased rent after retrofits are complete. Tenants often do not have a strong voice in this decision-making process.

**Dilraj**

Single, moderate-income strata unit owner

Dilraj owns a condo in an older strata building in the Brentwood area. At 32, Dilraj lives alone and earns \$55,000 a year. He has asthma and is very concerned about air quality during the summer months. Dilraj finds his unit drafty and pays high utility bills in the winter. He also does not have access to **air conditioning**.

Retrofit impacts: Strata unit owners will see various financial benefits including increased property values, decreased energy costs and the potential for a change in maintenance costs. They will also have improved thermal and/or lighting (visual) comfort and improved air quality with potentially better filtration, as well as a feeling of accomplishment in helping to reduce their **carbon emissions**. Strata unit owners will be required to co-operate with other strata members to finance the **retrofits**, which can be difficult, with many varying opinions and a lack of strata-specific financing options. Ultimately, strata council is the decision-maker and often lacks capacity or understanding of the sector and its complexities.



Doug
Small gas furnace business owner

Doug owns a very successful contracting company that specializes in gas furnaces. As a small business owner, Doug finds it difficult to find qualified people to manage the workload and is unsure where to obtain relevant and professional training. He is worried about how switching business practices to a more sustainability-focused industry will compound this issue and affect his bottom line. He has also been affected by supply chain uncertainties.

Retrofit impacts: A small gas furnace business owner may not be directly impacted by retrofitting; however, their business operations and practices will need to align with the changeover to electric. With this transition, they may require mentorship and training. This additional service could provide both financial and staffing growth in the company.

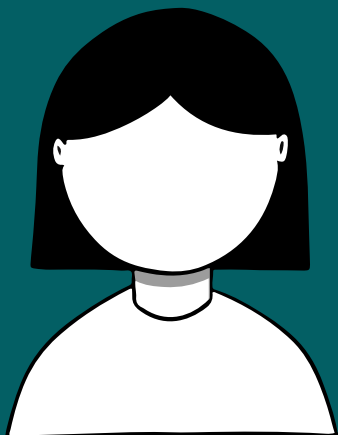


Nadia and Mustafa
Immigrant low-income renters

Mustafa and Nadia, a young married couple who immigrated to Canada in 2020, are renting a small one-bedroom apartment in the Edmonds area. Mustafa, currently the only income earner, makes less than \$30,000 a year. Nadia does not speak English and thus has not been able to find work. They have no other family in Canada.

Retrofit impacts: Tenants may experience a decrease in their energy costs, improved lighting and/or thermal comfort and values alignment by renting in a building that is sustainable. They may also encounter increased rent and displacement while renovations occur or risk “renoviction” in the face of increased rent after **retrofits** are complete. Tenants often do not have a strong voice in this decision-making process. Tenants are likely driven to **energy poverty** where they are spending a disproportionate amount of household income on heating and hot water. These tenants are most likely to live in buildings that are not energy efficient; these buildings are most in need of **retrofits**, and switching from fuel to energy will likely further increase costs.²⁰

²⁰ TacTaggart, L., Heerema, D. Transforming income-qualified home energy retrofits programs in BC. Vancouver; 2021.

**Lovely Homes Ltd.*****Residential rental building corporate owner***

Lovely Homes Ltd. is the owner of multiple residential rental buildings in Burnaby. Its building stock is a mix of newer and older properties ranging from 10 to 50 years old. It deals with many different types of complaints from the tenants in its buildings, including thermal issues in both the summer and winter months.

Retrofit impacts: Rental building owners will see financial returns on investments including increased rental potential, increased competitiveness, the potential for decreased energy costs and a reduction in life-cycle costs. They may also have the opportunity to diversify their investments to be more socially conscious and experience a feeling of accomplishment in helping to reduce their **carbon emissions**. Some retrofits may lead to fewer thermal comfort complaints. However, building owners will be faced with the upfront costs of retrofitting. In the case of an absentee building owner, there may be a disconnect from the issues, which, in turn, can result in a lack of perceived benefits and a lack of interest in retrofit investments.

**Lanfen*****Commercial rental building owner***

Lanfen owns a small 45-year-old building on Kingsway, which she currently leases to a local restaurant. The current kitchen set-up is gas-powered, and the dysfunctional HVAC system does not have a **cooling**²¹ component. The current tenant struggles to get any issues dealt with. Lanfen does not see the personal benefits of retrofitting the building.

Retrofit impacts: Non-residential building owners will see many financial returns on investments including the potential for decreased energy costs and a reduction in life-cycle costs. There may also be fewer thermal comfort complaints and lowered tenant turnover. They may also have the opportunity to diversify their investments to be more socially conscious, experience a feeling of accomplishment in helping to reduce their **carbon emissions** and be more highly regarded. They will, however, be faced with the upfront costs of retrofitting and a potential loss of rental income while **retrofits** occur.

²¹ See the definition in the glossary (Appendix A).

VANCITY HOMEOWNER JOURNEY MAPPING

STUCK: WHY HOME ELECTRIFICATION IS LAGGING IN BRITISH COLUMBIA AND WHAT MUST BE DONE TO BREAK THE DEADLOCK ON RESIDENTIAL CARBON RETROFITS

A report by OPEN Technologies in partnership with Vancity

What's the problem?

Too many British Columbia homes are producing too much **carbon** pollution. To meet the provincial, regional and local climate targets for 2030 and 2050 we must decarbonize our homes. And that means quickly replacing the gas furnaces, boilers and water heaters that currently dominate the landscape and ensuring that new homes are electrified from the start.

Across the province, hundreds of thousands of **natural gas** furnaces and water heaters are currently operating, but our research concludes that homeowners are replacing just four to five per cent of them each year. In the vast majority of those cases, new gas equipment replaces old gas equipment, which, of course, locks in another generation of fossil fuel combustion.

The research reveals that almost two-thirds of gas-powered home heating equipment is up for replacement by 2030. This represents either a huge electrification opportunity or a massive blow, should those homeowners choose to go with gas again and lock in another generation of **carbon emissions**.

What did we learn?

When it comes to home electrification, the central finding of the research is that **carbon** retrofitting—specifically, electrifying—a home is challenging and requires planning, but most homeowners are reactive rather than proactive.

Approximately 60 per cent of heating equipment replacements occur following a furnace or boiler failure, or when a homeowner comes to believe that burnout is imminent. This tends to result in quick, like-for-like installations that lock in fossil fuel combustion for another generation. Even with existing supports, residential **carbon retrofits** are inherently complicated and expensive projects. Our research shows that homeowners have little motivation to take them on, and there are many barriers standing in their way.

What needs to happen?

To halve buildings-based emissions by 2030, the province needs to electrify the primary space- and water-heating systems of at least five per cent of all BC households (the equivalent of seven per cent of today's existing gas-burning homes) each year, while also taking steps to reduce emissions from kitchen appliances and secondary heating systems and ensuring that all newly built homes run zero-emission heating and hot water systems.

The report calls upon policy-makers, program designers and others to transform the home energy equipment marketplace in a way that is beneficial for homeowners, industry participants and our shared climate imperatives.

Policy-makers must quickly phase out gas-primary space- and water-heating systems. To reach the 2030 targets, this “simply” requires replacing the 61 per cent of gas-fired furnaces and 68 per cent of gas-fired boilers that are already approaching the end of their service life.

Residential **carbon retrofits** require a multi-layered policy response, including new regulation, to send a strong signal to the market and supplement the current voluntary-focused approach.

This should include a clear signal from the provincial government that residential **natural gas** will eventually be phased out. It requires political courage and a funding commitment many orders of magnitude larger than current allocations.

What will happen if action is not taken?

In the absence of clear and aggressive new regulation, coupled with strategic and major program support for the industry transition, residential **carbon retrofits** will continue to stumble along as exceptions to the rule, and the province will not likely meet its climate targets.

The deck is presently stacked against even the most motivated of British Columbia homeowners, and a significant regulatory intervention is required to unleash **carbon retrofits** at the needed scope, scale and speed.

Where can I find the full report?

The full report sheds light on the factors that enable or discourage British Columbia homeowners that seek to transition away from **natural gas**-fired space and water heating in favour of clean electric alternatives, and—as a result—what can, and must, be done to decarbonize the province’s ground-oriented housing.

Download the report here: opentech.eco/products/stuck/

Who published this report?

OPEN Technologies, in partnership with Vancity, commissioned the research and compiled findings in collaboration with qualitative market researcher Circular Citizen and statistician Majid Khoury.

OPEN Technologies is a software company helping the people that shape our cities to make pro-climate decisions with confidence. Vancity works to deliver on its vision for a transformed economy that protects the earth and guarantees equity for all. Canada’s largest credit union is committed to supporting its members and communities through the transition to a clean and fair economy.

KAMBO ENERGY GROUP EMPOWER ME PROGRAM—UNDERSTANDING ENERGY POVERTY

Lower-income households face unique challenges and impacts as they relate to their home energy. Lower-income households tend to live in older and less efficient homes, leading to energy bills that are higher than average and that take up a greater amount of their income than the general population. This experience of struggling to pay for adequate heating and **cooling** is known as being in **energy poverty**.

Households that experience **energy poverty** often make compromises in health, comfort and conveniences that other people take for granted. Many of those that experience **energy poverty** keep their homes at lower temperatures in the winter—compromising their thermal comfort and their health. Living in colder homes has documented health effects, particularly for children and infants. Studies demonstrate higher rates of respiratory problems for children, as well as lower weight gain and more susceptibility to illness for infants that live in **energy poverty** (Frank et al., 2006; Howden-Chapman et al., 2008; Liddell and Morris, 2010). Adults in **energy poverty** typically report higher stress and worse mental health (Green and Gilbertson, 2004), which is unsurprising given the stress associated with higher bill burdens.

While the inability to afford to adequately heat homes has typically been considered for households experiencing **energy poverty**, with the effects of climate change, the ability to cool a home now also becomes an important consideration. In June 2021, the impacts of the inability to cool homes were acutely felt in B.C. by a weather phenomenon known as a heat dome that resulted in 619 deaths in what is being referred to as a mass casualty event. The majority of these deaths were in the Lower Mainland.

In addition to these important health effects, households that struggle with paying their energy bills may experience disconnection from utility services—resulting in periods of time without access to essential energy.

Home **retrofit** programs targeted at lower-income households offer the opportunity to multi-solve issues of health, safety, affordability, **carbon emissions** and comfort.

Section 4: The Task Force's Vision for Retrofits in Burnaby

As part of its deliberations, the Task Force developed a vision statement for retrofits in Burnaby. The principles and high-level directions in this vision statement provided a foundation for the Task Force in developing its detailed recommendations. This vision statement also provides a long-term reference point for the City of Burnaby to consider when deciding next steps and responding to new circumstances.

GOAL: A LOW-CARBON AND ENERGY-EFFICIENT FUTURE

- 1. Emission reductions:** The City of Burnaby must increase building retrofits at the speed and scale necessary to reach its targets of 45 per cent reduction by 2030 and **carbon neutrality** by 2050. By identifying high emitters, partnering with early adopters, targeting high-payoff actions and providing the necessary resources or funding to achieve its goals, the City of Burnaby can begin to stimulate and accelerate the retrofit market.
- 2. Move to clean energy:** Buildings in Burnaby must transition away from conventional **natural gas** to reduce their emissions. Most buildings will switch to electricity or connect to district energy as part of this transition, with limited supplies of **renewable²² natural gas** playing a small role for certain types of buildings.
- 3. Energy efficiency:** Buildings in Burnaby must increase their energy efficiency and implement conservation measures in addition to moving toward zero-emission energy sources. This will keep the load on the electrical grid manageable, reduce the negative impacts of new hydroelectric dams for other regions of the province, enable better performance of heating and **cooling systems** and reduce long-term energy costs for building owners and tenants.
- 4. Gentle densification:** Measures for gentle densification present an additional opportunity to decrease the City of Burnaby's **carbon** intensity per resident compared with existing single-family homes.

RECONCILIATION

- 5. Reconciliation:** The City of Burnaby should seek to further its goals for reconciliation with Indigenous peoples through its retrofit strategy and climate action programming.

EQUITY AND CLIMATE RESILIENCE AND COMMUNITY BENEFITS

- 6. Climate resilience:** Retrofits have an important role to increase the climate resilience of homes and make them more future-proof against increasing climate impacts such as heat waves and wildfire smoke.
- 7. Equity lens:** Burnaby's retrofit policies must use an equity lens to prioritize individuals who are most vulnerable to these impacts and have been historically under-prioritized, including seniors, people with disabilities and marginalized groups.

²² Renewable energy is energy obtained from resources that can be naturally replenished or renewed within a human lifespan. See the full definition in the glossary (Appendix A).

8. **Low-income residents:** Burnaby must ensure that lower-income residents have access to the benefits of energy-efficiency measures that reduce **energy poverty**, as well as zero-**carbon** alternatives to conventional **natural gas** so that no one is stranded on legacy energy sources that will become significantly more expensive in the coming decades.
9. **Unintended consequences:** Burnaby must avoid unintended consequences in its retrofit policies, such as displacing tenants, the risks of negative impacts to lower-income households through financing programs and the premature demolition of existing buildings, which can lead to increased **carbon emissions embodied**²³ in new construction.
10. **Additional benefits:** A retrofit strategy should create and communicate many additional community benefits, such as upgrades that also make buildings more livable (e.g., thermal comfort, air quality, lighting, **mould**²⁴), employment opportunities in the growing retrofit market or increased neighbourhood vibrancy and reduced social isolation through gentle densification.

CATALYZING ACTION

11. **Communication:** The purpose and benefits of retrofits have not been adequately communicated to residents and building owners in Burnaby and across Canada, leading to missed opportunities to decarbonize, such as when old equipment fails or is replaced. Burnaby needs to mobilize awareness and excitement for retrofits in ways that “show rather than tell” and make retrofits “the next Jacuzzi” in home upgrades.
12. **Tailored approach:** There are many building types, ages and ownership structures for buildings in Burnaby, and each will require different incentives and pathways to reduce and eliminate their emissions. Burnaby must tailor its policies and guidance to recognize this complexity and has an opportunity to fill gaps in existing policies, such as policies to enable retrofits for non-profit housing or renters.
13. **Expanded workforce:** To realize its retrofit goals, Burnaby will need to encourage an expanded retrofit workforce and contractor pools with appropriate labour standards and opportunities.
14. **Managing complexity:** In the future, the process to retrofit a building in Burnaby must be clear, streamlined and accessible. Currently, residents and building owners are faced with overwhelming complexity when trying to confirm what type of retrofit makes sense for them, access funding, engage contractors and manage the overall retrofit process.
15. **Cross-government:** Through the Task Force and the subsequent Zero-Emission Building Retrofit Strategy, Burnaby has the opportunity to both learn from other municipalities and share back new frameworks and innovations. All levels of government should work toward a harmonized approach, both to reduce the complexity of actions such as applying for grants and to prevent unintended incentives that drive residents, businesses and property owners to municipalities with less stringent rules.
16. **Measurement and evaluation:** The City of Burnaby should evaluate its progress on retrofits as part of its biannual climate review in ways that draw upon pre-existing or easily available data sets, recognizing limits to staff resources and capacities.

²³ Embodied carbon (CO₂ or CO₂E of greenhouse gases) is the carbon emitted into the atmosphere during the growth, mining, extraction, harvesting, transport, manufacturing and distribution of a building material. See the full definition in the glossary (Appendix A).

²⁴ A fungus that grows on surfaces or in materials as a result of damp conditions and that can have adverse health consequences. See the full definition in the glossary (Appendix A).

Section 5: Task Force Recommendations

In total, the Task Force produced eight high-priority (Table 7) and 12 regular-priority recommendations (Table 8) to inform Burnaby's Zero-Emission Building Retrofit Strategy.

Table 7: Summary of high-priority recommendations

NUMBER	RECOMMENDATION
1	Provide retrofit subsidies and incentives that increase affordability for residents living in energy poverty and/or that reduce the impacts of climate change for vulnerable residents (e.g., seniors and people with disabilities during heat waves).
2	Create or join a "one-stop shop" concierge service for different building (and ownership) types to navigate the retrofit process, including planning, applying for financing and grants, paperwork, inspections and contractor management.
3	Launch a multilingual awareness and education campaign to explain the benefits and necessity of retrofits and the availability of concierge services, and encourage participation in retrofit programming. The campaign could potentially include success stories, demonstrations and resources for a range of building types and circumstances.
4	Optimize the permitting process for all building types in ways that incentivize climate-friendly retrofit options such as heat pumps (e.g., fast-track permitting, streamlined processes) and discourage the use of fossil fuel gas (e.g., trigger contractors to present low- carbon choices to building owners during the application process).
5	Provide rules or resources to both landlords and tenants to mitigate tenant disruptions or evictions during retrofits .
6	Review City bylaws (e.g., noise, permitting) and clarify, adapt or simplify them to facilitate retrofits .
7	Accelerate the adoption of higher standards for the BC Energy Step Code (and upcoming carbon pollution standard) in Burnaby to increase the emission performance of new buildings and reduce the need for future retrofits .
8	Retrofit all City-owned buildings to lead by example, showcase solutions and stimulate the retrofit market.

Table 8: Summary of regular-priority recommendations

NUMBER	RECOMMENDATION
9	Build the capacity of contractors in Burnaby to offer heat pumps and other retrofit services, shaped by an initial needs assessment and leading to training programs and other forms of engagement.
10	Hold a large-scale retrofit pilot or participate in an existing accelerator/incubator program to identify innovative practices and stimulate the local retrofit market.
11	Add green space and trees around buildings in underserved parts of Burnaby, which are often the same locations where non-profit housing and those residents who are most vulnerable to heat waves are located.
12	Pilot new and innovative financing models that: i) promote retrofits for rentals, non-market housing and other buildings not well-served by current methods (e.g., stratas), while taking care not to place additional debt on residents who can't afford it. ii) implement pending provincial property assessed clean energy (PACE) legislation to allow property owners to borrow the upfront costs for retrofits and pay back the loan on their property tax bill, with any remaining debt transferred to future owners if the property is sold, while taking care to include consumer protections that protect lower-income households.
13	Ask the provincial government to amend the Strata Property Act to: i) require an evaluation of zero-emission retrofit options as part of depreciation reports. ii) require energy-saving upgrades in strata buildings at appropriate milestones, including when equipment or components have reached the end of their usable lifespan. iii) add a requirement for energy reports (a.k.a. depreciation reports) to identify potential energy upgrades and pathways to building electrification.
14	Mail every building owner in Burnaby customized information about how their home or building is able to be retrofitted, with individualized communications similar to property assessments.
15	Provide targeted information to “the right people at the right time” to influence building owners to retrofit at key milestones (e.g., point-of-sale, mortgage refinancing, new builds, equipment failure, having children), working with realtors, financiers, tradespeople and others.
16	Explore ways, such as through large-scale procurement or partnerships, to create training and employment opportunities for under-represented groups so they benefit from the growing retrofit economy. In addition, the City of Burnaby should ensure that retrofit solutions are designed and delivered by the communities they serve.

NUMBER	TITLE OF THE RECOMMENDATION
17	Ask the provincial government to introduce mandatory energy benchmarking and regulate emissions from existing buildings, starting with buildings over 50,000 square feet (4,645 square metres), in a manner that ensures a uniform approach across municipalities.
18	Eliminate the use of natural gas fireplaces in City of Burnaby-owned buildings. Include signage explaining why these have been turned off.
19	Seek out appropriate buildings that can be retrofitted and connected to the City of Burnaby's pending district energy system.
20	Decrease the emissions intensity per resident by finding ways to accommodate additional population density within existing single-family homes and along transit corridors.

DETAILED DESCRIPTIONS FOR HIGH-PRIORITY RECOMMENDATIONS

The Task Force developed additional detailed descriptions for each of its eight high-priority recommendations in response to the following questions:

- Why?
- How would it work?
- Who should the City consider involving?
- How should the City measure success?
- What first step(s) should the City take to get started?

RECOMMENDATION 1 – SUBSIDIES AND INCENTIVES

Provide retrofit subsidies and incentives that increase affordability for residents living in energy poverty and/or that reduce the impacts of climate change for vulnerable residents (e.g., seniors and people with disabilities during heat waves).

WHY?

People living in **energy poverty** struggle to afford to adequately heat or cool their home. These households can't afford the costs associated with protecting themselves from the impacts of climate change, and supporting action for these individuals would demonstrate Burnaby's commitment to equity, anti-racism and reconciliation. Vulnerable residents, such as seniors and people with disabilities, make up a considerable portion of the population and are sometimes faced with compounding impacts from overlapping life events that heighten the risks they face. For example, the 2021 heat dome resulted in 619 unnecessary deaths and countless medical emergencies, demonstrating that **cooling** can be a minimum requirement for survival during the summer in the same way that heating is a requirement for survival during the winter.

Many lower-income residents have been left behind by current **retrofit** incentive programs. Burnaby must ensure that these residents have access to the benefits of energy-efficiency measures that reduce **energy poverty**, as well as zero-**carbon** alternatives to conventional **natural gas** so that no one is stranded on legacy energy sources that will become significantly more expensive in the coming decades.

HOW WOULD IT WORK?

The City of Burnaby could work in partnership with relevant community organizations and existing program providers to co-create solutions and determine the incentives and subsidies that would be best suited to benefit lower-income and climate-vulnerable folks in a range of circumstances, including:

- Seniors who live in single-family dwellings on fixed incomes.
- Renters who are less able to initiate **retrofits** themselves and may face increased expenses if landlords download costs.
- Multi-family building complexes (e.g., assisted housing, non-profit) that could benefit from shared safety amenities such as a central **cooling** refuge.

In doing this work, the City of Burnaby should use a multi-solving approach to address a range of community priorities (e.g., climate, energy efficiency) and should also evaluate its programming to confirm this is not causing any unintended consequences. The City of Burnaby should also encourage increased participation in existing programs run by utilities and the Province and remove barriers to participation—for example, by providing multilingual materials.

WHO SHOULD THE CITY CONSIDER INVOLVING?

The City of Burnaby should consider partnering with or learning from:

- Existing programs run by the City of Vancouver, Metro Vancouver and LandlordBC.
- Member associations (e.g., Building Owners and Managers Association of BC, seniors housing advocates, renters' housing advocates such as the Tenant Resource and Advisory Centre, LandlordBC, Condominium Home Owners Association).
- Non-profit housing organizations (e.g., BC Non-Profit Housing Association, Co-operative Housing Federation of BC, Aboriginal Housing Management Association and other Indigenous housing operators).
- Community-based non-profits and charities already doing this work (e.g., Kambo Energy Group).
- Federal/provincial/municipal governments (e.g., Canada Mortgage and Housing Corporation, Federation of Canadian Municipalities, BC Housing).
- Financial institutions and foundations (e.g., Vancity, Vancouver Foundation, Real Estate Foundation of BC).
- Fraser Health.

The City of Burnaby should also explore connections with the recommendations from the [BC Coroners Service's report on B.C. heat-dome deaths](#), which highlights the need to prioritize provincial rebate programs for people who need them the most, integrate **active**²⁵ and **passive cooling** measure requirements in new construction and create more consistency between plans and programs across levels of government to address climate change.

HOW SHOULD THE CITY MEASURE SUCCESS?

Possible success measures include:

- Decreased overheating in low-income neighbourhoods.
- Decreased excess deaths in low-income neighbourhoods.
- Decreased equity gap.
- Affordability improvements.
- Savings per home including **carbon emission** reductions (as opposed to total savings across all homes).
- Reduction of number of residents in **energy poverty**.
- Decreased facility condition index.
- Increased tree cover in low-income areas.
- Number of **cooling** stations and centres created for refuge.

²⁵ In a home, an active system is one that requires mechanical energy to work. The opposite of an active system is a passive system. See the full definition in the glossary (Appendix A).

WHAT FIRST STEP(S) SHOULD THE CITY TAKE TO GET STARTED?

- Convene potential housing partners and lower-income folks to have input into subsidies and incentive programs.
- Identify the number of multi-family residential buildings that are two or more floors and do not currently have **cooling** facilities within their complexes either in-suite or in common gathering areas. Create a program for expedient evaluation to determine if a **cooling system** or **heat pump** could be easily installed.
- Convert air makeup systems from ambient/heat to **heat pumps** to eliminate gas and introduce **cooling** into buildings.
- Consider the low-income building market in Burnaby. Do current programs address the need based on building type and demographics? What has the success been of current programs? What are the goals of these programs? Do they match the City of Burnaby's goals?
- The City of Burnaby should also encourage increased participation in existing programs run by utilities and the Province, and remove barriers to participation—for example, by providing multilingual materials.

RECOMMENDATION 2 – CONCIERGE SERVICE

Create or join a “one-stop shop” concierge service for different building (and ownership) types to navigate the retrofit process, including planning, applying for financing and grants, paperwork, inspections and contractor management.

WHY?

The process of retrofitting buildings in Burnaby and accessing rebates is complicated to navigate and can be intimidating as it contains multiple barriers that deter many building owners and residents from taking action.

Due to labour shortages, skills gaps and an overall lack of time and resources, energy efficiency projects can be extremely challenging for even some of the largest building owners. There is high demand for contractors/installers and there are supply chain issues that make it challenging for homeowners to find installers and long wait times for things like **heat pumps**.

To make appropriate **retrofits**, building owners need to do long-term capital planning, conduct energy audits and perform other related tasks.

A one-stop shop at the City of Burnaby would be essential.

HOW WOULD IT WORK?

An integrated concierge service would provide a more streamlined process that combines all required services, information and expertise on the **retrofit** process in a central location with high-quality customer service, accessible language and multilingual support.

This service should be created using a design process that centres equity-seeking groups and should be prototyped with users to ensure usability.

Implementation options may include hosting the service on the City of Burnaby’s website, partnering with cities and other levels of government that already have concierge services, or providing referrals to specific agencies or member associations that serve particular constituencies (e.g., strata corporations, commercial buildings, landlords, non-profit housing, Indigenous housing, co-op housing).

The resulting concierge service should leverage established partnerships, with tailored pathways for specific building types and ownership structures.

This recognizes that a concierge service must be well informed of the requirements of specific building types (e.g., Part 3 and Part 9 buildings) and ownership structures such as strata corporations, which are complex corporations that have an extensive legislative framework and management processes (e.g., strata plans, property allocations and registered bylaws, easements, covenants, building schemes and amendments).

Because the need for concierge services is less understood with Part 3 buildings, Burnaby should also consider alternative models for supporting larger buildings such as Energy Star Portfolio Manager or Building Benchmark BC.

Supporting commercial building owners in applying for funding, navigating labour and skills shortages, and accessing resources to make **retrofit** plans and end-of-life capital equipment plans would be especially helpful.

WHO SHOULD THE CITY CONSIDER INVOLVING?

The City of Burnaby should research how the following services work and/or consider partnering with:

- Member associations such as the Building Owners and Managers Association of BC, the Condominium Home Owners Association of BC, the Aboriginal Housing Management Association, LandlordBC, the BC Non-Profit Housing Association and the Co-operative Housing Federation of BC.
- BC Hydro on reviving past programs that were designed to help commercial building owners recommission their buildings and to identify ways to reduce costs when electrifying or fuel switching given the sometimes-prohibitive costs of hydroelectricity.
- Part 9 buildings – Retrofit Assist (community energy association), Vancity Home Energy Advice (with City Green), CLEAResult (running income qualified program), Empower Me (offering multilingual concierge services), etc.
- Part 3 buildings – TAF Retrofit Accelerator, Audette, energy service company models (where a third party takes on risk and project implementation), etc.
- The Metro Vancouver Zero Emissions Innovation Centre, which is creating a **retrofit** accelerator for the region, and the strata **energy advisor** model (Metro Vancouver).
- Builders and contractors including the Homebuilders Association Vancouver, the Urban Development Institute and the Home Performance Contractor Network (for accessing qualified professionals for all types of buildings).

As it proceeds, Burnaby should also consider integration with the Government of BC's pending home energy labelling program, as well as the concierge programs of other BC municipalities to ensure program consistency across regions.

The Government of BC may also be planning an online platform to help homeowners diagnose energy efficiency in their homes, and Burnaby may wish to avoid investing in a large, custom online platform until these plans become clear.

HOW SHOULD THE CITY MEASURE SUCCESS?

Burnaby should evaluate the concierge service at set intervals after launch (e.g., within the first month, after six months, after one year), starting with evaluating the experiences of the first cohort recruited to use the service.

Possible success measures include:

- Number of registrants.
- Increased knowledge and understanding of **retrofits**.
- Increased engagement.
- Increased involvement of the many cultural communities living in Burnaby.
- Number and type of upgrades in buildings/homes.

- Replacement of **natural gas** heating/hot water.
- Nature of support.
- Reduction of stress and difficulties associated with home upgrades.
- Referral frequency and activity.
- Number of champions mentored within communities.

WHAT FIRST STEP(S) SHOULD THE CITY TAKE TO GET STARTED?

- Speak with the City of Vancouver and other municipalities that have implemented a concierge service to find out about lessons learned and to build momentum with other municipalities.
- Create the structure of the concierge service (if new service) or review options and pilot (if partnering with an existing service).
- Create a directory of services and resources with a partnership referral tree for each building ownership archetype that needs to be involved in the concierge program.
- Sign memorandums of understanding with existing partners who can provide specific services associated with the **retrofit** process.
- Similar to the Task Force, recruit individuals to be a part of a group to further develop this idea, with an emphasis on equity-seeking groups, other parties who may be hesitant about **retrofits** and organizations that represent constituencies for key building types (e.g., commercial, homeowners).
- Consider specifically creating a group for tenants so gaps can be identified and thoroughly considered at the beginning of the process.
- Host public information programs supported by partner agencies to introduce programs.
- Identify community champions and leaders and host change management workshops.

RECOMMENDATION 3 – AWARENESS CAMPAIGN AND COMMUNITY ENGAGEMENT

Launch a multilingual awareness and education campaign to explain the benefits and necessity of retrofits and the availability of concierge services, potentially including success stories, demonstrations and resources for a range of building types and circumstances.

WHY?

Many building owners have low awareness about energy efficiency, **carbon emissions** and the importance of stopping the use of conventional **natural gas**.

The current reliance on contractors to provide recommendations to building owners is resulting in the continued installation of **natural gas** furnaces, locking in emissions for the next generation. Contractor buy-in is essential to the success of Burnaby's **retrofit** strategy.

Due to the diversity of the population residing in Burnaby, their buy-in is essential for the City's success, requiring tailored messages about the benefits and need for retrofitting.

Without engagement, uptake of this opportunity will likely remain low, especially for historically vulnerable groups who may not have the privilege to immediately consider **retrofits** or don't have the language level to understand.

HOW WOULD IT WORK?

Burnaby should devise specific campaigns for each audience: single-family homeowners, commercial building owners, tenants, contractors, etc., with tailored outreach for each (e.g., on-the-ground community outreach vs. social media vs. running public demonstrations or events).

Recognizing that pilot programs with real buildings provide the best opportunity for education, the City of Burnaby should also showcase success stories from diverse building types and document the journey of **retrofit** "champions" within the community to facilitate cultural change and encourage peers to act.

The City of Burnaby may choose to provide funding assistance for initial buildings to participate in these pilots, prioritizing older systems for fuel switching.

The City of Burnaby's awareness campaign and community engagement should include all Burnaby residents and building owners, be delivered in plain language and accommodate all major languages spoken in Burnaby.

The City of Burnaby should include alternative formats of communication for people with disabilities—who make up 22 per cent of the Canadian population—including sign language videos and screen reader-friendly websites for people with visual disabilities.

WHO SHOULD THE CITY CONSIDER INVOLVING?

The City of Burnaby should consider partnering with:

- Multicultural organizations, disability organizations, seniors' organizations and Indigenous organizations (including working with these organizations to determine appropriate messaging and methods of communication).
- Climate leaders/organizers in Burnaby who have experience in equitable campaigning and can be a resource for the City (as well as a potential avenue to spread awareness).
- Similar partnerships as the concierge service, with the aim to involve the audiences Burnaby is trying to reach in shaping the campaign (e.g., organizations serving equity-seeking groups, neighbourhood houses, key community members who interact with groups such as a priest in a church, schools).
- Referrals from constituencies for specific building types and ownership structures (e.g., strata, rental, non-profit housing).

HOW SHOULD THE CITY MEASURE SUCCESS?

Possible success measures include:

- Information translated into many languages.
- Diversity of population groups engaged and participating in the **retrofit** program.
- Social media analytics.
- Number of community engagement sessions hosted.
- Number of people engaged (e.g., attended events).
- Number of people who sign up to learn more (for in-person engagements).
- Meeting baseline targets for each building category, measured at specific intervals after each campaign (e.g., three months, six months, one year).
- Successful completion of three pilot projects.

WHAT FIRST STEP(S) SHOULD THE CITY TAKE TO GET STARTED?

- Present campaign plans to existing consortiums of local organizations (e.g., Burnaby Board of Trade, Burnaby Intercultural Planning Table).
- Similar to the Task Force, recruit individuals to be a part of a group to further develop this idea, with an emphasis on equity-seeking groups and other parties who may be hesitant about **retrofits**.
- Evaluate campaigns done by the City of Burnaby in the past for other initiatives and gauge what went well and what could be improved to inform early planning.
- Decide what is within and outside capacity so limitations can be communicated to the partners who may be involved in the process.
- Decide key messaging for awareness campaigns and then reach out to the organizations mentioned above to work collaboratively with them on the education campaign.
- Identify three properties for upgrades.

RECOMMENDATION 4 – OPTIMIZE PERMITTING PROCESS:

Optimize the permitting process for all building types in ways that incentivize climate-friendly retrofit options such as heat pumps (e.g., fast-track permitting, streamlined processes) and discourage the use of fossil fuel gas (e.g., trigger contractors to present low-carbon choices to building owners during the application process).

WHY?

Permitting is within the City of Burnaby's jurisdiction, and permit delays can be extremely discouraging for property owners due to increased costs and unnecessary bureaucracy. Streamlining permitting or removing red tape for building owners who choose to engage in **retrofits** would send a signal that the City is a partner in the **retrofit** process and would provide a significant incentive to move faster on decarbonization projects.

HOW WOULD IT WORK?

The City of Burnaby should provide transparent information about how much time building owners will save compared with a traditional building permit, while ensuring that timelines are realistic and significant enough to actually incentivize action given the length of time required to make all necessary plans (financing, incentives, contractor, supply) and confirm the decision to proceed. Quantifying these time savings is necessary so that applicants can understand the level of incentive, given that "time is money". The City of Burnaby may wish to simplify and optimize the permitting process and/or prioritize permit fast-tracking for those energy-efficiency upgrades that are most effective in meeting the City's **retrofit** goals, including conversions to **heat pumps** (while recognizing that **heat pumps** on rooftop assemblies may result in changes to the roof decking, electrical services or weight loads). A process should be in place to ensure follow-through, especially if the City chooses to grant permits before the contractor is in place.

WHO SHOULD THE CITY CONSIDER INVOLVING?

The City of Burnaby should consider partnering with or speaking to:

- Building organizations and contractors.
- Other cities with experience in fast-track permitting (e.g., the City of Vancouver).
- Other cities reviewing their permitting processes, via the Local Government Retrofit Peer Network.
- Consultants required to certify safe operations.
- Technical Safety BC.
- BC Hydro.

HOW SHOULD THE CITY MEASURE SUCCESS?

Possible success measures include:

- Percent diverted (e.g., the percent of applicants who answer the following question on their permit application: “Would you have chosen to provide a **heat pump** within your **retrofit** if no fast-tracking was offered?”).
- Decrease in time required to obtain a permit.
- Number of air makeup units (used for hallway pressurization and air exchange) successfully converted to **heat pumps** so they can be used for both heating and **cooling**.
- Reduction of **carbon emissions** from buildings.

WHAT FIRST STEP(S) SHOULD THE CITY TAKE TO GET STARTED?

- Hire a City of Burnaby green building inspector.
- Establish a hierarchy of building permit lengths (with a plan for how to communicate this to people in a transparent way that doesn’t cause unnecessary backlash) and deprioritize traditional single-family home building permit lengths.
- Create a pilot program.
- Identify properties that are ready to conduct upgrades.
- Measure **cooling** and energy reductions.
- Raise awareness around how to trigger upgrades during certain types of building construction and renovations, such as roofing, **envelope**,²⁶ HVAC, etc.

²⁶ A **building envelope** refers to those elements that divide the home’s inside, conditioned spaces from the home’s non-conditioned spaces and the outdoors. See the full definition in the glossary (Appendix A).

RECOMMENDATION 5 – AVOID TENANT DISRUPTIONS AND EVICTIONS

Provide rules or resources to both landlords and tenants to mitigate tenant disruptions/evictions during retrofits.

WHY?

The risk of tenant disruptions and evictions due to **retrofits** is an equity issue. Residential disruption or renovation can destabilize families, reduce community resilience and cause some residents to leave Burnaby. Disruptions and evictions most often take place in multi-family rental buildings, housing co-ops and stratas, and tenants might not want to get involved with their landlords for fear of being evicted without reason. Tenant disruption and evictions due to **retrofits** can also be a reputational and political risk to the City of Burnaby if left unaddressed.

HOW WOULD IT WORK?

The City of Burnaby could provide resources that are complementary to tenant laws and landlord rights, in multiple languages and plain language, to support tenants to understand the **retrofit** process, send clear communications to tenants with information about their rights (triggered by the building permit application process) and help tenants overcome the risk of renovation if displacement is planned by landlords. It will be important for both tenants and landlords to receive the same information.

The City of Burnaby could inventory the kinds of building upgrades, integrate considerations of tenant rights in any **retrofit** program design that may lead to renovations (e.g., building upgrades for **heat pumps** and **cooling** should not result in tenant or occupant evacuation) and create an incentive program for building owners so they don't evict tenants during **retrofits** or implement temporary relocation programs for tenants if displacement is inevitable.

The City of Burnaby should also explore whether it has the power to establish vacancy controls.

In general, the City of Burnaby should be cognizant of its capacity to deliver and develop programming and carefully consider whether particular initiatives would be in-house, contracted out or led in partnership with local organizations.

WHO SHOULD THE CITY CONSIDER INVOLVING?

The City of Burnaby should consider partnering with or contacting:

- LandlordBC and other landlord associations of residential and commercial properties.
- Tenant Resource and Advisory Centre.
- Business improvement associations whose members are commercial businesses in communities.
- The Government of BC (e.g., to explore vacancy controls or the possibility of including in the Residential Tenancy Act a provision that **retrofits** are not grounds for renovation).

- Local organizations that support communities and have expertise in multiple languages and vulnerable/equity-seeking populations.
- Efficiency Canada (developing research of tenant disruption due to **retrofits**).

HOW SHOULD THE CITY MEASURE SUCCESS?

Possible success measures include:

- No rental or occupancy terminations take place.
- No increase in renoventions of renters due to **retrofits**.
- No untenable rent increases in rental housing due to **retrofits**.
- Monitor and manage the number of tenants being temporarily displaced because of **retrofits**.
- Monitor and manage the number of tenants benefiting from the temporary relocation program.
- Increased number of rental spaces available as a result of **retrofit** programming.

WHAT FIRST STEP(S) SHOULD THE CITY TAKE TO GET STARTED?

- Partner with the BC Residential Tenancy Branch and Technical Safety BC to establish base requirements.
- Meet with the groups mentioned above to develop resources, identify potential buildings for relocation and develop a relocation program to mitigate disruption to residential and commercial tenants.
- Get involved with local organizations that support communities and have expertise in multiple languages and vulnerable/equity-seeking populations.

RECOMMENDATION 6 – REVIEW AND AMEND BYLAWS

Review City bylaws (e.g., noise, permitting) and clarify, adapt or simplify them to facilitate retrofits.

WHY?

Reviewing and amending City bylaws would send a strong signal about Burnaby's commitment to **retrofits** and would create an enabling environment by reducing friction points and increasing incentives for low-**carbon** upgrades (e.g., installing electric **heat pumps**, insulation, electrical upgrades, air sealing, window/door replacements).

HOW WOULD IT WORK?

The City of Burnaby could start by doing a thorough review of all bylaws related to renovations, construction, installation, noise and aesthetics to identify barriers to **heat pumps** and low-**carbon** upgrades, as well as opportunities for streamlining and added flexibility (e.g., review existing noise bylaws to ensure they accommodate **heat pumps**). This could occur during the review of every bylaw that the City's Public Safety department is currently performing to optimize the use of staff resources.

The City of Burnaby should make its bylaws clear and well communicated, and ensure that contractors are aware of changes that enable easier **heat pump** installation.

The City of Burnaby could create policies to accelerate the replacement of **natural gas** heating and hot water systems with electric alternatives taking into account life-cycle costing (e.g., new construction, renovations of a certain scale, end-of-life replacement, densification permits).

WHO SHOULD THE CITY CONSIDER INVOLVING?

The City of Burnaby should consider partnering with, researching or contacting:

- City of Burnaby Public Safety Department (general manager: David Critchley).
- City of Vancouver and Metro Vancouver to see what they are doing that Burnaby could replicate.
- US cities that may be able to provide examples.
- Construction industry stakeholders and contractors (to get their insights into what doesn't work and what would streamline the process, and to ensure that contractors have a full understanding of the changes being made and don't misinterpret them).

HOW SHOULD THE CITY MEASURE SUCCESS?

Possible success measures include:

- Reduction in total **carbon emissions** from buildings.
- Number of pieces of equipment replaced.
- Reduced timelines for installing **heat pumps** or doing other upgrades.

WHAT FIRST STEP(S) SHOULD THE CITY TAKE TO GET STARTED?

- Review of all bylaws related to buildings and noise.
- Review permitting processes.
- Consider a small advisory group (contractors, building owners, engineers, City staff) and run sprint sessions to deal with bundles of existing bylaws and permits for review.
- Form a staff team and external expertise to inform the creation of new bylaws and regulations.

RECOMMENDATION 7 – BC ENERGY STEP CODE STANDARDS

Accelerate the adoption of higher standards for the BC Energy Step Code and upcoming carbon pollution standard in Burnaby to increase the emissions performance of new buildings and reduce the need for future retrofits.

WHY?

Every new building not adhering to a higher step code is a building that will require **retrofits** in the future to achieve zero emissions.

HOW WOULD IT WORK?

The City of Burnaby should accelerate advancing an increase in the **BC Energy Step Code** for both Part 3 and Part 9 buildings and should establish new predetermined timelines to move up remaining steps (with the aim for new single-family homes to be built at step 5 immediately).

The City of Burnaby may also wish to:

- Define a low-**carbon** energy system in the BC Energy Step Code as **heat pump** only (Burnaby's current policy allows **electric baseboard heaters**²⁷).
- Encourage low-**carbon** energy systems/**heat pumps** in every step code decision (e.g., as part of the negotiations with developers, developers could receive extra floor area ratio in their density offset for doing this).
- Embrace greenhouse gas intensity metrics that will soon be released and further define how **embodied carbon emissions** can be reduced for new constructions.

WHO SHOULD THE CITY CONSIDER INVOLVING?

The City of Burnaby should consider partnering with:

- **BC Energy Step Code** Council.
- Government of British Columbia (provincial codes should evolve to enhance renewed building cycles on a five-year basis to accelerate attrition).
- Other municipalities via regional committees and the Energy Step Code Peer Network.
- Planners to figure out how to incentivize higher step codes (e.g., could there be additional floor area ratio for each increase in step?).

²⁷ A thin linear heating appliance that produces heat from an internal electric heating element, typically installed at the base of exterior walls under windows. See the full definition in the glossary (Appendix A).

HOW SHOULD THE CITY MEASURE SUCCESS?

Possible success measures include:

- Reduced **carbon emissions** from buildings.
- Number of buildings built to higher steps than base requirements.

WHAT FIRST STEP(S) SHOULD THE CITY TAKE TO GET STARTED?

- Review development regulations and rules around new developments.
- Match up timelines to the most aggressive municipalities in the Lower Mainland for each step that Burnaby has not yet reached for both Part 3 and Part 9 buildings (and communicate these timelines to industry).
- Implement changes as soon as possible while engaging on an ongoing basis and communicating clearly and transparently with builders.
- In the BC Energy Step Code, define a low-**carbon** energy system as **heat pump** only (Burnaby's current policy allows **electric baseboard heaters**).
- Adopt an appropriately ambitious level of the **carbon** pollution standard when available in early 2023.

RECOMMENDATION 8 – RETROFIT CITY-OWNED BUILDINGS

Retrofit all City-owned buildings to lead by example, showcase solutions and stimulate the retrofit market.

WHY?

Retrofitting City-owned buildings is entirely within the City of Burnaby's control, making it more doable compared with other actions. Starting **retrofits** with the City's own buildings would send a strong message about the City's commitment to climate action and contribute to its net-zero by 2050 target, making Burnaby a leader across the province of BC. Showcased **retrofit** buildings is also a key education tool, with the opportunity to use municipal buildings as pilot projects that are open to public scrutiny and access.

HOW WOULD IT WORK?

- Make visible, effective and forward-thinking changes so that future retrofitting needs are minimized.
- Create education centres in public buildings and showcase achievements through educational activities (e.g., interactive green building tours, forums for schools and community associations, real-time energy savings display).

WHO SHOULD THE CITY CONSIDER INVOLVING?

The City of Burnaby should consider partnering with, sharing awareness or consulting:

- City of Burnaby operations.
- External consultants to prioritize the portfolio and conduct a business case analysis (e.g., Affine Climate Solutions, Integral Group, SES Consulting).
- Community and industry associations for their awareness or engagement.
- Member associations (e.g., hosting of town halls, mentoring programs).
- Post-secondary institutions such as BCIT (e.g., use their buildings as learning labs, employ students, make communications assets).
- Building Benchmark BC.

HOW SHOULD THE CITY MEASURE SUCCESS?

Possible success measures include:

- Energy and emissions reductions.
- Community engagement.
- General uptake of Burnaby's **retrofit** program.
- Improvement on other indicators such as those in WELL Building Standard living buildings.

WHAT FIRST STEP(S) SHOULD THE CITY TAKE TO GET STARTED?

- Undertake a comprehensive portfolio assessment and analysis of buildings to prioritize and set a schedule for improvements.
- Pick a small, medium and large City-owned building to model and demonstrate applicable **retrofit** solutions.
- Look into bulk purchasing.

Section 6: Next Steps

Task Force spokespeople will present their final recommendations to Burnaby City Council in summer 2022. The City has committed to publicly respond to these recommendations as it develops its Zero-Emission Building Retrofit Strategy, estimated to be ready in spring 2023. The Task Force will reconvene in 2023 to review the City of Burnaby's draft **retrofit** strategy and provide feedback on the strengths and weaknesses of the strategy and the extent to which it satisfactorily implements the Task Force's recommendations.

Appendix A: Glossary of Terms

The definitions below are adapted from the following online resources: [Natural Resources Canada's EnerGuide Housing Glossary](#), [BPC Green Builders' glossary of green building terms](#) and [Canadian Urban Sustainability Practitioners' website](#).

Active System (©Green Builders Glossary)

In a home, an active system is one that requires mechanical energy to work. Heaters and air conditioners are part of an active HVAC system. The opposite of an active system is a passive system.

Building Code, BC Energy Step Code (©Green Builders Glossary)

A building code is a set of minimum standards for construction of a building. Building codes often pertain to structural and fire safety. Building codes are generally set at the provincial level and help ensure that all construction meets an agreed-upon minimum standard of safety and comfort.

The term *building code*, as it is commonly used, rarely, if ever, pertains to green building standards, as those are always higher than building codes.

The [BC Energy Step Code](#) is an optional compliance path in the BC Building Code that local governments may use, if they wish, to incentivize or require a level of energy efficiency in new construction that goes above and beyond the requirements of the BC Building Code. Builders may voluntarily use the BC Energy Step Code as a new compliance path for meeting the energy-efficiency requirements of the BC Building Code.

Building Envelope (©Green Builders Glossary)

A building envelope is one of the most vital parts of an energy-efficient home and is important to understand.

A building envelope refers to those elements that divide the home's inside, conditioned spaces from the home's non-conditioned spaces and the outdoors. Conditioned spaces are the parts of your home you use energy to heat and/or cool.

Non-conditioned areas of the home usually include the garage, porch and deck, and sometimes the attic.

Elements of a home's envelope include the foundation, exterior walls and framing, insulation, air sealing, vapour barriers, wind barriers, drainage planes, exterior windows and doors, attic floor and/or roof.

The quality of a home's envelope, including its strength, insulative qualities, airtightness, and ability to act as a vapour/moisture barrier are critical to a green home's energy performance, indoor air quality, comfort and health.

Green homes have envelopes with superior insulation and that are essentially airtight. The insulation and airtight nature of the envelope is, in large part, what makes your home energy efficient.

Carbon Dioxide (CO₂) (©Green Builders Glossary)

Carbon dioxide, or CO₂, is the most prevalent of the greenhouse gases. It is primarily created by burning fossil fuels, but it can also come from other sources such as burning biomaterials like wood and occurs naturally from sources including animal respiration, ocean-atmosphere exchange and volcanic activities.

Carbon (Greenhouse Gas) Emissions

The amounts of carbon dioxide, methane and nitrous oxide that are produced directly, by burning fossil fuels, or indirectly, through the consumption of electricity. Greenhouse gas emissions are expressed in carbon dioxide equivalent units (CO₂e). Greenhouse gas emissions are calculated by multiplying the quantity of fuel or electricity used in your home by the emission factors for the particular energy source. Electricity emission factors vary by province because there are different emissions associated with each province's method of producing electricity. One tonne of greenhouse gas emissions is equivalent to the CO₂ emissions produced by driving an average-efficiency mid-sized vehicle from Toronto to Vancouver.

Electric Baseboard Heater

A thin linear heating appliance that has openings at the top and bottom through which air circulates and collects heat from an internal electric heating element. It is typically installed at the base of exterior walls under windows. Electric baseboard heaters rely on the natural convection of heated air to distribute heat. These units are available in different lengths, suitable to the heating requirements of a room. Electric baseboard heaters consume a lot of electricity. Each baseboard heater normally requires its own dedicated electric circuit. The easy installation of this wiring is a factor in evaluating the cost of the system. In newly constructed structures or buildings, baseboard heating usually has the lowest initial cost compared with other systems, but often has very high operating costs.

Embodied Carbon (©Green Builders Glossary)

Embodied carbon (CO₂ or CO₂E of greenhouse gases) is the carbon emitted into the atmosphere during the growth, mining, extraction, harvesting, transport, manufacturing and distribution of a building material.

Embodied carbon does not include any carbon emissions the building material or product creates when in use after the home is finished, such as from a coal, oil or gas furnace. Those emissions are called operational carbon.

Energy Advisor

Energy advisors, sometimes known as EnerGuide rating service energy advisors, are independent experts in energy efficiency for homes. They are affiliated with professional organizations across the country that work with Natural Resources Canada to deliver the EnerGuide rating system.

Energy Poverty

Energy poverty refers to the experience of households or communities that struggle to adequately heat and cool their homes and power their lights and appliances. Those in this situation face multiple challenges and impacts, including:

- Discomfort and health impacts from living in cold and drafty homes.
- Disruptions and mental health stress from abrupt utility shut-offs, such as inability to cook and spoiled food.

- Sacrificing other essentials such as groceries and medication to keep up with energy bills.
- Increased incidence of respiratory illness in children and infants.
- Higher stress and poor mental health outcomes for adults.
- Difficulty participating fully in community life.

Heat Pump (©Green Builders Glossary)

A heat pump is a home heating and cooling device that is energy efficient because it transfers (or pumps) heat into or out of a home. Transferring heat energy is more energy efficient than generating heat energy. Most devices that people call heat pumps are technically air-source heat pumps, which is just one kind of heat pump. There are also geothermal heat pumps, also called ground-source heat pumps, which use the earth several feet below the surface or the frost line, which maintains a constant temperature of between 10 C and 13 C year-round, to help warm a home during the winter and to cool a home during the summer.

Heat-Pump Water Heater (©Green Builders Glossary)

A heat-pump water heater uses a heat-pump system to transfer latent heat from the air or ground, to assist in the heating of hot water in the home. This reduces or eliminates the need for a secondary source of heating such as gas or electric power. Heat-pump water heaters use insulated tanks, as most conventional hot water systems do.

Mould

A fungus that grows on surfaces or in materials as a result of damp conditions; it can have serious health implications for occupants if it occurs in a home. If you suspect mould growth in your home, it must be thoroughly removed, the affected areas cleaned and disinfected, and contaminated materials properly disposed of. To control and reduce the potential for mould growth, control sources of moisture, maintain indoor humidity at recommended levels and remedy water infiltration and leakage.

Natural Gas

A mixture of gaseous combustible hydrocarbons made up mostly of methane but also smaller amounts of ethane, propane and butane. Natural gas is piped to buildings for space heating, domestic hot water, cooking, fireplaces and clothes drying.

Renewable Energy

Renewable energy is energy obtained from natural resources that can be naturally replenished or renewed within a human lifespan—that is, the resource is a sustainable source of energy. Some natural resources, such as moving water, wind and sunshine, are not at risk of depletion from their use for energy production. Biomass, however, is a renewable resource only if its rate of consumption does not exceed its rate of regeneration. A wide range of energy-producing technologies and equipment have been developed over time to take advantage of these natural resources. As a result, usable energy can be produced in the form of electricity, industrial heat, thermal energy for space and water conditioning, and transportation fuels.

Retrofit

Retrofitting is the process of modifying something after it has been built. There are four main types of building retrofits related to energy efficiency and emissions: replacing windows, improving insulation, reinforcing airtightness (how much air escapes from a building) and installing more efficient space and water heating equipment (such as heat pumps). Many low-carbon energy source and energy-efficiency retrofits are supported by provincial and federal government grants and incentives.

Space Cooling, Air Conditioning, Cooling and Cooling Systems

The cooling of the rooms or spaces within a building. Air conditioning is a good example of where oversizing is clearly detrimental to comfort, cost of operation and equipment performance. An oversized system will lower house temperature too quickly without removing excess humidity. The result is a house that is cool and damp, which in turn can promote mould growth and musty odours. Higher indoor temperatures (e.g., 26 C/79 F) with

reduced humidity levels are more comfortable and allow for more energy savings.

Air conditioners should be serviced and maintained regularly. They become inefficient when the inside coil is dirty, when the airways on the outdoor condenser unit are blocked and when the refrigerant level runs low. You can do some simple maintenance yourself. For example, clean or change the air filter, and keep the outside condenser free from obstructions such as plants and leaves. In addition, a service contractor should periodically maintain your unit. Check your owner's manual for information on maintenance.

Appendix B: Full Terms of Reference



TERMS OF REFERENCE ZERO-EMISSIONS BUILDING RETROFIT TASK FORCE

Urban Resilient Futures Burnaby

Last updated: February 17, 2022

The City of Burnaby's Retrofit Agenda

In 2019, Burnaby City Council declared a climate emergency and announced seven “big moves” to accelerate climate action, including Zero-Emissions Building Retrofits. This reflects the reality that buildings emit close to a third of all greenhouse gasses within Burnaby city limits, and that many existing commercial and residential buildings will still be present for decades to come, making retrofits an essential part of achieving City Council's target to achieve carbon neutrality by 2050.

Task Force Mandate and Outcomes

Taking place under the auspices of the Urban Resilient Futures Burnaby initiative, the Zero-Emissions Building Retrofit Task Force (Task Force) will play a key role advancing the City of Burnaby's retrofit agenda, with a mandate to:

- Make recommendations to Burnaby City Council for “quick starts” and long-term actions to shape Burnaby's Zero-Emissions (ZE) Building Retrofit Strategy, with a goal to accelerate greenhouse gas reductions through the creation of a robust market to retrofit commercial and residential buildings, as well as to examine how different policy options can improve outcomes for equity-seeking communities and residents who face heightened vulnerability to the impacts of climate change.
- Identify actions the City and community groups can take to advance shared retrofit goals and incubate demonstration projects for innovative practices in areas such as awareness, construction and financing.
- Inform the design of a retrofit awareness campaign that will be carried out under the auspices of the Urban Resilient Futures Burnaby program.

Composition of Task Force

Simon Fraser University's Morris J. Wosk Centre for Dialogue will design and facilitate the Zero-Emissions Building Retrofit Task Force in partnership with the City of Burnaby and Vancity. Task Force members will include representatives from the City of Burnaby and Vancity, the construction and trades sectors, utilities, leading experts in building electrification, decarbonization and retrofits, residential and commercial building owners/operators, individuals reflecting the needs of impacted residents, intergovernmental representatives and other relevant stakeholders.

Terms for Task Force Member Participation

Task Force members will:

- Participate in 7 half-day online meetings, scheduled as follows:
 - Meeting 1: Wednesday March 30, 2022 (1-4pm)
 - Meeting 2: Wednesday April 13, 2022 (1-4pm)
 - Meeting 3: Wednesday May 4, 2022 (9am-12pm)
 - Meeting 4: Wednesday May 11, 2022 (2-5pm)
 - Meeting 5: Wednesday May 25, 2022 (3-6pm)
 - Meeting 6: Tuesday June 7, 2022 (1-4pm)
 - Meeting 7: Wednesday June 29, 2022 (1-4pm).
- Vote on the approval of final report and recommendations for public release.
- Assign spokesperson(s) to present final recommendations to Burnaby City Council (anticipated for July 2022) and liaise with news media about recommendations.
- Reconvene once in 2023 to provide feedback on the City's draft Zero-Emissions (ZE) Building Retrofit Strategy and give further advice on ways to engage building owners and residents.
- Be eligible to receive accessibility supports to reduce barriers to participation such as reimbursement of special child care arrangements or closed captioning.
- Be eligible to receive an honorarium of \$200 per meeting, except where already financially supported to participate through existing paid employment.

About Urban Resilient Futures Burnaby

Urban Resilient Futures Burnaby puts people at the centre of climate action. Stewarded by Simon Fraser University's Morris J. Wosk Centre for Dialogue in partnership with the City of Burnaby and Vancity, the initiative will work with the City of Burnaby, residents and stakeholders to accelerate a just transition to a resilient, low-carbon future. Planned activities include a Zero-Emissions Retrofit Task Force, Neighbourhood Climate Action and Awareness Projects, and a Citizens' Assembly on Livable and Resilient Neighbourhoods.

More information: <https://www.sfu.ca/dialogue/programs/urban-sustainability/urban-resilient-futures>



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