P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Item No. 13.1.1
Environment and Sustainability Standing Committee
March 7, 2024

TO: Chair and Members of the Environment and Sustainability Standing Committee

SUBMITTED BY: Original Signed

Cathie O'Toole, Chief Administrative Officer

DATE: February 13, 2024

SUBJECT: **Proposed Amendments to the Nova Scotia Building Code Regulations**

ORIGIN

Staff-initiated report.

LEGISLATIVE AUTHORITY

Halifax Regional Municipality Charter, SNS 2008, c 39:

7A The purposes of the Municipality are to (a) provide good government; (b) provide services, facilities, and other things that, in the opinion of the Council, are necessary or desirable for all or part of the Municipality; and (c) develop and maintain safe and viable communities.

Building Code Act, RSNS 1989, c 46:

4 (1) The Minister may make such regulations as are considered necessary or advisable for the purpose of establishing a Building Code governing minimum standards for the construction and demolition of buildings…(a) adopting by reference the National Building Code of Canada 1985 or any change thereto or any other code or requirement issued by the National Research Council, or any change thereto, in whole or in part with such modifications and additions as may be specified in the regulations, and requiring compliance with it as adopted;

4 (2) Upon the recommendation of the council of a municipality, the Minister may, by regulation, prescribe additional standards applicable to the construction or demolition of buildings in that municipality, where such standards are more stringent than the standards in the Building Code or relate to matters not regulated by the Building Code.

RECOMMENDATION

It is recommended that the Environment and Sustainability Standing Committee recommend that Halifax Regional Council request that the Mayor write a letter to the Minister of Municipal Affairs and Housing urging timely action on the adoption of the 2020 National Building Code.

BACKGROUND

On August 14, 2023, the Province of Nova Scotia released a list of proposed amendments to the Nova Scotia Building Code Regulations to align them with the 2020 National Building Code and 2020 National Energy Code for Canada for Buildings. A key component of this proposal was the integration of the 2020 national codes' (NBCs) tiered energy performance compliance scheme. This scheme is designed to guide the building sector toward net-zero emissions by mandating minimum standards for the construction of new buildings – ensuring they are built to comply with progressively rigorous energy efficiency benchmarks. In its proposal, the province presented its plan to begin mandating – on January 1, 2024 – the least stringent of the NBCs' compliance tiers (tier 1), followed by the rollout of tiers 2 and 3 over the next four years.[1]

Although the proposal represented a positive step toward decarbonizing Nova Scotia's building sector, this tier adoption pathway outlined by the province fell short of the regulatory action needed to keep the municipality and province on track with their respective 2030 emissions reduction targets. Through HalifACT, the municipality has a community target of a 75% emission reduction from 2016 levels by 2030. Through the provinces Environmental Goals and Climate Change Reduction Act, there is a community target of a 53% emissions reduction over 2005 levels by 2030. Consequently, on September 29, 2023, in response to the Province's call for public comments, the Municipality submitted feedback requesting that the proposal be modified to allow municipalities in Nova Scotia the ability to adopt the more stringent, upper tiers of the NBCs (tiers 4 and 5), according to their needs. This recommendation was supported by an analysis conducted by Sustainable Solutions Group (SSG) consultants (Attachment 1), who were initially contracted to develop the energy and emissions model for HalifACT, the municipality's climate action plan. No response from the province regarding the request has been received.

On December 28, 2023, the Province of Nova Scotia announced that it is indefinitely postponing the adoption of the 2020 NBCs, stating that this delay will allow time for more education and training within industry.[2]

DISCUSSION

In 2016, fuel and electricity consumption in residential, commercial, and industrial buildings accounted for 77% of the municipality's total emissions.[3] To address this, HalifACT establishes several targets aimed at reducing the environmental impact of the building sector. One of these targets is to achieve 100% net-zero new construction of all corporate and community buildings within HRM by 2030. Given the scale of the building sector's carbon footprint, meeting this target is essential to accomplishing HalifACT's broader objectives of a 75% percent reduction in community-wide emissions by 2030 and net-zero emissions by 2050.

The province's decision to postpone adopting the 2020 NBCs poses a significant obstacle in realizing these HalifACT targets. To achieve net-zero new construction by 2030, the municipality needs to proactively work toward mandating net-zero buildings. Postponing the implementation of the NBCs undermines the utility and overall efficacy of regional initiatives geared towards accelerating the transition to net-zero emissions buildings. This is particularly true in the context of the recently inaugurated Building to Zero Exchange (BTZx), a membership-based coalition formed in October of 2023 to help expedite Nova Scotia's building sector transformation to net-zero. A core function of the BTZx is to support governments in maximizing the potential of their policy and regulatory authority to mobilize net-zero buildings as a vehicle for job creation, economic development, and climate action[4]. As a founding partner and member of BTZx, the municipality

[1] Nova Scotia Building Code Proposed Regulations. 2023. https://novascotia.ca/building-code-regulations-public-notice/building-code-proposed-regulations.pdf
[2] CBC News Nova Scotia. 2023. https://www.cbc.ca/news/canada/nova-scotia/national-building-codes-ns-delay-1.7070448
[3] HalifACT 2050: Acting on Climate Together. 2020. https://www.halifax.ca/sites/default/files/documents/city-hall/regional-council/200623rc916.pdf
[4] Building to Zero Exchange. 2022. https://www.buildingtozero.ca/members-2

would typically be well-positioned to capitalize on this opportunity. However, delaying the adoption of the 2020 NBCs further delays the adoption of more stringent energy performance requirements aligned with HalifACT. This delay also impacts the long-term health, wellbeing, and prosperity of HRM residents.

Sustainable Regional Development

Beyond emissions reductions, the SSG analysis outlines how adopting the NBCs and then progressing through the tiers will promote sustainable regional development. Specifically, it highlights the distinct advantages in relation to the following issues:

- Affordability and Energy Poverty: The analysis underscores the significant opportunity cost faced by property owners and occupants if new buildings are not constructed to meet higher performance standards. It emphasizes that while constructing a new building to adhere to the more stringent performance tiers of the codes may increase costs by 0-10% for developers, this cost differential is approaching parity, and that the cost of retrofitting a building later to achieve these enhanced performance levels can be 3-5 times more than the initial capital expenditure. Additionally, it notes that buildings that meet the upper energy efficiency thresholds of the NBCs can yield operating costs savings of up to 80% over a 30-year period. Together, these capital and operating expense savings can help to alleviate energy insecurity and affordability challenges experienced by residents in the municipality.

- Economic Development: The analysis outlines the long-term economic advantages linked to mandating high performance buildings. In citing the positive economic impacts realized in Vancouver from net-zero ready building policies, it stresses that proceeding promptly with implementing the upper tiers of the NBCs is critical to ensuring the local building industry remains competitive in the rapidly evolving green buildings market.

- Electricity Decarbonization: The analysis highlights that mandating higher tier-conforming buildings is important to mitigating challenges associated with decarbonizing the region's electricity grid. By operating more energy efficiently, buildings that meet the upper compliance standards of the NBCs can help offset heightened electricity demand occurring from the electrification of energy-intensive sectors such as heating and transportation. Given the municipality's rapid population growth, such offsetting will become increasingly critical to meeting residents' energy needs.

- Resilience: The analysis points out that high performance buildings are more resilient to extreme weather events. It notes that attributes such as thicker building envelopes, lower glazing ratios, and reduced incidences of thermal bridging enable high performance buildings to sustain habitable indoor temperatures over longer periods with less energy than their lower performance counterparts. These attributes will help to improve community resilience to power outages and other weather-inflicted challenges**.**

Health and Wellbeing

The analysis also outlines the importance of applying the upper tiers of the NBCs on community health and wellbeing. It does so by touching upon several of the many health benefits high performance buildings offer to their occupants – improved air quality, better temperature moderation, and reduced noise.

CONCLUSION

The timely adoption of the NBCs and subsequent tiers are critical to achieving the HalifACT target of 100% net-zero new construction by 2030 and ultimately net-zero community emissions by 2050. By delaying the implementation of the NBCs, the province is impeding the municipality's ability to make necessary progress toward accomplishing these HalifACT objectives. Approving the recommendation presented in this report signals to the province and the wider HRM community that the municipality is committed to meeting its

climate action goals in a manner that prioritizes the long-term prosperity of its residents.

FINANCIAL IMPLICATIONS

There are no financial implications associated with this recommendation report.

RISK CONSIDERATION

No risk considerations were identified.

COMMUNITY ENGAGEMENT

Significant community engagement was completed during the development of the HalifACT plan, and stakeholder engagement remains a key aspect of the plan's ongoing implementation.

ENVIRONMENTAL IMPLICATIONS

As mentioned throughout the report, achieving the HalifACT target of 100% net-zero new construction by 2030 is essential to accomplishing HalifACT's broader emissions reduction objectives. The total emission reduction potential associated with meeting this target is 360,000 tCO2e.[5] This amount is equivalent to approximately 10% of the total emissions reductions resulting from HalifACT in 2050.

ATTACHMENTS

Attachment 1: Regarding the Proposed Building Code Amendments Response by Halifax Regional Municipality

---

A copy of this report can be obtained online at halifax.ca or by contacting the Office of the Municipal Clerk at 902.490.4210.

Report Prepared by: Nick Tweel, Jr. Environmental Professional, Environment & Climate Change, 782.641.1790
Kevin Boutilier, Manager, Clean Energy, Environment & Climate Change, 902.719.8567

[5] Halifax Regional Municipality: Low Carbon Technical Report. 2020. https://cdn.halifax.ca/sites/default/files/documents/about-the-city/energy-environment/Technical%20Report.pdf

SUSTAINABILITY SOLUTIONSGROUP

September 25, 2023

Regarding the Proposed Building Code Amendments Response by Halifax Regional Municipality

Summary

Halifax's climate action plan, HalifACT, provides an economic and environmental case for requiring high performance residential and non-residential buildings across the region.

Halifax requests that the Province **modify the regulation to allow municipalities in Nova Scotia to adopt upper tiers of the building code, according to their context.** This approach draws on a successful implementation of similar tiered codes in British Columbia, and aligns with policy approaches by other cities across North America, including Vancouver, North Vancouver, Seattle, Boston, Toronto, New York, Brampton, Markham and others. Halifax is experiencing rapid growth and it is critical that the new houses and buildings align with Halifax's GHG targets, rather than impose the burden of additional GHG emissions reductions on other sectors. Specifically, the rationale for this request includes the following justifications:

1. **Achieve HalifACT's GHG targets**: The proposed building code amendments could result in an increase in GHG emissions by more than 70,000 tCO2e annually by 2026 from new residential construction in Halifax alone. Additional emissions will result from non-residential buildings. This number will continue to increase as additional homes and buildings are added to the building stock without higher performance requirements. The ability for municipalities to adopt higher standards would also contribute to the Province's GHG targets.
2. **Ensure that housing is affordable in the Halifax region:** High performance buildings can result in an increase in construction costs ranging from 0%-10% with ongoing operating costs savings over 30 years of up to 80%. In Nova Scotia, professionals indicate that if the energy performance requirements are a design consideration, the construction cost differential can be minimal or zero.
3. **Leverage the expertise and experience of the building industry**: Halifax has leading expertise in Canada in high performance buildings that will provide a foundation of expertise for adopting higher tiers.
4. **Ensure that Halifax's economy is competitive regionally, nationally and globally:** High quality buildings that are affordable over the long term and protect homeowners and building owners from volatile energy prices and extreme weather conditions, make the province attractive for living and working.

5. **Avoid the need for costly retrofits of recently built housing stock:**. It is more cost effective to build high performance buildings than to retrofit post-construction.
6. **Increase the resilience of buildings to severe weather impacts:** High performance buildings are safer for occupants.
7. **Decrease the costs of decarbonising the electricity system**: High performance buildings reduce the costs of decarbonising the electricity system, reducing the cost of electricity.

1 Proposed Amendments

The Government of Nova Scotia is seeking input on Proposed Building Code Amendments, which include adopting the National Building Code, the National Plumbing Code and the National Energy Code for Buildings. The amendments include adopting Tier 1 of the National Building Code and the National Energy Code in 2024, Tier 2 for the National Building Code (2025) and the National Energy Code (2026) and Tier 3 for the National Building Code (2026) and the National Energy Code (2028).[1] There is no timeline specified for the adoption of Tier 4 and Tier 5. No assessment of the GHG impacts of this regulation is available, nor is a cost benefit analysis. The rationale for the proposed approach to implementing the tiers is confidential.[2]

This response addresses the energy performance requirements as determined by the tiers and their adoption timeline.

About Tiered Codes[3]

In the past, building codes have established the minimum standard of construction – they defined the lowest standard for constructing a building in a given jurisdiction. Tiered codes, first introduced in British Columbia in 2017 with its Energy Step Code, offer a different approach to achieving increased energy efficiency in buildings.

With a tiered code, the provinces, territories, and municipalities with jurisdiction over building construction, have greater flexibility in how they implement the building code. This aspect of the tiered codes is particularly valuable for two reasons: 1. Tiered codes eliminate the need for developing unique building codes to pursue their jurisdiction's specific energy efficiency objectives. 2. Municipalities looking to implement aggressive energy efficiency and carbon reduction strategies can easily choose a tier that meets the knowledge and capacity of their community.

2 HalifACT's GHG Targets Require the Adoption of Higher Tiers.

[1] Schedule A, B and C revise the regulations with the tier requirements but do not include a timeline. The timeline for the tier requirements are described in a document (PDF) distributed by email provided by the Building Code Coordinator. The schedules are available here: https://novascotia.ca/building-code-regulations-public-notice/building-code-draft-amendments.pdf

[2] Personal communication with the Building Code Coordinator.

[3] Efficiency Canada. Codes4Climate. Retrieved from: https://codes4climate.efficiencycanada.org/

On June 23, 2020, Halifax Regional Council unanimously adopted HalifACT – a transformational plan to achieve a net-zero economy by 2050.[4] HalifACT was developed by municipal staff, members of the municipality's climate action community, technical modelling and analysis and significant public engagement.

Stakeholder engagement and public consultation is important for evaluating the complex issue of climate change and finding solutions. The HalifACT team held meetings in 2019 with over 250 internal and external stakeholders, including all levels of government, utilities, non-profits and advocacy groups, academic institutions, educators, industry, Mi'kmaq and African Nova Scotian communities, Acadian groups, youth and more.

HalifACT is a foundational element of the region's economic development strategy. A dedicated municipal tax allocation, the Climate Action Tax, represents an unprecedented investment by citizens in climate action. Halifax Regional Municipality and Halifax Partnership announced the launch of the CEO Climate Action Charter,[5] a key element of the five-year Economic Strategy.

2.1 HalifACT Targets for New Construction

HalifACT includes GHG reduction targets in each sector, including new construction, targeting 100% net-zero new construction by 2030. If the building sector fails to achieve its targets, there is increased pressure for additional GHG reductions in other sectors.

To achieve net-zero new construction, HalifACT establishes a target of Passive House levels of performance for residential homes and aligns with the approach applied by the Toronto Green Standard (TGS) for non-residential homes.

The best pathway to achieve these targets is for Halifax to apply the higher tiers of the NBC, which achieve 60-70% energy savings. The lower tiers of the NBC do not align with HalifACT's targets.

[4] HalifACT can be accessed here: https://cdn.halifax.ca/sites/default/files/documents/about-the-city/energy-environment/HRM_HaliFACT_vNew%20Logo_.pdf

[5] Halifax Partnership (2023). Halifax leaders unite to launch CEO Climate Action Charter. https://halifaxpartnership.com/news/article/halifax-leaders-unite-to-launch-ceo-climate-action-charter/

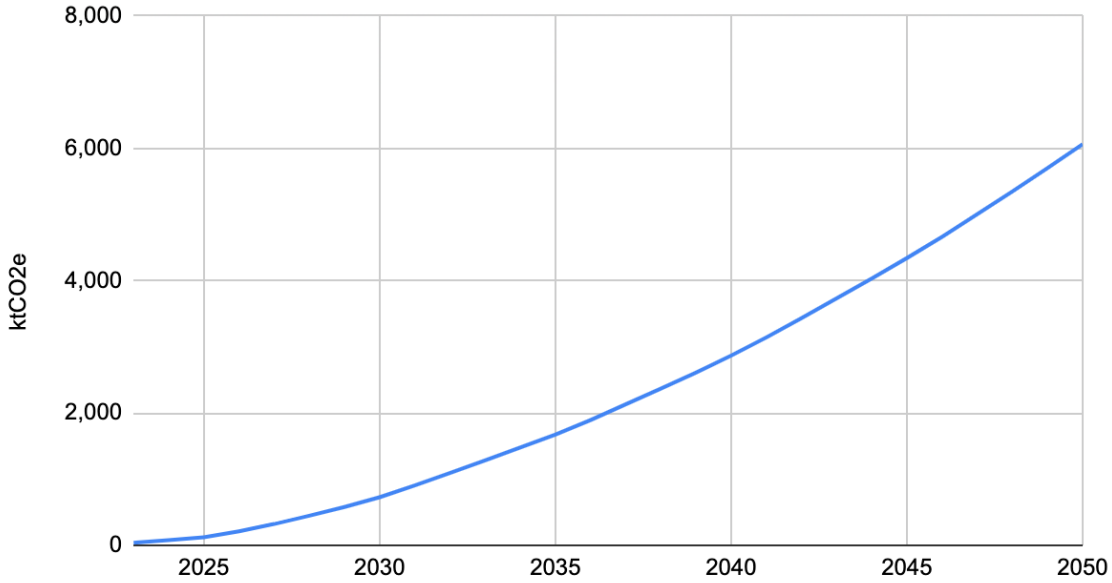
2.2 GHG Reductions from HalifACT's New Construction Action

The demand for new homes and workspaces is driven by population growth. The population is projected to grow from 440,000 to 570,000 between 2016 and 2050, resulting in a growth of the building stock of 20%.[6]

Table 1. Projected Growth in HalifACT Climate Action Plan

	By 2050
New dwellings	69,861
New commercial floor space	1,301,788

High performance new construction across all building types results in **9% of the total GHG reduction opportunities identified in HalifACT, or 6 million tonnes (MtCO2e) between 2023 and 2050.** This cumulative total is equivalent to just under half of Nova Scotia's total GHG emissions in 2021.[7]



[6] The HalifACT analysis was completed in 2020 and the rate of growth in Halifax has accelerated in the last two years.

[7] Nova Scotia's GHG emissions totalled 14.6 MtCO2e in 2021. For details, see: Government of Nova Scotia (2023). Urgent Times, Urgent Action. The Annual Progress Report on the Environmental Goals and Climate Change Reduction Act and Nova Scotia's Climate Change Plan. Retrieved from: https://novascotia.ca/nse/progress-report/docs/ns-climate-change-plan-progress-report-2023.pdf

Figure 3. Cumulative GHG emissions reductions resulting from the new construction targets in HalifACT.

Halifax will not be able to achieve the GHG targets in HalifACT with the proposed adoption process for the tiers identified by the Province. **Assuming 3,000 homes are added to Halifax each year[8], Tier 1 of the building code will add 26,000 tCO2e of GHG emissions annually, and 320,000 GJ of new energy consumption.[9]** While the proposed adoption of Tier 2 in 2025 (-10%) and of Tier 3 in 2026 (-20%) will reduce this total incrementally, total GHG emissions could increase by more than 70,000 tCO2e by 2026 from residential buildings in Halifax alone, as illustrated in Table 2. Emissions and energy totals from non-residential buildings will further increase this total.

Table 2. Calculation of the GHG impact of new housing in Halifax

Year	# of new homes	Building Code Tier	GHG emissions per household (tOC2e)[10]	GHG emissions per household (tOC2e)
2024	2,900	Tier 1	9	26,100
2025	2,900	Tier 2	8.1	23,490
2026	2,900	Tier 3	7.2	20,880
Total	**8,700**		**24.3**	**70,470**

2.3 The Economic Case

HalifACT's GHG targets for new construction are a **"no-regrets' policy**, with an abatement cost of -$26 per tonne. The abatement cost means that for every tonne of emissions reductions, $26 is saved in reduced energy expenditures and avoided carbon price expenditures, even assuming an incremental construction cost. Over the next 25 years, incremental expenditures on the construction of high performance homes and buildings under HalifACT's actions are projected to total $560 million; this is more than offset by energy

[8] CMHC reported 2,914 housing starts in 2022 in Halifax. CMHC (2023). Housing Market Information Portal. Retrieved from: https://www03.cmhc-schl.gc.ca/hmip-pimh/en#Profile/0580/3/Halifax

[9] Based on a calculation of an annual average of 9 tCO2e per dwelling unit and 111 GJ per house, calculated as part of HalifACT.

[10] For the purposes of illustration it is assumed the energy savings in the tiers of the National Building Code translate into equivalent GHG emissions reductions. In reality there is not a one to one relationship.

and carbon price savings of $670 million, for a net benefit of $110 million.[11] The incremental expenditure reflects a cost premium for net zero homes, however there is increasing evidence that the cost premium can be minimal, which will further improve the financial return.[12]

In addition to direct savings to those who live, work or own the houses or buildings, there are also financial benefits that result from avoiding damages from climate change, given that each tonne of GHG emissions results in economic damage. **The value of the avoided damages from climate changes resulting from HalifACT's new construction actions is $2 billion.[13]**

3 The Rationale for Enabling the Upper Tiers

Halifax requires the flexibility to apply the upper tiers in order to achieve its GHG targets. But there are also many other compelling reasons. In addition to reducing GHG emissions, high performance buildings also:

- Improve comfort, by better managing temperature
- Improve health, by better managing fresh air throughout the building
- Reduce noise, through better insulation and airtightness
- Require less energy, helping occupants lower their energy bills
- Are more durable and resilience against extreme weather and forest fire events

Other municipalities across Canada are already requiring high performance buildings. For example, Appendix 1 illustrates the requirements from a small city in BC (North Vancouver), a pertinent example because it has elected to apply a higher standard under BC's step code. **Enabling Halifax, and other municipalities, to adopt the higher tiers will also help Nova Scotia achieve its GHG targets.**

3.1 Affordability and Energy Poverty

[11] This finding is reinforced by a report by the Canada Green Building Council (2019). Making the Case for Building to Zero Carbon. Retrieved from: https://www.cagbc.org/wp-content/uploads/2022/01/Making_the_Case_for_Building_to_Zero_Carbon_2019_EN.pdf

[12] Nova Scotia firms report 0-10% increased construction costs for passive house levels of construction. See: https://www.passivedesign.ca/ and https://www.habitstudio.ca/ for example.

[13] The $2 billion is calculated by applying the social cost of carbon (SCC) to the annual GHG emissions reductions resulting from high performance residential and non-residential building codes. The SCC is the dominant economic mechanism to estimate shadow prices. Canada uses this approach for federal regulatory processes as it uses credible, robust values and is well suited to Canada's regulatory context and the government's approach to cost-benefit analysis. For more details, see: Government of Canada. (2016). "Technical Update to Environment and Climate Change Canada's Social Cost of Greenhouse Gas Estimates." https://publications.gc.ca/collections/collection_2016/eccc/En14-202-2016-eng.pdf

One of the criticisms wielded against high performance building codes is that they will increase the cost of housing. However, affordability is a function of both the operating and capital costs.

1. **Construction costs near parity:** Highest performing buildings (Passive House certified) can cost 0-10% more in construction costs, but recent analysis indicates costs are nearing parity.[14]
2. **Minimal operating costs:** Building energy codes determine a building's long-term operational and environmental performance. Early thinking about how a building consumes energy, for example during the initial design phase, helps to lock-in savings through efficient design and help building owners avoid costly retrofits in the future that are meant to increase the building's performance. Affordable housing providers have been using the Passive House standard to ensure exceptionally low operating costs for their occupants.[15]
3. **Avoided future costs:** Enabling Halifax to mandate higher tiers minimizes the need to retrofit the new building stock. Buildings that are not designed at the outset to be high performance can expect to undergo more costly retrofits. These retrofits are likely to be disruptive, resulting in adverse economic impacts such as lost rent, or in the case of owner-operator buildings, displacement of staff.

As an example of the impact of energy costs, early 45,000 people in Halifax were assessed as having a high home energy burden,[16] meaning they are vulnerable to energy poverty-challenges such as "pay the rent or feed the kids", "heat or eat", or "cool or eat".[17] In particular, energy insecurity disempowers low-income residents such as single parents, the elderly, the disabled, and others with low or fixed incomes,[18] resulting in stresses such as utility-related debt, shutoffs, inefficient heating systems, antiquated appliances, and extreme home temperatures with significant health impacts.[19] Children can experience nutritional deficiencies, higher risks of burns from non-conventional heating sources, higher risks for cognitive and developmental behaviour deficiencies, and increased incidences of carbon

---

[14] Passive House Network (2023). Safe at Home: How all-electric, multi-family Passive House buildings deliver comfortable, cost-effective climate resilience. Retrieved from: https://passivehousenetwork.org/wp-content/uploads/2023/07/Passive-House-Network-Summer-2023-Report-Safe-at-Home.pdf.pdf

[15] CBC (2023). Many of Canada's greenest apartments are ultra-affordable. Here's why https://www.cbc.ca/news/science/green-affordable-housing-1.6876487

[16] CUSP. (2019). Energy Poverty and Equity Explorer. Retrieved from: https://energypoverty.ca/mappingtool/

[17] Cook, J. T., Frank, D. A., Casey, P. H., Rose-Jacobs, R., Black, M. M., Chilton, M., ... Cutts, D. B. (2008). A brief indicator of household energy security: Associations with food security, child health, and child development in US infants and toddlers. PEDIATRICS, 122(4), e867–e875. https://doi.org/10.1542/peds.2008-0286

[18] Hernández, D. (2013). Energy insecurity: A framework for understanding energy, the built environment, and health among vulnerable populations in the context of climate change. American Journal of Public Health, 103(4), e32–e34. https://doi.org/10.2105/AJPH.2012.301179

[19] Hernández, D., & Bird, S. (2010). Energy burden and the need for integrated low-income housing and energy policy. *Poverty & Public Policy*, *2*(4), 5–25. https://doi.org/10.2202/1944-2858.1095

monoxide poisoning.[20] Subsequent impacts include parents being unable to work in order to look after children, missed school days, and lost productivity.

Postponing the requirement for enhanced energy performance increases the requirement for retrofits in order to achieve GHG targets. A deep retrofit of an existing home is both disruptive and expensive, costing 3-5 times more than the incremental capital cost in new construction. Missing the opportunity to achieve high performance buildings from the point of construction is therefore an opportunity cost for both owners and occupants and society in general, reducing the available capital for electrification of vehicles and deployment of renewable energy, for example.

At the scale of a single family home, the incremental cost on a $300,000 home might be $30,000 to achieve a passive house standard. If that house is built to Tier 1 or even Tier 3, the cost to retrofit it to achieve a similar standard will exceed $100,000. Assuming that society is serious about addressing climate change, requiring higher performance at the point of construction avoids a decarbonisation retrofit burden later in the lifetime of the home,

3.2 Economic Development

Cities across Canada and in the US have plans to or already are requiring high performance buildings. While they are designed to reduce GHG emissions, these standards are also a key element of each jurisdiction's economic development strategy. For example, the Vancouver Economic Commission estimated that Vancouver and British Columbia's zero emissions and net-zero energy ready building policies are stimulating a $3.3B market for high-performance building products and technologies in Metro Vancouver.[21] Halifax has also developed its economic development strategy around climate action, building on a foundation of expertise on green building and energy efficiency.

[20] Ibid.

[21] Vancouver Economic Commission (2019). Green Buildings Market Forecast. https://vancouvereconomic.com/wp-content/uploads/2019/03/GreenBuildingsMarketResearch_WEBMarch7_Launch-compressed-compressed.pdf

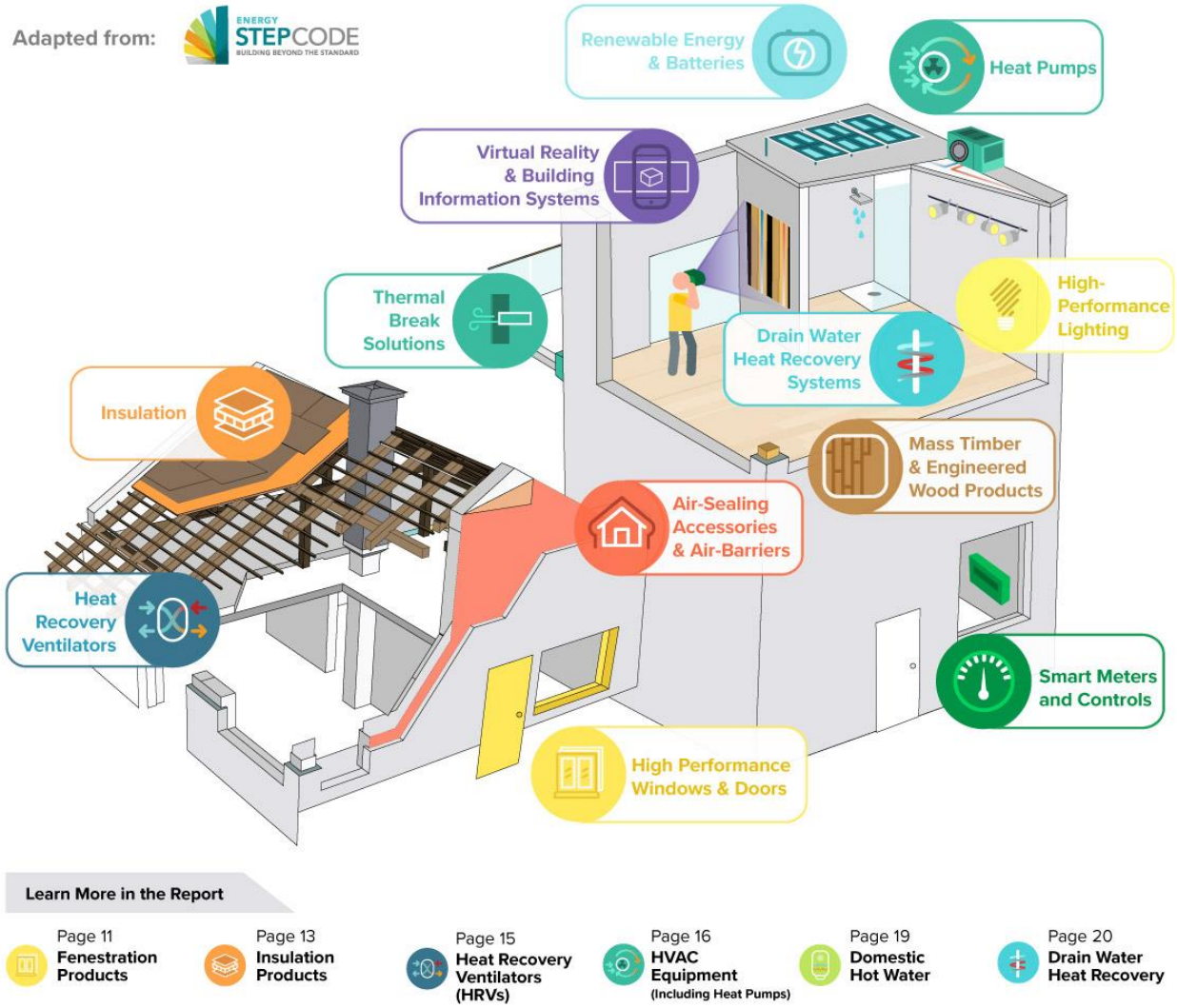


Figure 3. Innovation in material developed stimulated by Vancouver's high performance codes.

The Economic Impact of Vancouver's Green Building Strategy

Green building design and construction is the largest sector, which grew 146% since 2010. Vancouver's world-leading regulations, like green rezoning policy, and the Zero Emissions Building Bylaw, often referred to as "the greenest building code in the world," are driving growth in this sector and making Vancouver businesses global exporters of green building practice and green building technology.

25% of Canada's cleantech companies are based in Vancouver, which is also home to the BC Cleantech CEO Alliance, the province's industry association. Cleantech companies are working in all sectors of the economy, like

Loop Energy in alternate transportation fuels, Saltworks in industrial wastewater treatment, Awesense in smart grids and energy analytics, and Teramerra in bio-pesticides and agri-tech. Vancouver's startup ecosystem is incredibly robust and filled with innovators to watch: Sensible Build Science in advanced building control system, Nano-lit in smart, human-centric lighting systems, and Portable Electric for portable renewable energy systems.

Source: Vancouver Economic Commission

3.3 Electricity Decarbonisation

A key prong of HalifACT is decabronising the electricity system and high performance buildings make this easier. In nearly every scenario, heating will continue to be electrified in buildings in Nova Scotia using heat pumps and transportation will be electrified. The population is also growing. These three factors will drive up demand for electricity, while the utilities need to decarbonise their existing generation.

Demand can be reduced by maximizing the energy efficiency of the building stock, which requires high performance new construction and deep building retrofits. Each new home or building which achieves Passive House levels of performance, for example, directly translates into a more viable pathway to rapidly decarbonise electricity by reducing generation, transmission and distribution costs.

3.4 Resilience

High performance buildings are more resilient to extreme weather events.

Passive survivability refers to a building's ability to maintain critical life-support functions and conditions for its occupants during extended periods of absence of power, heating fuel, and/or water. Thermal resilience is a dimension of passive survivability, and refers to a building's ability to maintain liveable temperatures in the event of a power outage or disruption in fuel supply for prolonged periods of time.

Improved building envelopes can better regulate temperature and therefore protect inhabitants in periods of extreme weather,[22] which the US Green Building Council has defined as passive survivability or thermal safety.[23] Thermal safety is defined as maintaining thermally safe conditions during a power outage that lasts four days during peak

[22] Ribeiro, D., Mackres, E., Baatz, B., Cluett, R., Jarret, M, Kelly, M., Vaidyanathan, S. (2015). Enhancing community resilience through energy efficiency. Report U1508. Retrieved from: https://aceee.org/sites/default/files/publications/researchreports/u1508.pdf.

[23] USGBC. Passive survivability and back-up power during disruptions. LEED BD+C: New construction. Retrieved from: https://www.usgbc.org/credits/passivesurvivability.

summertime and wintertime conditions. A study of buildings in New York City found that homes with efficiency upgrades could maintain indoor temperatures of over 60 degrees during a week-long power outage, whereas the temperature in average efficiency homes fell below 35°F in three days.

High performance buildings designed with thicker building envelopes, lower glazing ratios, lower incidences of thermal bridging, or other highly efficient building strategies help to maintain liveable indoor temperatures with less energy and for longer periods of time under power outages. Buildings with lower overall energy use intensity (EUI) and superior thermal performance also require less back-up fuel during periods of power outages, lengthening the duration of back up generation reserves or energy storage.

6 Appendix 1: District of North Vancouver's Energy Performance Requirements

Summary of requirements

This table provides a summary of the requirements. For a more in-depth look at the requirements, review our July 10, 2023 staff report to Council.

Building type	Description	Requirement as of July 1, 2021	Requirement starting Nov 1, 2023
Part 9 residential	Single family home, coach house, smaller townhouse	Step 5 OR Step 3 with a low carbon energy system*	Step 5 OR Step 4 and Emissions Level 3**
Part 3 residential	Larger multi-family and apartment projects	Step 4 OR Step 3 with a low carbon energy system*	Step 4 OR Step 3 and Emissions Level 3**
Part 3 commercial	Larger commercial, office, and retail buildings	Step 3 OR Step 2 with a low carbon energy system*	Step 3 OR Step 2 and Emissions Level 3**
Public sector buildings	Schools, libraries, colleges, recreation centres, hospitals, and care centres	Step 1	Step 2