Backgrounder on Buildings Emissions Trends in the Metro Vancouver Region

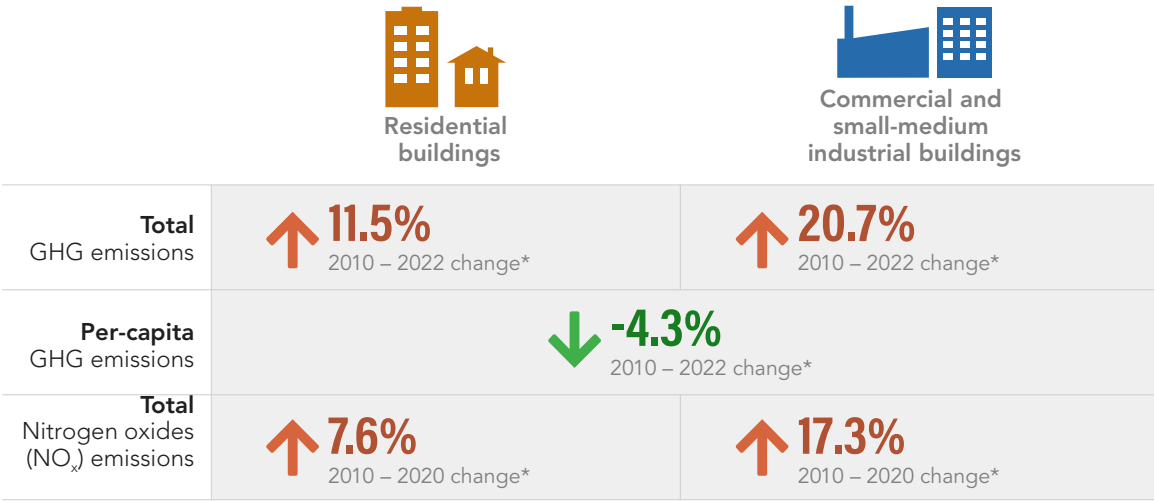
New data from Metro Vancouver's Emissions Inventory shows that greenhouse gas (GHG) emissions from buildings continued to rise between 2010 and 2022. Buildings remain the second-largest source of GHG emissions in the region and a significant source of air pollutants that directly harm human health, primarily from burning natural gas for space and water heating.

More local governments are adopting stronger standards for energy efficiency and GHG reduction in new construction.

However, the challenge of retrofitting existing buildings continues to grow, while there is an increasing need for cooling as temperatures rise. Continued policy support and investment in clean energy infrastructure are critical to reducing emissions, improving energy efficiency, and ensuring affordability and health benefits for residents.

Building Emissions Are Still Increasing

Figure 1: Emissions of air pollutants continue to rise.



* GHG emissions are reported annually (latest: 2022), while health-harming air pollutants, such as NOx, are reported every five years (latest: 2020)

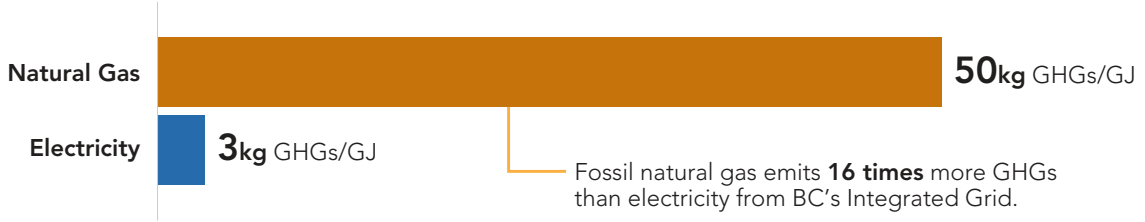
Source: Metro Vancouver 2022 Emissions Inventory[1]

Buildings remain the second-highest source of GHGs in our region, following transportation.

Building emissions rose along with the number of new gas connections

- Between 2010 and 2022, GHG emissions increased by **11.5% from residential buildings** and by **20.7% from commercial and industrial buildings**.
- Over the same period, **per capita emissions** from buildings in the region decreased slightly by **4.3%**.
- Between 2010 and 2020, nitrogen oxide (NOx) emissions, which harm human health, increased by **7.6% in residential buildings** and **17.3% in commercial and industrial buildings.**
- There were **42,659 new gas connections** between 2010 and 2022 – 39,011 were for residential buildings (8.6% increase), and 3,648 for commercial buildings (7.3% increase).

Figure 2: Emissions from buildings are mostly due to burning fossil natural gas for space and water heating.



Source: BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions[2]

Stronger Codes are Making New Buildings Cleaner and More Efficient

- As of March 10, 2025, new building projects across BC must meet Level 1 of the Zero Carbon Step Code by measuring and disclosing a building's operational GHG emissions[3].
- By the year 2030, new building projects will have to meet the strongest level (Level 4) of the Zero Carbon Step Code[4] – most buildings will comply by having electric heating, cooling, and hot water equipment.
- The Energy Step Code has reduced energy use in new buildings. Projects started after May 1, 2023 are at least **20% more energy efficient** than the 2018 Building Code[5].
- As of 2025, 14 municipalities in the Metro Vancouver region have adopted higher steps of the **Energy Step Code** and/or the **Zero Carbon Step Code**[6], representing about 93% of the region's population.

Benefits of Stronger Codes for New Buildings

- Research by BC Housing and others shows that low-carbon buildings can be built at or below the cost of conventional buildings and reduce the burden of future energy and carbon retrofits[7].
- Residents of energy-efficient, low-carbon homes enjoy lower utility bills, cleaner air, and more comfortable temperatures.
- Updates to building and fire codes help to protect residents from hazards like extreme heat, wildfire smoke, and earthquakes.

What Is Working Elsewhere?

- **New York State[8] and California[9]** have adopted regulations that require electric space and hot water heating (e.g., heat pumps) in new buildings.
- California requires new construction to be equipped for a future transition from gas to electricity.
- **Denmark[10], France[11], and California[12]** are moving beyond just operational emissions, to introduce life-cycle emissions limits for new construction to reduce **embodied emissions**, such as from building materials like concrete and steel.

Industry is ready for Zero-Carbon New Buildings by 2030

A survey conducted in 2024 by the Zero Emissions Innovation Centre revealed that **46% of builders** are already meeting provincial 2030 Zero Carbon Step Code requirements, and **another 44%** are confident that they can do so by 2030[13].

Figure 3: BC has two opt-in building codes and local governments can adopt one or both: the **Energy Step Code** focuses on energy efficiency, and the **Zero Carbon Step Code** focuses on reducing GHG emissions.

14 Municipalities in the Metro Vancouver region have adopted higher steps of the **ZERO CARBON** and/or **ENERGY STEP CODE**

Source: BC Community Climate Action Dashboard[6]

BC Hydro Ramps Up Clean Energy

BC Hydro has launched another "call for power" (a competitive bidding process), to acquire an additional 5,000 GWh per year of clean, renewable energy14. This is enough to power approximately 500,000 homes and doubles the supply from the responses to its 2024 call for power, most of which are wind projects. What's more, BC Hydro plans to invest over $700 million over the next three years in energy-efficiency programs, projected to save enough power each year to meet the needs of another 200,000 homes[14].

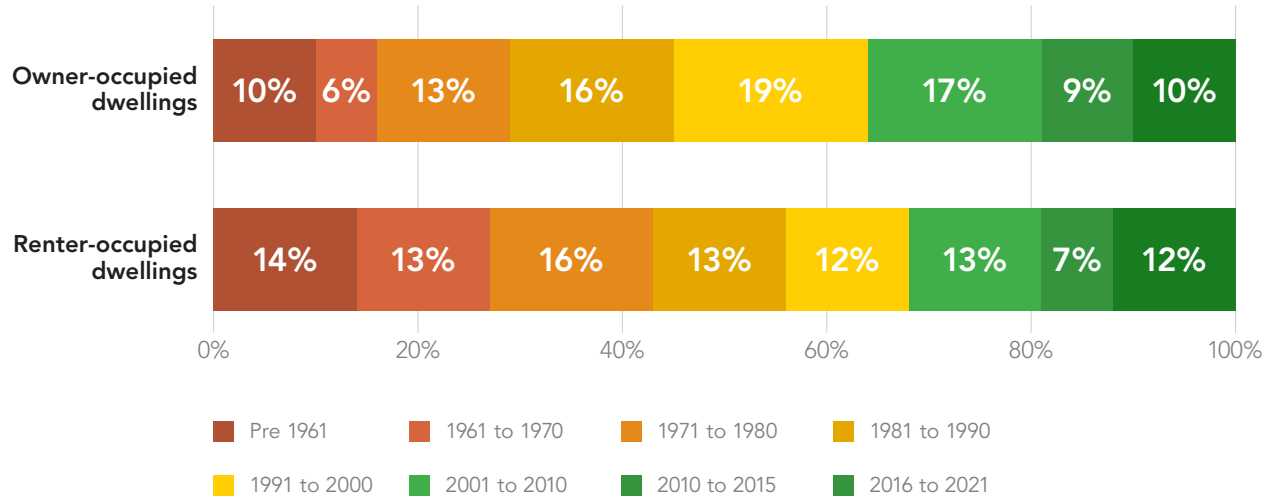
Accelerated Upgrades Are Needed to Reduce Energy and Emissions in Existing Buildings

- **Over 80% of the region's buildings will still be standing in 2050**[15].
- Across BC, upgrades to **40,000 houses** and **27,000 apartment units** are needed every year to decarbonize by 2050[16]. The Metro Vancouver region is home to more than **50% of BC's population**.
- Renters tend to live in older and less efficient buildings – **43% of renters live in homes built before 1980, compared to 29% of owners**[17].
- Many owners need financial support to make upgrades – **41% of owner-occupied households earn less than $90,000 annually**[17].
- As of 2021, over **100,000 households** are burdened with high energy costs[18].

Benefits of Policies for Building Upgrades

- Upgrades like heat pumps, better windows, and insulation **lower household energy bills and improve health**[19].
- Upgrades like heat pumps, insulation, and shading can **protect occupants from extreme heat**.
- Electrification and efficiency upgrades **improve energy security and protect against fossil fuel market fluctuations**[20]. Most existing and forthcoming BC electricity is generated within BC, making it less vulnerable to global disruptions.

Figure 4: Renters are more likely to occupy older homes

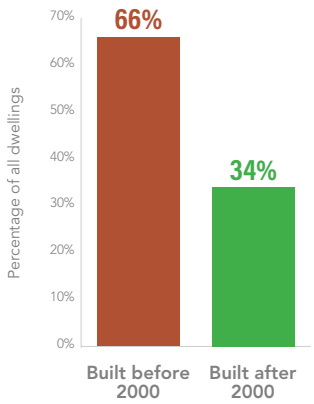


Source: Metro Vancouver Housing Data Book[17].

Hidden Emissions in Older Homes

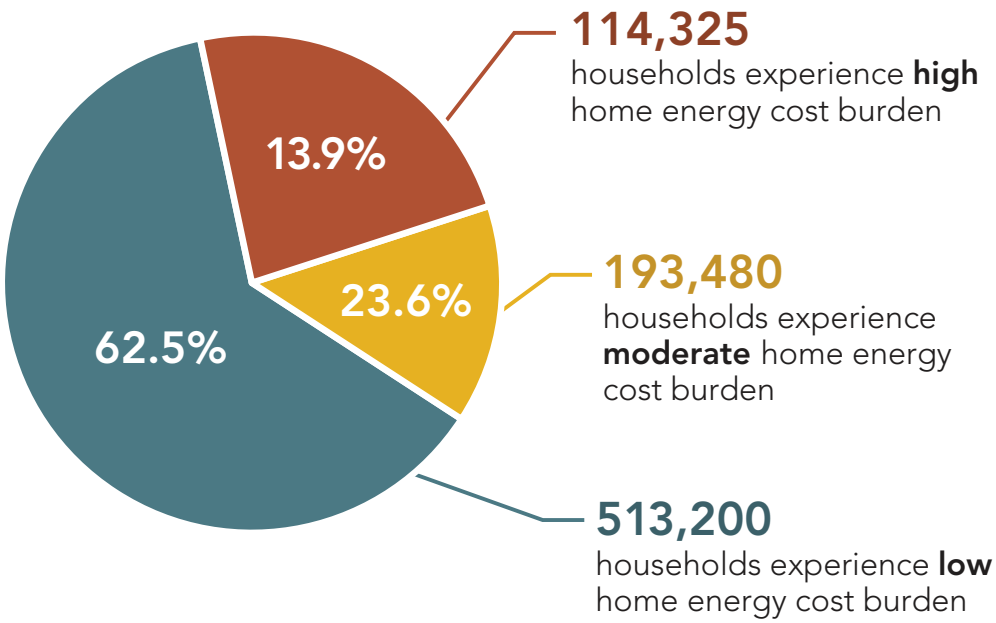
Energy efficiency requirements weren't added to the BC Building Code until 2005, meaning at least **66% of dwellings in this region were not designed with energy performance in mind**[17]. That means many of these buildings are vulnerable to overheating, need more energy to heat and cool, and emit more GHGs and other harmful air pollutants.

Figure 5: Percentage of Dwellings Built Before and After 2000.



Source: Metro Vancouver Housing Data Book[17].

Figure 6: Household energy cost burden, according to the percentage of annual income spent on home heating and electricity: **high** (>6%), **moderate** (3–6%), and **low** (<3%).



Source: Canadian Urban Sustainability Practitioners Energy Poverty Explorer[18].

What Are the Risks to Progress?

- Building upgrades face **upfront costs, limited financing options, and a lack of data** to inform policymaking.
- Most owners have **difficulty navigating the retrofit process** and many need significant support to plan and execute upgrades.
- **Short-term funding cycles** and reduced funding levels hinder long-term retrofit planning, especially for strata buildings, where projects often take years to organize.
- **A lack of consistent regulations** for energy and emissions performance may create a patchwork of policies, causing challenges for industry.

Collaborating on Clean and Efficient Buildings

B2E, a program of the Zero Emissions Innovation Centre, is a coalition of industry professionals, educators, policy makers and financial advisors working on the challenges of building electrification. Among their resources, they provide real-world examples of successful building upgrades, which can be viewed on their website.

B2E website link

Every Building Needs a Plan

You can't manage what you don't measure. Building owners that pursue energy-efficiency upgrades without a tailored, data-informed plan may be missing ways to reduce costs. A good plan requires accurate data on a building's current energy and carbon performance.

A number of scalable programs are now providing support targeted at helping owners get the right data, and using it to make cost-effective upgrade choices:

- BC Retrofit Accelerator
- Energize Vancouver
- Jump on a New Heat Pump
- Energy Save New West
- Better Homes BC
- Better Buildings BC
- BC Home Energy Planner

Figure 7: Energy retrofits can save money—but not all upgrades offer the same return. Data from Clean Energy Canada shows how upgrading to efficient electric appliances can pay off over the long term[21]. Outcomes vary by building type and the specific retrofit choices made, but having the right data and a clear plan maximizes cost savings and emissions reductions.

	Baseline home	Mix of Gas and Electric Appliances	Full electrification
Example detached home	$261 Monthly expense	↑ $10 Monthly expense	↓ $60 Monthly expense
	0% GHG emissions reduction	↓ -58% GHG emissions reduction	↓ -94% GHG emissions reduction
Example apartment building	$143 Monthly expense	↑ $10 Monthly expense	↓ -$2 Monthly expense
	0% GHG emissions reduction	↓ -37% GHG emissions reduction	↓ -92% GHG emissions reduction

Source: Clean Energy Canada[21]

What Is Working Elsewhere?

- **Many jurisdictions** have programs to finance the up-front costs of energy upgrades with long-term stable repayments (e.g., on utility bills or property taxes). One type of this lending—called Property Assessed Clean Energy (PACE)—has supported nearly 400,000 retrofits and created over 35 billion dollars of economic activity in the US[22].

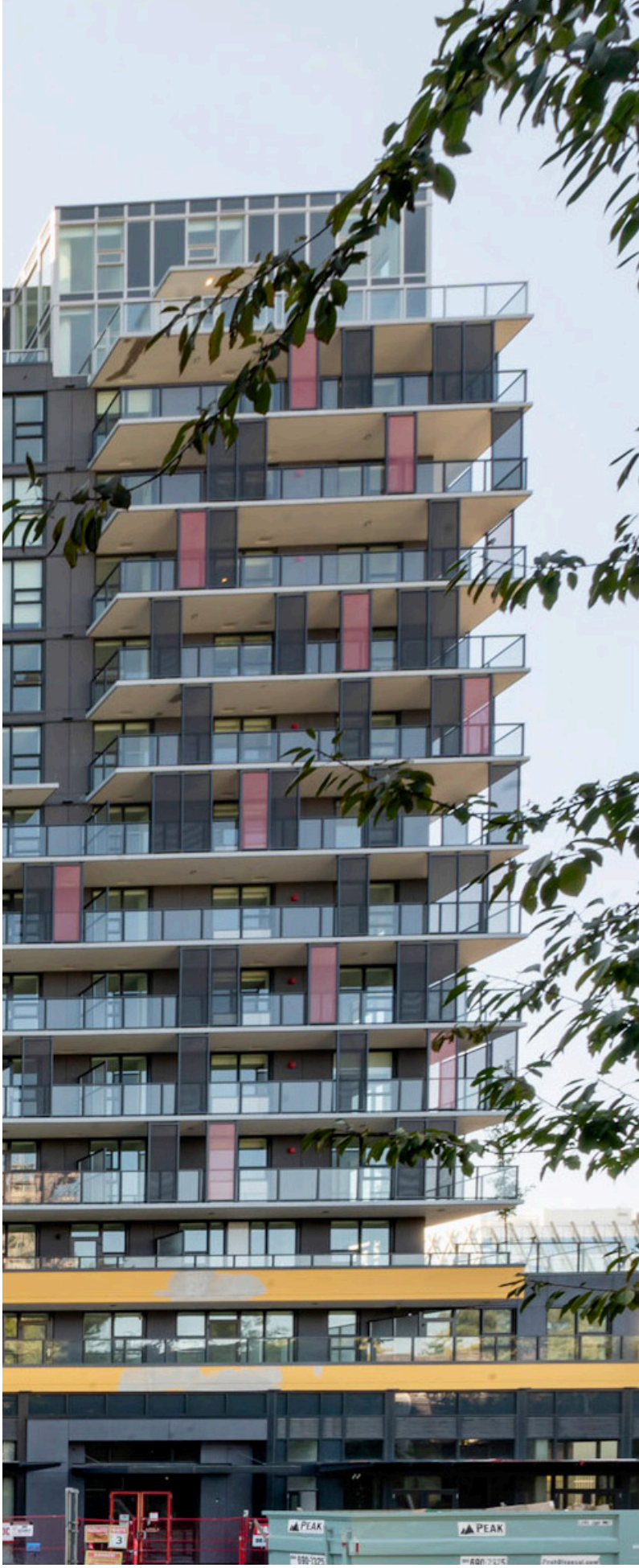
- **New York City[23], Seattle[24], Chicago[25] and dozens of other cities and states** require building owners to track and report energy use and emissions, while 11 US cities and 4 states have gone further and adopted building performance standards requiring reductions in energy use and/or emissions.

- **Quebec, Toronto and Montreal** are at different stages of developing reporting requirements and building performance standards for existing buildings.

BC Leaders in Energy and Carbon Reporting Requirements

City of Vancouver and **District of Saanich** have already passed formal reporting requirements, **City of Victoria** has approved a similar policy, and **City of Richmond** is exploring a potential approach with stakeholders.

City of Vancouver is the first city in Canada to introduce **limits on carbon emissions** for **certain types of buildings**. These jurisdictions use performance data to develop customized support programs to help owners meet the targets. For example, **Energize Vancouver** provides resources, training, and guidance to help regulated building owners in the city plan and implement upgrades that reduce emissions and save on energy.



For Many, the Lack of Cooling in Buildings Is Becoming a Safety Concern

- Climate projections show that residents in the Metro Vancouver region could experience **7 days over 35°C every year** by 2050 — and **25 days every year** by the 2080s (on average, based on humidex temperatures)[26].

- **The region's heat-vulnerable populations face the highest risks.** During the 2021 heat dome, 619 people died from heat in BC[27], of which approximately two-thirds were in the Metro Vancouver region[28]; 98% were at home, and most lacked access to cooling[27].

- While air conditioning use is growing, **access remains limited:** census data shows that from 2013 to 2021, the share of households with cooling rose from **13% to 26%**, but is still **far below the national average of 64%**[29].

- **Policy is starting to address life safety:** BC requires new dwellings to maintain at least one living space (e.g., living room, bedroom) **below 26°C**, and Vancouver mandates active mechanical cooling in all new multi-unit residential buildings[30].

- BC Hydro is distributing over 28,000 free portable A/C units to medically vulnerable, low-income households[31].

- In a recent survey of food service workers in BC, **97% said they needed more protection from extreme weather**, with 77% reporting worsened physical health during these events, and 87% identifying extreme heat as their top extreme weather-related concern[32].

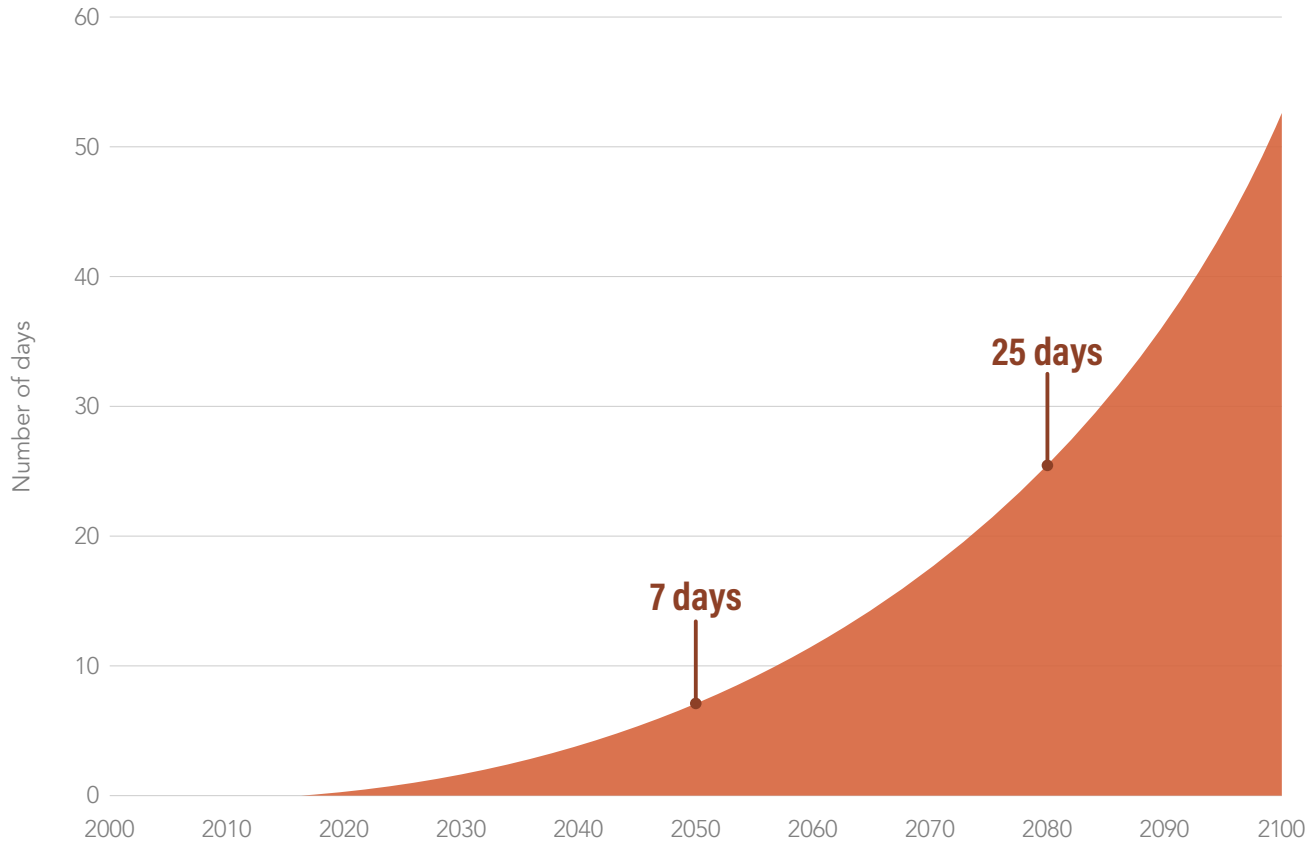
Health and Equity Risks of Extreme Heat

- Extreme heat **increases the risk of heat exhaustion, heat stroke, and worsened chronic conditions**. Even moderate overheating impacts sleep, productivity, and mental health.

- **Workplace overheating raises occupational health risks**, reduces productivity, and increases physical strain.

- Lower-income and heat-vulnerable communities are more exposed to urban heat and **less able to afford cooling technologies, compounding health and safety risks**.

Figure 8 | The number of days that feel hotter than 35°C is expected to continue to increase in the Metro Vancouver region beyond the 2080s.



Source: ClimateData.ca[26].

Advancing Thermal Safety in Multi-Unit Buildings

Metro Vancouver is helping local governments tackle extreme heat risks in older multi-unit residential buildings (MURBs), many of which were designed without cooling systems. A new thermal safety toolkit outlines 31 recommended actions to improve resilience and protect residents' health by 2030.

Example Actions:

"Right to Cool" Policies: Advocating for changes to the Strata Property Act, making it easier for residents to install cooling technologies like heat pumps.

Standards of Maintenance Bylaws: Supporting municipal updates to set safe maximum indoor temperatures in rental and multi-unit buildings.

Emergency Preparedness: Encouraging building-level emergency plans and common area cooling spaces to protect heat-vulnerable residents during extreme heat events.

Read the full report

What Are the Risks to Progress?

- Many people are unable to make the decision to install cooling due to **legal and regulatory barriers**, especially renters and strata residents.
- Without **clear policy and funding pathways**, most of the region's existing buildings will struggle to meet future cooling needs and residents will suffer increasing health impacts.
- Building owners have limited access to **low-cost financing** to plan and implement efficient cooling upgrades, particularly in strata buildings.

What is Working Elsewhere?

- US Cities including **Phoenix, Dallas, New Orleans, Tucson and Chicago** have enacted cooling requirements to keep indoor temperatures below specified thresholds[33].
- **New Orleans' Healthy Homes Program** requires landlords to register and receive a certificate of compliance with minimum rental housing standards, including providing cooling to keep bedroom temperatures below 27°C[34].
- Paris, France operates **Europe's largest district cooling network** – called Climespace – that pipes cold water from the Seine River in a closed loop underground to cool large buildings in central districts[35].

References

1. Metro Vancouver. (2025). *Emissions Inventories and Forecasts*. https://metrovancouver.org/services/air-quality-climate-action/emission-inventories-and-forecasts.

2. Government of British Columbia. 2024. *BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions*. https://www2.gov.bc.ca/assets/gov/environment/climate-change/cng/methodology/2020-pso-methodology.pdf.

3. Government of British Columbia. (2025). *BC Building, Plumbing, and Fire Code revisions*. https://www2.gov.bc.ca/gov/content/industry/construction-industry/building-codes-standards/bc-codes/errata-and-revisions.

4. Government of British Columbia. (2021). *Zero Carbon Step Code. Energy Step Code: Building Beyond the Standard*. https://energystepcode.ca/zero-carbon/.

5. Government of British Columbia. (2023, May 9). *Building code changes support B.C.'s zero-carbon targets. BC Gov News*. https://news.gov.bc.ca/releases/2023ENV0030-000653.

6. Community Energy Association. (2025). *BC Community Climate Action Dashboard: Step Codes*. https://dashboard.communityenergy.ca/big-moves/step-codes/.

7. BC Housing Research Centre. (2024). *Building Innovation Case Study: Does High Performance Construction Cost More?*. https://www.bchousing.org/sites/default/files/media/documents/Building-Innovation-Case-Study-Nov-2024.pdf.

8. City of New York. (2021, December 21). *Mayor de Blasio Signs Landmark Bill to Ban Combustion of Fossil Fuels in New Buildings*. https://www.nyc.gov/office-of-the-mayor/news/852-21/mayor-de-blasio-signs-landmark-bill-ban-combustion-fossil-fuels-new-buildings.

9. State of California. (2022, December 22). *2022 Building Energy Efficiency Standards for Residential and Nonresidential Buildings: For the 2022 Building Energy Efficiency Standards Title 24, Part 6, and Associated Administrative Regulations in Part 1*. California Energy Commission. https://www.energy.ca.gov/sites/default/files/2022-12/CEC-400-2022-010_CMF.pdf.

10. The Danish Social and Housing Authority. *Building Regulations 2018*. https://www.bygningsreglementet.dk/. [Danish language source].

11. Ministère de la Transition Écologique. (2024, January). *RE2020 Guide: Réglementation Environnementale: Éco-construire pour le confort de tous*. https://www.ecologie.gouv.fr/sites/default/files/documents/guide_re2020_version_janvier_2024.pdf. [French Language Source, Ministry of Ecological Transition].

12. State of California. (2018). *CALGreen*. California Department of General Services: Building Standards Commission. https://www.dgs.ca.gov/bsc/calgreen.

13. Zero Emissions Innovation Centre. (2024, October 10). *BC Building Industry Survey Results: Energy & Emissions Requirements*. https://zeic.ca/wp-content/uploads/2024/10/ZEIC-BCBuilding-Industry-Survey-Report.pdf.

14. Government of British Columbia. (2025, May 5). *Province takes energy action to electrify economy, increase resilience*. BC Gov News. https://news.gov.bc.ca/releases/2025ECS0018-000412.

15 The Pembina Institute. (n.d.). *Buildings*. https://www.pembina.org/programs/buildings.

16 Kennedy, M., & Frappé-Sénéclauze, T.P. (2021, July). *Canada's Renovation Wave: A plan for jobs and climate*. The Pembina Institute. https://www.pembina.org/reports/canadas-renovation-wave.pdf.

17. Metro Vancouver. (2025, February). *Metro Vancouver Housing Data Book.* https://metrovancouver.org/services/regional-planning/Documents/metro-vancouver-housing-data-book-2025.pdf#search=housing%20data%20book.

18. Canadian Urban Sustainability Practitioners. (n.d.). *Energy Poverty and Equity Explorer: Housing and Demographics Theme*. https://energypoverty.ca/mappingtool/.

19. Riva, M., Makasi, S.K., O'Sullivan, K.C., Das, R.R., Dufresne, P., Kaiser, D., & Breau S. (2023, February 8). *Energy poverty: an overlooked determinant of health and climate resilience in Canada. Canadian Journal of Public Health, 114(3)*, 422-431. https://doi.org/10.17269/s41997-023-00741-0.

20. George, S., Yuan, M., Loutfi, F., Reyes, J., Tesfamichael, M., Dolan, A., Hack, J., & Chen, J. (2025, February 25). *Sharing Electricity Across Borders Could Bolster Energy Security. World Resources Institute*. https://www.wri.org/insights/grid-interconnection-for-energy-security.

21. Clean Energy Canada. (2025). *Opening the Door: Clean energy solutions can save households hundreds of dollars every month, but some Canadians still face upfront barriers to adoption. Governments at all levels can help*. https://cleanenergycanada.org/report/opening-the-door/.

22. PACENation. (2019). *PACENation is the national nonprofit association that advocates for PACE financing*. https://www.pacenation.org/.

23. City of New York. (2025). *Local Law 84: NYC Benchmarking Law. NYC Buildings*. https://www.nyc.gov/site/buildings/codes/ll84-benchmarking-law.page.

24. City of Seattle. (2025). *Energy Benchmarking. Seattle Office of Sustainability & Environment*. https://www.seattle.gov/environment/climate-change/buildings-and-energy/energy-benchmarking.

25. City of Chicago. (2025). *Chicago Energy Benchmarking Overview. Office of the Mayor.* https://www.chicago.gov/city/en/depts/mayor/supp_info/chicago-energy-benchmarking/ChicagoEnergyBenchmarkingOverview.html#Background.

26. ClimateData.ca. (2025). *Annual Values for North Vancouver.* https://climatedata.ca/explore/location/?loc=JBFRV&location-select-temperature=HXmax40&location-select-precipitation=r1mm&location-select-other=allowance.

27. British Columbia Coroners Service. (2022, June). *Extreme Heat and Human Mortality: A Review of Heat-Related Deaths in B.C. in Summer 2021. Government of British Columbia*. https://www2.gov.bc.ca/assets/gov/birth-adoption-death-marriage-and-divorce/deaths/coroners-service/death-review-panel/extreme_heat_death_review_panel_report.pdf.

28. Henderson, S. B., Mclean, K. E., Lee, M. J., & Kosatsky, T. (2022, January 19). Analysis of community deaths during the catastrophic 2021 heat dome: Early evidence to inform the public health response during subsequent events in greater Vancouver, Canada. *Environmental Epidemiology, 6*(1), e189, February 2022. https://doi.org/10.1097/EE9.0000000000000189.

29. Statistics Canada. (2023, April 24). *Air Conditioners*. [Table 38-10-0019-01]. Government of Canada. https://doi.org/10.25318/3810001901-eng.

30. Building and Safety Standards Branch. (2024, April 19). *Protection from Overheating in Dwelling Units*. Government of British Columbia. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/construction-industry/building-codes-and-standards/bulletins/2024-code/b24-08_overheating.pdf.

31. Government of British Columbia. (2024). *Province taking action to help people stay safe, cool. BC Gov News*. https://news.gov.bc.ca/releases/2024HLTH0028-000843#:~:text=Through%20%2420%20million%20in%20new,AC%20units%20throughout%20the%20province.

32. Worker Solidarity Network. (2023). *Can't Stand the Heat? Get out of the Kitchen!: The Impact of extreme weather events on food service workers in British Columbia.* https://workersolidarity.ca/wp-content/uploads/2023/05/Climate-and-Labour-Report-WSN-2023.pdf.

33. Lawton, B. (2025, March 20). *Home Cooling Policies Can Combat Health Impacts of Extreme Heat, But Should Be Paired with Strategies to Reduce Unintended Consequences*. The Network for Public Health Law. https://www.networkforphl.org/news-insights/home-cooling-policies-can-combat-health-impacts-of-extreme-heat-but-should-be-paired-with-strategies-to-reduce-unintended-consequences/#:~:text=Some%20cities%20are%20helping%20offset,if%20cooled%20by%20evaporative%20cooling.

34. The City of New Orleans. (2025). *Healthy Homes Program. Healthy Homes Administration*. https://nola.gov/next/healthy-homes/home/.

35. World Economic Forum. (2023, September 12). *Paris is keeping buildings cool with river water, instead of air conditioning*. https://www.weforum.org/stories/2023/09/paris-seine-water-cool-buildings/.