



COUNCIL REPORT

Report Date: November 12, 2024
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Meeting Date: November 26, 2024
[Submit comments to Council](#)

TO: Vancouver City Council
FROM: General Manager of Planning, Urban Design, and Sustainability
SUBJECT: Allowing Gas Heating and Hot Water in New Construction

Recommendations

- A. THAT Council approve, in principle, amendments to the Building By-law to provide an energy and carbon performance compliance path aligned with the top level (EL4) of the BC Zero Carbon Step Code for small residential buildings, and second from the top level (EL3) for large buildings, to come into force and effect on March 1, 2025;

FURTHER THAT Council instruct the Director of Legal Services to prepare and bring forward for enactment these amendments to the Building By-law, generally as outlined in Appendix A.
- B. THAT Council approve, in principle, amendments to the Building By-law to provide an energy and carbon performance compliance path that allows natural gas for heating and hot water and is aligned with the top step of the BC Energy Step Code, to come into force and effect on March 1, 2025;

FURTHER THAT Council instruct the Director of Legal Services to prepare and bring forward for enactment these amendments to the Building By-law, generally as outlined in Appendix B.
- C. THAT Council approve a revised Green Buildings Policy for Rezoning applications to remove energy modelling requirements from rezoning applications effective immediately, as set out in Appendix C.

Purpose and Executive Summary

On July 23, 2024, Council directed staff to report back with building by-law changes to allow gas for space heating and hot water in new construction, while still pursuing Vancouver's 2030 climate targets. As outlined in the following report, staff are recommending builders/developers have the option between two compliance paths: to build to a high level of the Zero Carbon Step Code (ZCSC), which generally does not allow gas for space heating and water heating, or to build to the highest step of the Energy Step Code (ESC), which achieves a higher level of energy efficiency through building envelope requirements but allows gas to be used for space heating and hot water. Both paths allow the use of gas for cooking.

Currently, the proposed approach is generally aligned with the province and other local governments. However, the path allowing gas could fall out of alignment with the province as early as 2026, as the province begins requiring local governments to follow the ZCSC. Allowing natural gas for space heating and hot water provides applicants with more choice over fuel source but is not expected to improve affordability or accelerate housing approvals when compared to the low carbon option. Buildings that opt to use the gas compliance path will have significantly higher carbon emissions, which will make it more challenging to reach Vancouver's 2030 climate targets, and may incur future costly retrofits. Staff engaged with a range of stakeholders on the proposed compliance paths and the feedback was generally supportive.

Council Authority/Previous Decisions

On [Jul 13, 2016](#), Council approved the Zero Emissions Building Plan that was developed with industry and established a regulatory framework to set and progressively lower GHG limits for new buildings so as to gradually phase out natural gas for space and water heating for most building types by 2025.

On [May 31, 2023](#), Council directed staff to report back to Council with recommendations on updates to the Vancouver Building By-law for new residential buildings regarding the adoption of the top step of the BC Zero Carbon Step Code.

On [Jul 23, 2024](#), Council directed staff to develop 2026-2030 climate action plans to reduce carbon pollution, and to report back with by-law amendments to allow natural gas for heating and hot water for new construction.

City Manager's Comments

The City Manager concurs with the foregoing recommendations.

Context and Background

Ensuring there is adequate housing and commercial space in Vancouver is of utmost importance. Through the Vancouver Plan and Housing Vancouver Strategy, the City has set bold targets for the number and types of housing units built each year. Related to these outcomes, the City has taken a number of actions to streamline permitting and harmonize the City's approach to codes with that of the province and other cities. The overarching goals of this work has been to improve housing supply and affordability, as a top priority of Council.

The City has also set a target to reduce community-wide carbon emissions by 50 percent by 2030 and to be carbon neutral before 2050. The largest source of carbon emissions in Vancouver is from burning natural gas in buildings, which makes up roughly 57 percent of community-wide emissions. As part of its climate work, the City has focussed on reducing emissions from new construction by improving energy efficiency and progressively phasing out natural gas for space and water heating over time. The City has generally aligned with the provincial Energy Step Code and Zero Carbon Step Code frameworks, to provide clarity, consistency and certainty about future changes for local builders, designers and equipment suppliers. It should be noted that the City's requirements do not apply to gas cooking.

In July, 2024, Council directed staff to begin developing the City's next climate plans (for 2026-2030) and also gave direction to allow natural gas for space heating and hot water in new construction, as follows:

"...in providing greater clarity about the City's role in climate action, and to support other Council priorities such as housing affordability, Council resolves to allow natural gas for heating and hot water for new construction, including homes that fall within the Missing Middle Housing Framework given the rapid decarbonization of B.C.'s gas system such as provincially-stated RNG percentage targets (15% by 2030), hydrogen gas blends, and the adoption of new technologies that would allow for greater choice and more resilient pathways to achieving the City's desired emission reduction and decarbonization outcomes".

The following report is in response to the above direction and includes proposed Vancouver Building By-Law amendments (Appendix A-C).

For the purpose of this report, the term "small buildings" refers to 1-3 story low rise residential generally covered by Part 9 of the Building By-law, and "large buildings" refers to medium and high rise residential (4+ storeys) and all commercial buildings generally covered by Part 3 of the Building By-Law.

Discussion

Following Council's direction to allow natural gas for heating and hot water and accounting for other previous direction, staff used a set of objectives to help guide the development of the proposed compliance approach. The objectives are as follows:

1. Supporting efficient service;
2. Supporting housing affordability;
3. Minimizing carbon pollution;
4. Ensuring energy resilience;
5. Providing consistency and harmonization.

Based on these objectives, the proposed compliance approach is to allow builders the choice between two options:

- **Path 1** – Small buildings will achieve Emissions Level 4 (highest level) of the Zero Carbon Step Code and large buildings will achieve Emissions Level 3 of the Zero Carbon Step Code.
- **-OR-**
- **Path 2** – Both small and large buildings will achieve Step 5 (highest step) of the Energy Step Code (Note: this path allows the use of natural gas for heating and hot water).

Both paths would continue to allow gas cooking.

The following sections describes each objective and how the compliance paths perform against the given objective.

1. Supporting efficient service

A review of City permitting indicates that reviewing energy/emissions requirements does not delay City permitting processes for new construction; meaning the proposed compliance paths will not expedite the servicing and permitting process and there is no permitting advantage with either path.

Consultation on these paths with industry highlighted one opportunity to simplify permitting for new buildings. The Green Building Policy for Rezonings currently requires developers to submit a building energy model as part of their application. Since the introduction of the Zero Emission Building Plan and the widespread adoption of Energy Step Code, consideration of energy efficiency and carbon emissions is now an integral part of the building design process. An energy model is no longer needed at the rezoning stage of development to ensure energy and emissions are being considered early in the design. Staff recommend that the Green Building Policy for Rezonings be updated to remove the energy modelling requirement for rezoning applications.

One aspect of permitting that was been raised as a concern by both builders and developers is the impact energy requirements may have on electrical servicing. For example, in some cases, new multi-plexes have required ground-mounted transformers as part of the electrical servicing. It is important to clarify that the main driver of increased electrical service capacity for new development, including multiplexes, is increased density (e.g., more dwelling units per lot). Heat pumps and electric domestic hot water heaters are relatively minor contributors to the overall peak electrical load. In new buildings with efficient envelopes and air conditioning, using gas for heating and hot water does not change the size of electrical service in most cases.

For example, an electrical engineering study completed for the City modelled a fourplex archetype in Vancouver as having an electrical service size of 274 amps. Switching to natural gas for heating and hot water only reduced the service size by 3% (266 amps). This is because electrical service sizing calculations look at the larger of heating or cooling loads; in new, efficient buildings where heating and cooling loads are similar in size, reducing the heating electrical load doesn't significantly reduce the overall electrical load. By contrast, using load management technology reduced the electrical load by 27% (199 amps).

Though not directly related to enabling heat pumps and electric water heating, City staff have been working with BC Hydro to make electrical service connections easier, faster and at lower cost. Staff have implemented concurrent City permitting and BC Hydro processes for multiplex projects to minimize electrical servicing delays. Staff are currently working with BC Hydro to enable more overhead servicing for these projects, including through the installation of new poles. City staff are also developing an electrical service optimization guide for multiplexes that will enable designers and builders to make design decisions (such as using load management) to minimize the risk of triggering more costly service connections. In combination, these improvements will help most new multiplexes be serviced by overhead connections, which

avoids the cost and space challenges of ground-mounted transformers and underground service connections. In addition, staff will leverage the learning from the streamlining and new relationships within BC Hydro for multiplexes to begin to explore opportunities with BC Hydro and Urban Development Institute (UDI) for the City to support and enable the streamlining electrical servicing for new large buildings.

2. Supporting housing affordability

Affordability is a top priority for the City and was referenced in the Council direction in July 2024. As part of this report, staff reviewed the cost implications of both proposed compliance paths on builders/developers and residents, from both a capital and operating cost perspective. Based on staff's analysis, there are very minor differences in affordability between Path 1 (Zero Carbon Step Code) and Path 2 (Energy Step Code that allows gas).

Using the proposed compliance approach, staff calculated zero-emission heating and hot water systems (Path 1) will have an incremental effect on construction cost of roughly -4% to +0.9% for small buildings and +0.1% to +0.4% for large buildings, compared to a typical building not subject to Zero Carbon Step Code requirements. Buildings that achieve the highest step of the Energy Step Code (Path 2) will have an incremental cost of 0% to +1.4% for small buildings and +0.9% to +2.6% for large buildings, compared to current requirements. Like staff's findings, a recent [BC Housing Research Centre report](#) (June 2024) found no correlation between construction cost and carbon emission performance. Likewise, an industry survey done by the Zero Emissions Innovation Centre found that energy and emissions requirements were not big drivers of capital cost variance (the highest drivers of housing costs were borrowing costs, interest rates, land values, and development cost charges and levies).

In terms of operating costs, there is minimal difference between the two paths. Electricity rates are higher than natural gas but heat pumps are much more efficient than gas furnaces, essentially countering the rate difference for a new building. Also, new buildings are substantially more energy efficient than they were 10 years ago, helping occupants save on their monthly utility bills. Staff analysis showed that operating costs for apartments or multiplex units built to Path 1 could save \$2 to \$19 a month when compared to a building using gas built to the 2014 building code (prior to current efficiency requirements). A unit in a building that follows Path 2 could save \$6 to \$34 a month when compared to that same 2014 building. These results are similar to costing reported by the City of Richmond, which found that the capital, operating and lifecycle costs of heat pumps are similar to gas-fired equipment for new detached homes. See Appendix E for more detailed information on costing.

3. Minimizing carbon pollution

New buildings constructed to Path 1 will have substantially lower carbon emissions than those built to Path 2. For example, a new multiplex with electric space and water heating (Path 1) is expected to produce 0.5 tonnes of carbon pollution per year, while the same multiplex with gas space and water heating (Path 2) would produce 6.2 tonnes. The reason for the difference is that Vancouver benefits from access to clean electricity from BC Hydro, which has amongst the lowest carbon emissions of all North American utilities. By 2030, BC Hydro will be mandated to deliver 100% clean electricity, which it achieved in both 2022 and 2023. The provincial Clean Electricity Trading Standard helps ensure that the electricity BC Hydro generates or purchases

for their customers is clean. While FortisBC is procuring more renewable gas, the renewable mix is currently at 1 percent. With the addition of 15 percent renewable natural gas to the base blend (Fortis' target for 2030), the carbon intensity of natural gas will be 16 times higher than electricity (180 CO₂e/GWh vs 11 tonnes CO₂e/GWh).

If all applicants took Path 1, it would decrease Vancouver's carbon footprint by 15,900 tonnes per year by 2035. If all applicants took Path 2, it would increase Vancouver's carbon footprint by 65,100 tonnes of per year by 2035. The actual outcome will be fall between these two numbers and is difficult to predict. Based on current conditions, staff expect some of this emissions risk will be mitigated because most large buildings will pursue Path 1 due to the ease of construction compared to Path 2. For smaller buildings, however, it is more difficult to anticipate how many buildings will follow each of the compliance paths. A full summary of carbon pollution analysis can be found in Appendix D.

4. Ensuring energy resilience

Council's direction in July, 2024 made it clear that energy supply and resilience of energy service are concerns that need to be addressed as we advance our climate protection work. New buildings constructed using either of the compliance paths recommended in this report will have reliable sources of energy.

Path 1 would rely on electricity for space and water heating. In terms of day-to-day reliability, BC Hydro's service in Vancouver exceeds the average reliability of Canadian electricity utilities reported by industry association Electricity Canada. The average outage experienced by BC Hydro customers in Vancouver (including planned outages) lasts approximately two hours, occurring every two years. Path 2, which allows for natural gas for space heating and hot water, would have the same level of reliability because gas heating commonly relies on electricity for fans or pumps to move heat around the building.

In terms of the long-term resilience of electrical supply, BC Hydro's Integrated Resource Plan, approved by BC Utilities Commission in March 2024, lays out how the utility will meet forecasted growth in electricity demand until 2041. The plan accounts for population and economic growth, more electric heating and transportation, and the impacts of climate change on BC Hydro's reservoirs. BC Hydro's recent Call for Power received more than 9,000 GWh per year of clean energy proposals (three times the amount called for). For context, Site C is expected to produce 5,100 GWh of electricity each year. Additional calls are expected every two years to meet ongoing increases in electrical demand. FortisBC also has a Long-Term Integrated Resource Plan that is approved by BCUC and which accounts for population and economic growth.

5. Providing regulatory consistency and harmonization

Going back to the Zero Emissions Building Plan, approved in 2016, staff have heard from builders and suppliers that a clear, consistent roadmap for regulations is crucial for industry to prepare for change and invest in new approaches and technologies. Path 1 of the proposed compliance approach is consistent with previous direction under the Zero Emissions Building Plan and current requirements. Carbon emissions limits that drive electric heating have been part of Vancouver's Building By-Law for several years for residential and most commercial building types. These limits have also effectively required electric hot water in low-rise residential buildings since 2022 and mid-rise residential buildings since 2023. Limits that would effectively require electric hot water in high-rise developments by 2025 were approved in 2022

but have not yet been brought into effect. Path 1 also aligns well with the provincial direction as it follows the Zero Carbon Step Code framework. Many cities across B.C. have adopted the ZCSC, with eleven (11) local governments already adopting, and the Tsleil-Waututh First Nation committing to, the highest level.

Path 2 is based on the Energy Step Code, which likewise has been adopted by many BC municipalities and is very familiar to designers and builders across the province. This path will fall out of alignment with the province when they start mandating progressively higher levels of ZCSC in the coming years with the highest level being planned as a requirement province-wide by 2030. In addition, Path 2 will introduce a risk for low-rise residential buildings. Specifically, owners of buildings that followed Path 2 may experience space challenges when the time comes to replace gas-fired tankless domestic hot water equipment if and when the provincial Highest Efficiency Equipment Standards come into effect (currently planned by 2030). Staff will report back to Council with recommendations to mitigate this risk.

Interest holder engagement

In mid-October, staff gathered feedback from a number of key interest holders to inform the recommendations contained in this report. In total there were 17 meetings with over 100 representatives from large buildings (UDI and developers), small buildings (HAVAN, CHBC-BC, and builders), the City’s buildings Technical Advisory Committee, governments and utilities (province, BC Hydro, and FortisBC), and climate and building focused organizations. As a result of these meetings the initial proposals were modified to what is presented here.

Generally, the key interest holders indicated support for the compliance paths presented in this report. Not related to the two paths, concerns were raised related to electric servicing challenges, and staff have already initiated work with BC Hydro on streamlining electrical servicing. A full summary of the engagement can be found in Appendix F.

Financial Implications

As discussed in the report, the introduction of the path 2 option, which allow for gas heating and hot water, is not expected to provide any permitting advantage or construction cost savings to development; however, homeowners or landlords will be exposed to risk of significant costs when the time comes to replace gas-fired equipment if and when the new provincial standards come into effect.

The potential for increased emissions under path 2 will increase the GHG reductions needed to achieve the City’s 2030 Climate Targets and could require pursuit of deeper and less cost-effective emission reduction opportunities to offset their impact.

Legal Implications

If the Recommendations in this report are adopted, Legal Services will bring forward for enactment by-law amendments in accordance with the adopted Recommendations.

* * * * *

**APPENDIX A
VBBL CODE – PATH 1**

Proposed by-law amendments are described below, and shown in red:

- In Book I, Division B, Article 10.2.2.5. Building Energy and Emissions Performance, Council amends Table 10.2.2.5.A1 as follows:

Table 10.2.2.5.A1			
Maximum Energy Use and Emissions Intensities			
Forming part of Sentence 10.2.2.5.(2)			
Occupancy Classification ⁽¹⁾	Total Energy Use Intensity (kWh/m²a)	Thermal Energy Demand Intensity (kWh/m²a)	Greenhouse Gas Intensity (kgCO_{2e}/m²a)
Group C occupancies complying with 10.2.1.5.(2)(a)(i)	See Table 10.2.2.5.A2	20	<u>See Table 10.2.2.5.A3</u>
Group C occupancies in buildings up to 6 Storeys, except Hotel and Motel	110	25	3.0
Group C occupancies in buildings over 6 Storeys, except Hotel and Motel	120	30	<u>3.0</u>
Hotel and Motel occupancies	140	20	<u>4.0</u>
Group D and E occupancies, except Office	120	20	3.0
Office occupancies	100	20	3.0
All other occupancies	(1)		50% lower than GHGI of the reference building modelled using only fossil-fuel systems

- In Book I, Division B, Article 10.2.2.5. Energy and Emissions Performance, Council adds the following:

Table 10.2.2.5.A3 Greenhouse Gas Emissions Compliance Pathways Forming part of Sentence 10.2.2.5.(2)					
<u>Maximum GHG Emissions (kgCO_{2e} / a)⁽¹⁾⁽²⁾</u>	<u>or</u>	<u>Maximum GHG Emissions^{(1) (2)(3)}</u>		<u>or</u>	<u>Reduction of GHG Emissions by Energy Source of Building Systems</u>
		<u>Maximum GHGI Emissions (kgCO_{2e}/m²a)</u>	<u>Maximum GHG Emissions (kgCO_{2e}/a)</u>		
<u>265</u>		<u>1.5</u>	<u>500</u>		<u>Energy sources supplying all building systems, including equipment and appliances, shall be electricity</u>

Notes to Table 10.2.2.5.(A3):

- (1) GHG and GHGI values shall be calculated for each 'house' which consists of a principal dwelling unit, with or without ancillary dwelling units
- (2) Refer to the City of Vancouver Energy Modelling Guidelines for 1 to 3 Storey Residential Buildings for guidance on modelling GHG and GHGI metrics
- (3) Compliance with this option is demonstrated by meeting both the GHGI and the GHG emission requirements for each house.

**APPENDIX B
VBBL CODE – PATH 2**

Proposed by-law amendments are described below, and shown as [aqua](#):

- In Book I, Division B, Article 10.2.1.2. Buildings Without Residential or Commercial Components, Council amends the article as follows:

10.2.1.2. Buildings Without Residential or Commercial Components

1) All *buildings* except those included in 10.2.1.3 through 10.2.1.5.,

a) shall be designed in compliance with Article (See Note A-10.2.1.2.(1)(a.)

i) 10.2.2.2. or 10.2.2.3., or

ii) 10.2.2.2. in a *building* required to be designed to Part 9 by Division A, 1.3.3.3.,

b) except where space heating and service water heating systems are powered only by electricity, shall be designed with a *greenhouse gas* intensity (GHGI) reduction in compliance with Table 10.2.2.5.A as *acceptable* to the *Chief Building Official*, [or be designed for energy efficiency in compliance with Table 10.2.2.5.B1.](#)

- In Article 10.2.2.5. Building Energy and Emissions Performance, Council amends the article as follows:

10.2.2.5. Building Energy and Emissions Performance

3) Compliance with the GHGI limits in Table 10.2.2.5.A1 is not required where a building can demonstrate that the performance values of the proposed building comply with Table 10.2.2.5.B1.

Table 10.2.2.5.B1			
Maximum Energy Use and Emissions Intensities			
Forming part of Sentence 10.2.2.5.(3)			
Occupancy Classification	Total Energy Use Intensity (kWh/m ² a)	Thermal Energy Demand Intensity (kWh/m ² a)	Greenhouse Gas Intensity (kgCO _{2e} /m ² a)
Group C occupancies complying with 10.2.1.5.(2)(a)(i)	See Table 10.2.2.5.B2	15	N/A
Group C occupancies	100	15	N/A
All other occupancies ⁽¹⁾	Energy Performance Tier 3 of the NECB		

[Notes to Table 10.2.2.5.B:](#)

(1) [For buildings containing multiple occupancies, refer to the procedures on mixed-use buildings in Section 5 of the City of Vancouver Energy Modelling Guidelines.](#)

- In Book I, Division B, Article 10.2.2.5. Building Energy and Emissions Performance, Council as adds the following:

<p align="center">Table 10.2.2.5.B2. Mechanical Energy Use Intensity in Buildings under 4 Storeys for Group C Major Occupancies except Hotel and Motel Forming part of Sentence 10.2.2.5.(3)</p>						
Amount of the Building's Conditioned Space Served by Space-Cooling Equipment	Floor Area of Conditioned Space (m ²)					
	≤ 50	51 to 75	76 to 120	121 to 165	166 to 210	> 210
Mechanical Energy Use Intensity (MEUI) (kWh/m ² -a)						
Not more than 50%	65	55	40	30	25	25
More than 50%	100	83	58	40	33	30

APPENDIX C
Proposed New Green Building Policy for Rezonings - Redline

Note: Amendments to Council-adopted policies will be prepared generally in accordance with the provisions listed below, subject to change.

Policy

Green Buildings Policy for Rezonings

Approved by Council July 22, 2010

Last amended November 26, 2024 ~~July 25, 2023~~

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1 BACKGROUND AND CONTEXT

In July 2010, Council approved the Green Buildings Policy for Rezoning setting out requirements for all applicable developments applying for rezoning to help transition industry toward more sustainable building practices. Subsequent amendments of this Policy in 2014, 2017 and 2018 updated requirements as the local development industry gained capacity in green building design and construction practices and new priority topics emerged. This current version of the Green Buildings Policy for Rezoning reflects Council's direction and targets stated in the Zero Emissions Building Plan, the Climate Change Adaptation Strategy, the Embodied Carbon Strategy and the Climate Emergency Action Plan.

2 INTENT

This policy is effective immediately, and shall be mandatory for all Rezoning Applications received on or after ~~November 26, 2024, May 18, 2022~~, with exceptions permitted at the discretion of the Director of Planning. ~~For Rezoning Applications received prior to May 18, 2022 that have not yet been referred for approval by Council to Public Hearing by August 1, 2022, applicants may choose to meet this updated version of the Policy or the preceding version.~~

3 POLICIES

3.1 Reporting of Green and Resilient Building Measures

~~4.1 Energy and Emissions Performance Limits~~

~~Complete the *Energy & Emissions Design Report* for each building to demonstrate that the project is on track to meet the *Vancouver Building By-law* energy and emissions performance limits expected to be in force at the time of the project's first Building Permit application. Performance limits are modelled according to the *City of Vancouver Energy Modelling Guidelines*, which set standard assumptions and requirements for energy models when assessing compliance with the limits.~~

3.1.12 Embodied Carbon Limits

Complete the *Embodied Carbon Design Report* for each building to demonstrate that the project is on track to meet the *Vancouver Building By-law* life-cycle equivalent carbon dioxide emissions (i.e. global potential impact, or 'embodied carbon') limits expected to be in force at the time of the project's first Building Permit application. Embodied carbon is calculated for each building, in kgCO₂e/m², as calculated by a whole-building life-cycle assessment using standard assumptions according to the *City of Vancouver Embodied Carbon Guidelines*.

3.1.23 Resilient Buildings Planning Worksheet

Complete the *Resilient Buildings Planning Worksheet* to summarize the level of resilience planning undertaken by the project and to identify proposed strategies.

3.2 Enhanced Commissioning

An enhanced commissioning process for all building energy systems is to be completed in accordance with CSA Z5000-18, or ASHRAE Guideline 0-2005 and 1.1-2007, or an alternate commissioning standard acceptable by the Director of Sustainability.

3.3 Energy System Sub-Metering

Separate main metering for each energy utility (e.g. Electricity, Gas, etc.) and each building is to be provided as well as sub-metering of all major energy end-uses and major space uses within each building.

4 REQUIREMENT ADMINISTRATION

Refer to the bulletin *Green Buildings Policy for Rezonings – Process and Requirements* for more guidance on meeting the requirements of this Policy.

Projects demonstrating that the building is extremely ill-suited to achieving a specific requirement may request that the requirement be modified, or deemed not applicable, at the discretion of the Director of Sustainability.

5 HERITAGE BUILDINGS

Where a project includes heritage retention, heritage components can be exempted from one or all of the requirements of this policy at the discretion of the Director of Planning.

APPENDIX D CARBON POLLUTION ANALYSIS SUMMARY

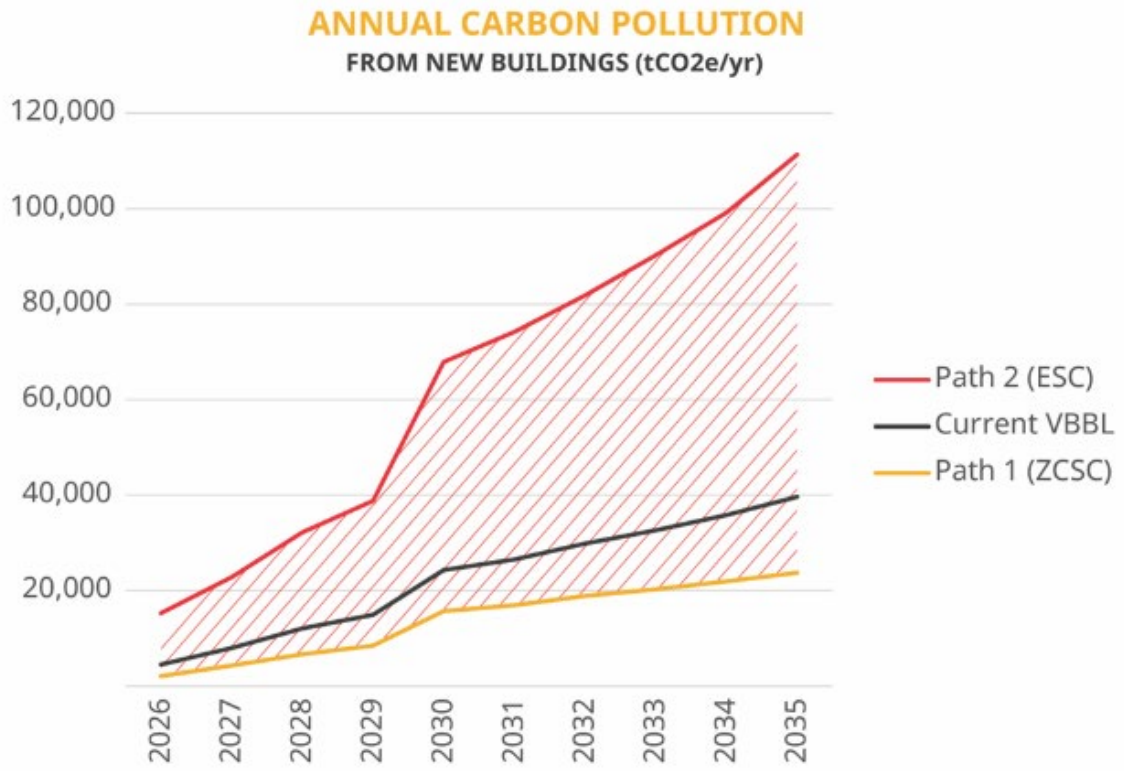
Estimates of the carbon pollution impacts of this report were provided by Licker Geospatial. Using existing models of energy use profiles for a number of building archetypes, assumptions were set for fuel type for heating and hot water systems depending on the scenario. The pollution from individual buildings in all scenarios were then multiplied across assumed new building floor area in future years through to 2035, to estimate how the different policy paths in this report would affect future emissions in Vancouver from new buildings.

Key assumptions:

- The current VBBL scenario assumes electric heating and hot water for low- and mid-rise residential to match Zero Carbon Step Code (ZCSC) Emissions Level three (EL-3) and gas hot water for high-rise residential to match EL-2.
- The Zero Carbon Step Code (ZCSC) scenario (Path 1) assumes electric heating and hot water and minimal other gas use to match ZCSC Emissions Level three (EL-4) for low-rise residential and assumes some gas use for heating to match EL-3 for mid- and high-rise residential, with a greenhouse gas intensity (GHGI) just below 3 kgCO_{2e}/m². Commercial and other building types also assumed electric heating and hot water.
- The Energy Step Code (ESC) 'step-up' scenario (Path 2) assumes more efficient building envelopes that use less heat, aligned with the top step of the energy step code (Step 5 in low-rise residential, Step 4 in high-rise residential). All buildings assumed typical high-efficiency gas equipment for heating and hot water.
- The analysis assumes nearly 82 million new square feet of residential floor space is constructed by 2035 (23% in low-rise, 77% in mid/high-rise) and nearly 20 million new square feet is constructed in commercial and other building types. This means that changes for mid- and high-rise residential will have a larger effect on emissions than changes in other building types.

The results:

The analysis shows that carbon pollution from new buildings in Vancouver will depend on which path applicants choose. If all applicants took Path 1, it would decrease Vancouver's carbon footprint by 15,900 tonnes per year by 2035. If all applicants took Path 2, it would increase Vancouver's carbon footprint by 65,100 tonnes of per year by 2035. The actual outcome will be fall between these two numbers and is difficult to predict. The following chart shows the range of outcomes and how emissions from new buildings increase over time depending on which path applicants choose.



APPENDIX E COSTING ANALYSIS DETAILS

Costing for this report was compiled by City staff from the following sources:

- [2022 Step Code Metrics Report – Evoke](#)
 - Cited for construction costs of Path 2 for large and small buildings.
- [2021 Zero Emissions Building Options Cost Study – AME Consulting Group](#)
 - Cited for construction costs of Path 1 for large buildings.
 - Cited for operating costs of Path 1 and Path 2 for large buildings.
- 2024 Study Update on Costs in Low-Rise Residential – RDH Building Science
 - Cited for construction costs of Path 1 for small buildings (<1%).
 - Cited for operating costs of Path 1 and Path 2 for small buildings.
 - Utility Rates:
 - Gas: \$13.29/GJ (Mainland rates + carbon tax, Sept 2024)
 - Electricity: \$0.131/kWh (Blend Step 1/2 Sept 2024 + 2.5% Deferral Account Rate Rider + 2.8% Trade Income Rate Rider)
 - Summary of energy use and operating cost calculations results for multiplex as follows:

Energy Model Results	Totals	Step Code Metrics		Total Fuel & Costs					Total Utility Cost (\$)	Monthly Energy Costs per unit
		MEUI, kWh/m2	TEDI, kWh/m2	Natural Gas (GJ)	Natural Gas (kWh)	Electricity (kWh)	Gas Cost (\$)	Electricity Cost (\$)		
ECM Bundle	Total kWh									
VBBL 2014 estimate	87,737	86	64	225	62,376	25,361	\$ 2,984	\$ 3,329	\$ 6,313	\$ 105
Path 1 - ZCSC with heat pumps	39,495	24	21	-	-	39,495	\$ -	\$ 5,184	\$ 5,184	\$ 86
Path 2 - ESC Step 5 with all gas	42,658	28	7	58	16,104	26,555	\$ 770	\$ 3,486	\$ 4,256	\$ 71

- 2024 Interviews with various builders and developers – City of Vancouver staff
 - Informed construction costs of Path 1 and Path 2 for small buildings.
- [2024 City of Richmond Council Report – City of Richmond staff](#)
 - Cited as supporting reference for costs of various heating systems in new detached homes.
- [2024 Report: Does High Performance Construction Cost More? - BC Housing Research Centre](#)
 - Cited as support for lack of correlation between construction costs and carbon performance of new buildings.
- [2024 Industry Survey – Zero Emissions Innovation Centre](#)
 - Cited as supporting reference for energy and emissions requirements not being big drivers of capital cost variance.

APPENDIX F ENGAGEMENT SUMMARY

SUMMARY OF ENGAGEMENT APPROACH

In July 2024, Council directed staff to allow gas for heating and hot water in new buildings, and report back by November. From October 8 to November 7, 2024, an interest holder engagement process was conducted to get feedback on the proposed paths staff were considering in response to this direction. In total, staff held 18 meetings and interviews, reaching over 100 participants from relevant interest holder groups, including utilities, builders of detached homes and multiplexes, and representatives from larger developers.

During engagement, staff asked participants about their experience with current regulations, presented an overview of the changes under consideration and collected feedback on what was proposed. Answers were recorded and analyzed to look for themes. This feedback was used by staff to finalize the recommendations presented in this Council Report.

ENGAGEMENT OBJECTIVES

The engagement objectives were to:

- understand builders and developers’ experiences with our current policy (what issues have they encountered, how have they overcome these challenges, how have things changed over time, and what is still a concern)
- understand builders and developers’ experiences building electric homes
- get reactions to proposed compliance paths (including pros and cons)
- learn what we can do to make the regulations easier to understand

ENGAGEMENT TACTICS

INTEREST HOLDER	TACTIC	SUMMARY OF WHAT WE HEARD
Builders	<ul style="list-style-type: none"> • 7 interviews with 10 builders (hour-long online meetings) • 1 in-person Sikh builder-focused meeting, reaching 20 people. • 2 online meetings with builder associations: Homebuilders Association Vancouver (HAVAN) & Canadian Home Builders’ Association of BC (CHBA-BC) 	<p>Builders appreciated having compliance paths to choose from and were mostly supportive of the regulation approach. Many expressed disappointment the City may step back from existing regulations and the signal the will send to the market, while others were supportive of allowing choice to use gas.</p> <p>Path 1: Zero Carbon Step Code Was preferred by many as it is simpler, well understood, and already in practice. Floor space incentive would encourage further uptake of path 1, but not central to their preference.</p> <p>Path 2: Energy Step Code – Step 5 vs Highest Efficiency Equipment Standards (HEES) Path 2 was preferred by those who wanted to use gas, citing familiarity with ESC. Concerns included cost or challenges of building to Step</p>

		<p>5 and achieving air tightness in multifamily buildings with party walls. Some would prefer to work within an emissions cap. HEES was not preferred as it was unfamiliar, with uncertainty about equipment availability and HVAC complexity.</p> <p>Current Code: Builders commonly cited challenges were electrical servicing from BC Hydro (timeliness, lack of predictability of triggers, concerns over cost allocation, and communication challenges) and design issues (learning curve to balance electrical loads without triggering upgrades, especially for radiant heat systems, space requirements for water tanks, and sourcing heat pumps for smaller homes). Some approached design challenge by standardizing equipment and using smart breakers.</p>
<p>Developers</p>	<p>2 meetings with the Urban Development Institute (UDI), one of which included 3 developers identified by UDI for input</p>	<p>Developers of large multi-family and commercial buildings primary concern related to ongoing challenges with electrical servicing and potential cost implications of requiring full electrification of heating and hot water immediately. They indicated that allowing for small amounts of gas for heating and hot water, as well as allowing for the possibility of an exemption should they not be able to connect to BC Hydro service in a reasonable timeframe, would enable them to mitigate these issues.</p>
<p>Governments and Utilities</p>	<ul style="list-style-type: none"> • 5 online meetings with BC Ministry of Energy, Mines and Low Carbon Innovation, Climate Action Secretariat, and Metro Vancouver’s Regional Engineers Advisory Committee – Climate Protection Subcommittee (representatives from all municipalities and First Nations in Metro Vancouver), reaching 23 people. • 2 online meetings with BC Hydro and FortisBC, reaching 9 people. 	<p>Because these meetings happened during the provincial election period, many of these interest holders were limited in their ability to provide feedback and the meetings were primarily to share information on the draft approach being considered by staff. Feedback that was shared overlaps with the feedback received from other interest holders and captured elsewhere in this table.</p>
<p>Building & Climate NGOs</p>	<ul style="list-style-type: none"> • 2 meetings with NGOs focused on climate and buildings, reaching 40 people 	<p>Disappointment that Vancouver may reverse direction, Vancouver’s leadership has been important regionally and provincially.</p>

		<p>Concern that allowing gas now will burden homeowners with future retrofits to comply with existing bylaws and upcoming Provincial commitments</p>
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HOW ENGAGEMENT ADJUSTED THE RECOMMENDED COMPLIANCE PATHS

The conversations had with interest holders throughout this process influenced the compliance paths that were ultimately proposed.

- For small buildings, staff adjusted proposed path 2 from the Highest Efficiency Equipment Standards (HEES) to step 5 of the Energy Step Code. Staff also adjusted the path by proposing to adopt the energy efficiency metrics of step 5 (Mechanical Energy Use Intensity (MEUI); Thermal Energy Demand Intensity (TEDI)), but not the airtightness metric (1.0 Air Changes per Hour (ACH)), as this was seen as challenging and a potential barrier to adoption of the proposed path 2. This also simplifies inspections of airtightness by maintaining the current minimum requirement of 2.5 ACH.
- For large buildings, staff adjusted proposed path 2 shifted from the top level of the Zero Carbon Step Code to the third level of the Zero Carbon Step Code to allow some gas for peak loads. Staff also observed that the Chief Building Official has the ability to make allowances under the Building By-law for applicants if, in the unlikely case, BC Hydro was not able to provide servicing for the site due to the GHG limits of the ZCSC EL3.
- Staff engaged on a possible floor space incentive for small buildings being built to path 1. While it would meaningfully cut carbon pollution by encouraging builders to choose path 1, it was not central to engagement or feedback. Staff did not have time to work out the details of potential floor space incentives to encourage path 1, so a recommendation specific to incentives is not contained in this report.

Other considerations as fossil gas is progressively phased out

Builders urged the City to continue working with BC Hydro to improve processes related to electrical connections and to advocate for changes to the Distribution Extension Policy. To help builders build increasingly electrified buildings, there was a desire for additional educational resources on designing homes within existing electrical parameters and a dedicated City staff position to steward projects through City processes.

Staff are actively working with BC Hydro to overcome the electrical servicing issues associated with small developments and with ZEIC and other partners on improving technical support for the building community. They have begun discussions with BC Hydro to explore ways in which the City could support streamlined electrical connections for large developments.