



COUNCIL REPORT

Report Date: May 29, 2024
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Meeting Date: June 11, 2024
[Submit comments to Council](#)

TO: Vancouver City Council
FROM: General Manager of Planning, Urban Design, and Sustainability
SUBJECT: Updating Efficiency Standards for Water Heaters in Existing Detached Homes

Recommendations

- A. THAT Council approve changes to the Building By-law generally in the form attached as Appendix A, including increased energy efficiency standards for replacement water heaters in detached homes, with some exceptions, to be brought forward for enactment no later than October, 2026, and to come into force and effect on January 1, 2027, and direct staff to work with industry and utilities as outlined in this report to prepare for that effective date;

FURTHER THAT Council instruct the Director of Legal Services to prepare and bring forward for enactment the by-law necessary to implement these amendments, generally as outlined Appendix A.

- B. THAT Council approve amendments to the Building By-law generally in the form attached as Appendix B, including streamlining and simplifying requirements for smaller renovations in detached homes to focus on upgrading the energy efficiency of water heaters, and requiring Multiple Conversion Dwellings to match new construction standards for heating and hot water, to come into force and effect on February 28, 2025;

FURTHER THAT Council instruct the Director of Legal Services to prepare and bring forward for enactment the by-law necessary to implement these amendments, generally as outlined Appendix B.

Purpose and Executive Summary

The purpose of this report is to recommend changes to the Building By-law to update the efficiency standards of water heaters in detached homes during replacements and renovations, beginning in 2027 and 2025 respectively. Building codes and standards are regularly updated to require modern, cleaner technologies and water heaters are one of the largest sources of GHG emissions in detached homes. These changes are a critical action towards meeting Vancouver's Climate Emergency targets. In addition to reducing carbon pollution, the proposed changes do not add costs for residents, and streamline existing renovation requirements, making it simpler to get a permit.

The proposed highest efficiency standards allow a diverse range of solutions, including gas heat pump, hybrid heat pump, electric heat pump, and electric (resistance) water heaters, and align with standards proposed in the Province's climate plans and those implemented by other leading cities.

The costs of highest efficiency water heaters are similar to standard-efficiency gas water heaters and cost less over their lifetime. By acting when equipment is already being replaced, the proposed changes minimize the costs of improving energy efficiency and reducing carbon pollution from existing homes.

A representative survey of Vancouver residents and homeowners indicated that a majority support these proposed changes while only a small minority felt they went too far.

Council Authority/Previous Decisions

On [April 29, 2020](#), Council approved amendments to the Building By-law to decrease carbon pollution and increase the energy efficiency requirements for new residential buildings 3 storeys and under, including effectively requiring electric heating and hot water systems, effective January 1, 2022.

On [November 5, 2020](#), Council approved the Climate Emergency Action Plan (CEAP) including a goal to reduce carbon pollution from existing buildings in Vancouver by 50% from 2007 levels by 2030, and directed staff to bring forward recommendations to Council to limit carbon pollution from existing detached homes.

On [May 17, 2022](#), Council approved amendments to the Building By-law requiring new air conditioning systems to be heat pumps and electrification requirements for major renovations in existing detached homes, effective January 1, 2023. Council also directed staff to explore and report back on electrification of domestic hot water at time of replacement in the Building Bylaw.

City Manager's Comments

The City Manager concurs with the foregoing recommendations.

Context and Background

Vancouver is already experiencing the impact of climate change, in the form of increased extreme weather events such as heat domes, forest fire smoke, and atmospheric rivers. In

2002, the City of Vancouver approved its Climate Emergency Action Plan with the goal of cutting community-wide carbon pollution by 50% by 2030. Existing homes and buildings emit 57% of Vancouver’s carbon pollution – more than all other sources, including vehicles. Of the total emissions from existing buildings, Vancouver’s approximately 79,000 detached homes account for 28%, the largest portion across all building types. These emissions are from burning natural gas for space heat and for water heating.

The City regularly makes changes to the Building By-law as cleaner, more efficient technologies become common. In new detached homes, electric heating and hot water has been a requirement since January 2022. In existing detached homes, since January 2023, it has been a requirement for all new permanently installed air conditioning systems to be a heat pump, and for all renovations greater than \$250,000 to upgrade to electric heating and hot water.

Discussion

Proposed Changes

This report contains two recommended changes to the Building By-law, described in Table 1 below. These changes raise the standard for energy efficiency of water heaters in existing detached homes in Vancouver. By acting when equipment is already being replaced, and when renovations are already being planned, the proposed changes minimize the costs of improving energy efficiency and reducing carbon pollution from existing homes.

Table 1: Summary of Recommended Changes to the Building By-law

	Time of Replacement (Recommendation A)	Time of Renovation (Recommendation B)
Description:	When water heaters are being replaced, the replacement must meet highest efficiency standards.*	In renovations over \$150k homeowners must upgrade existing water heaters to be highest efficiency standards.*
Exceptions:	<ul style="list-style-type: none"> • If electrical panel would need to be replaced • No space for new water heating tank • Combined heating and hot water systems (common with radiant floors) 	<ul style="list-style-type: none"> • If electrical panel would need to be replaced • No space for new water heating tank • Combined heating and hot water systems (common with radiant floors) • The existing water heater was installed with a permit in the last five years
Timing:	To take effect January 1, 2027	To take effect March 1, 2025
*Note: highest efficiency standards refers to equipment that is at least 100% efficient, which includes heat pumps (electric, gas, or hybrid), or all-electric water heaters.		

The proposed requirement for highest efficiency equipment in Recommendations A and B is the same standard that the Province has proposed to require for all new heating and hot water equipment sold in BC after 2030 in the CleanBC Roadmap. It is proposed Vancouver proceed ahead of the Province as their regulations have not been enacted yet and a larger portion of Vancouver’s GHGs are building based, making this necessary to hit our targets.

Some of the technologies meeting this standard are readily available. Nationally, roughly 50% of all hot water heating equipment is electric. In addition, the usage of electric and heat pump water heaters in new construction - as already required in the Building By-law - is increasing market readiness for the proposed requirements. New heat pump technologies are regularly

being introduced to the local market, providing greater flexibility and choice for applicants to comply with the recommended regulations.

The changes to renovation requirements in Recommendation B also:

- delete all existing energy upgrade requirements for renovations less than \$250,000 in value, streamlining and simplifying requirements for smaller renovations to focus on upgrading the energy efficiency of water heaters; and,
- clarify administrative changes where Multiple Conversion Dwellings must meet the electric heating and hot water requirements of new construction (in effect since January 2022).

The Time of Renovations requirements in Recommendation B uses a threshold of \$150,000 in declared value, as submitted by the applicant. Staff initially considered a lower threshold or using the scope of the renovation as a trigger, but discussions with permitting staff and public engagement indicated using the existing value-based trigger, with a higher threshold value of \$150,000, is the best way to avoid affecting small or simple renovations with less capacity to add scope. Based on renovation permit data since 2017, staff expect this to apply to approximately 130 renovations per year.

Costs

The costs of highest efficiency water heaters are similar to standard-efficiency gas water heaters. A cost estimate of water heaters was prepared for the City, with costs for some typical options show in Table 2 below. Electric water heaters cost less to buy and install but similar or slightly more to operate. Heat pump water heaters cost more to buy and install but less to operate. Heat pumps are also eligible for Provincial rebates and Federal interest-free loans. Highest efficient water heaters cost less over their lifetime, with a positive Net Present Value. For more detail on the costs of different water heaters, refer to Appendix C.

Table 2: Estimated Costs for Water Heaters

Equipment	Cost to Buy and Install	Monthly energy costs	Total Lifecycle Cost
Typical Current Examples			
Typical efficiency gas water heater	\$1,939 - \$2,339	\$33	\$8,040
Typical condensing gas water heater	\$4,482 - \$4,882	\$23	\$8,740
Highest Efficiency Standard Examples			
Electric water heater	\$1,632 - \$1,832	\$34	\$7,820
Heat pump water heater	\$4,637 - \$5,637	\$10	\$6,900

While the costs of replacing a water heater will differ due to site-specific conditions, the size and choice of equipment, and contractors' quotes, the costs shown above are similar to real-world costs experienced by homeowners installing highest efficiency water heaters as part of a pilot program run by the Zero Emissions Innovation Centre¹. For example, one home switching from a gas-fired water heater to an electric tank water heater had costs to buy and install of \$1,853, and another home switching to a heat pump water heater had costs of \$3,977. As seen above, these costs are similar to those that would be required anyway when replacing a water heater under today's by-law.

¹ <https://nearzero.ca/home/stream-3/>

The proposed changes for renovations in Recommendation B also delete existing energy upgrade requirements for renovations below \$250,000 in value, simplifying renovation permits and saving applicants upwards of approximately \$2,000-5,000 compared to the current requirements, according to staff estimates.

2027 Readiness Plan

To help prepare local industry for a responsible shift to higher efficiency equipment by 2027, staff propose to work with industry and utilities the actions outlined in Table 3 below.

Table 3: Proposed Actions in 2027 Readiness Plan

Challenge	Proposed Actions
<p>Same-Day Replacements: Local industry not broadly organized for same-day replacements of gas to electric water heating.</p>	<p>Facilitate Same-Day Replacements:</p> <ul style="list-style-type: none"> • Coordinate with manufacturers and suppliers to support and encourage new 'plug-and-play' equipment in local market • Coordinate with contractors and industry associations to develop and support tools, training, and practices for same-day replacements
<p>Capacity: Some homes have space or electrical capacity constraints.</p>	<p>Minimize Exceptions:</p> <ul style="list-style-type: none"> • Facilitate use of smart meter data to avoid often unnecessary service upgrades • Collaborate with BC Hydro to support the roll-out of technologies and tools to manage peak electrical demands and enable heat pump installations while avoiding service upgrades
<p>Compliance: Industry may not comply with regulations as most work is currently unpermitted</p>	<p>Facilitate Compliance:</p> <ul style="list-style-type: none"> • Streamline Permitting <ul style="list-style-type: none"> • Develop faster and simpler permit processes for equipment replacements • Build Relationships & Raise Awareness <ul style="list-style-type: none"> • Create advisory committee with industry leaders to inform City actions, identify barriers, and co-create solutions • Raise industry and public awareness of the new requirements, technologies and tools while dispelling myths regarding equipment permitting • Monitor Uptake <ul style="list-style-type: none"> • Coordinate with suppliers and contractors to gather data on compliance with time-of-replacement requirements

For planned home renovations, the Time of Renovation water heating requirement in Recommendation B allows time for contractors to identify and solve site-specific challenges. This experience with hundreds of renovations each year will help to build industry readiness in advance of the Time of Replacement requirements in Recommendation A to take effect in 2027.

Staff will monitor industry readiness to carry-out same-day replacements in advance of the Time of Replacement requirements coming into effect, and if needed, will introduce an additional, time-limited exception for emergency replacements, to ensure residents can maintain hot water service in cases where same-day replacements are not yet commonplace.

Engagement

Staff consulted with industry in the development of the recommendations, including equipment manufacturers, equipment installers, and industry associations. Manufacturers were fully supportive, highlighting they have equipment that meets the proposed requirements available today, and are developing new and innovative higher-efficiency products that will launch in the local market soon. For installers feedback ranged from supportive to neutral, with most being supportive due to the recommendations proposing require the same highest efficiency standards as the Province, and they appreciated the highest efficiency standards allow for a diverse range of solutions, including gas and hybrid heat pumps. Industry associations ranged from generally supportive to neutral, while providing input on how the City can best get ready for implementation.

From November 14 - December 7, 2023 an engagement process sought feedback on the proposed regulatory changes for hot water heating equipment in single-detached and duplex homes. This process consisted of a Shape Your City page, online survey, two online public meetings, staff meetings, two focus groups, stakeholder meetings, meetings with the Renters Advisory Committee and the Persons with Disabilities Advisory Committee, and comment forms and supporting materials translated into Traditional Chinese, Simplified Chinese, Vietnamese, Tagalog and Punjabi. While staff promoted this engagement process through our usual City methods and channels, working with community groups to share the word, direct mail, and social media, public participation during this process was low. In total, staff received 101 completed surveys, two comments submitted in other languages, four attendees to a public session, and 15 participants to the focus group sessions.

Staff used what was heard during this phase to simplify and adjust the recommendations. To get feedback on this iteration of the proposed policy from a broader group of residents, the City partnered with Sentis Group to conduct a representative survey in April 2024 that reached 434 Vancouver residents aged 18+ and was weighted to reflect Vancouver's adult population. The results found that resident support for the proposed changes outweighs the opposition by a wide margin, with 68% of residents indicated replacement requirements in Recommendation A "seems about right" or "doesn't go far enough", and 59% indicated renovation requirement in Recommendation B "seems about right" or "doesn't go far enough" compared to those who felt the proposed changes "went too far" (13% for time of replacement, and 17% for time of renovation). A majority of affected homeowners expressed support for each of the recommendations (56% for time of replacement, and 52% for time of renovation). One in five residents had no opinion about the proposed changes. More details on engagement activities and outcomes are available in Appendix D.

Impact

There are approximately 79,000 detached homes in the City of Vancouver. Based on EnerGuide assessment data from new and existing homes, staff estimate that approximately 90%, or approximately 70,000 one and two family homes in Vancouver, use gas-fired water heaters. With an average lifetime of 15 years, and assuming success in the above-noted proposed actions to minimize exceptions and facilitate compliance, staff estimate the proposed changes will reduce carbon pollution by up to 14,700 tonnes per year by 2030, and achieve a 50% reduction in emissions from water heaters by 2035. 14,700 tonnes per year is equivalent to taking nearly 3,700 cars off the road permanently, or equivalent to decarbonizing a large community district energy system twice.

Financial Implications

There are no financial implications for the City associated with this report's recommendations. Work on the 2027 readiness plan would be undertaken with existing staff and budgets. Refer to the discussion section above for financial implications for residents.

Legal Implications

There are no legal implications associated with this report's recommendations.

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APPENDIX B
DRAFT By-law to amend Building By-law No. 12511
regarding energy upgrades at the time of renovation

THE COUNCIL OF THE CITY OF VANCOUVER, in public meeting, enacts as follows:

4. This by-law amends the indicated provisions of Building By-law 12511.
5. In Sentence 11.2.1.4.(2) of Division B of Book 1, Council strikes out Table 11.2.1.4.(2) and substitutes the following:

“Table 11.2.1.4.(2)

Energy Efficiency Upgrade Requirements for Residential Buildings containing not more than Two Principal Dwelling Units Forming part of Sentence 11.2.1.4.(2)

	EnerGuide Assessment ⁽¹⁾	Air tightness upgrades ⁽²⁾	Attic and Sloped Roof Insulation ⁽³⁾	Hot Water Heating ⁽⁴⁾	Space Heating
Alteration construction (\$) value					
\$0.00 to \$149,999	N	N	N	N	N
\$150,000 to \$249,999	N	N	N	Y	N
≥\$250,000	Y ⁽¹⁾	Y	Y	Y	Y

Notes to Table 11.2.1.4.(2):

(1) An EnerGuide Assessment completed within the last 4 years must be submitted, a post-construction assessment must also be completed.

(2) Where EGH>5 air changes per hour, air sealing is required.

(3) Where attic insulation <R12 (2.11RSI), increase to R28 (4.93RSI); where attic insulation ≥R12 (2.11RSI), increase to R40 (7.04RSI); Insulation in existing attics shall not exceed R43.7 (7.7RSI). All flat roof and cathedral ceiling insulation shall be upgraded to ≥R14 (2.47RSI).

(4) Domestic hot water equipment must be replaced in compliance with the domestic hot water requirements of Article 10.2.2.12. or a uniform energy factor of not less than 1.0, except the system may be gas-fired with a uniform energy factor of not less than 0.78 or a thermal efficiency of not less than 90% where: the building mechanical room, storage or service spaces have insufficient space to accommodate the footprint, height, or manufacturer-specified space requirements of the new equipment; the existing electrical panel has insufficient circuit or amperage capacity to accommodate the new equipment; the existing domestic hot water system is part of a combined system that also provides space-heating; the existing domestic hot water equipment was installed with a valid permit within the previous five years; or, equivalent emissions reduction measures are completed as *acceptable* to the *Chief Building Official*.”.

6. In Book 1, Division B, Council adds the following new Article in the correct numerical order:

“11.4.7.2. Alternative Compliance Measures for Energy Upgrades

- 1) An existing residential *building* containing not more than two principal *dwelling units* may be converted into 2 or more strata lots, if the entire *building* is
- a. upgraded to comply with the domestic hot water heating requirements in Sentence 10.2.2.12.(1), and
 - b. upgraded to comply with electric heating requirements in Sentences 10.2.2.13.(1) and 10.2.2.14.(1).

7. This by-law is to come into force and take effect on February 28, 2025.

ENACTED by Council this _____ day of _____, 2024

Mayor

City Clerk

APPENDIX C FURTHER DETAILS ON COST ESTIMATES

The City commissioned cost estimates of different hot water scenarios by RDH Building Science. The key results of this costing exercise are shown in the tables below.

Energy costs:

TABLE 4.0 LOW CONSUMPTION FIXTURES CASE, MAY 2023 RATES							
ID	System type	HOT2000 Results (kWh)		Total DHW Fuel & Costs			Compared to base (%)
		Gas	Electric	Gas cost	Elec. Cost	Total Cost	
Base	Gas conventional water heater (EF=0.55)	5637	-	\$ 294	-	\$ 294	-
1	Electric Hot Water heater standard (EF=0.83)	-	3499	-	\$ 412	\$ 412	19 % increase
2	Electric hot water long life heater and well insulated (EF=0.92)	-	3028	-	\$ 357	\$ 357	3% increase
3	Electric heat pump DHW system (CCE = 91%)	-	1049	-	\$ 124	\$ 124	64% decrease
4	Gas non-condensing naturally aspirated (UEF=0.57)	4839	-	\$ 252	-	\$ 252	27% decrease
5	Gas condensing tank (EF=0.78)	3840	-	\$ 200	-	\$ 200	42% decrease
6	Gas condensing on-demand (EF=0.93)	2785	-	\$ 145	-	\$ 145	58% decrease

TABLE 4.1 LOW CONSUMPTION FIXTURES CASE, MAY 2023 RATES BUT WITH \$170/TONNE CARBON TAX							
ID	System type	HOT2000 Results (kWh)		Total DHW Fuel & Costs			Compared to base (%)
		Gas	Electric	Gas cost	Elec. Cost	Total Cost	
Base	Gas conventional water heater (EF=0.55)	5637	-	\$ 400	-	\$ 400	-
1	Electric Hot Water heater standard (EF=0.83)	-	3499	-	\$ 412	\$ 412	12% decrease
2	Electric hot water long life heater and well insulated (EF=0.92)	-	3028	-	\$ 357	\$ 357	24% decrease
3	Electric heat pump DHW system (CCE = 91%)	-	1049	-	\$ 124	\$ 124	74% decrease
4	Gas non-condensing naturally aspirated (UEF=0.57)	4839	-	\$ 343	-	\$ 343	27% decrease
5	Gas condensing tank (EF=0.78)	3840	-	\$ 272	-	\$ 272	42% decrease
6	Gas condensing on-demand (EF=0.93)	2785	-	\$ 198	-	\$ 198	58% decrease

Capital costs:

TABLE 5 DHW SYSTEM TYPES								
System (size)	Unit	Energy Source	Manufacturer Listed Uniform Energy Factor (UEF)	Retail Price	Estimated Install Time (hours)	Installation Cost	Permit Costs	Total Cost (before taxes)
Direct Electric Tank (39 gal)	Rheem 6 Year Tank Electric Water Heater	Electricity	0.90	\$545	2-3	\$400-\$600	\$687	\$1,632-\$1,832
Insulated Direct Electric Tank (40 gal)	Rheem Marathon Lifetime Electric Water Heater	Electricity	0.92	\$1,349	2-3	\$400-\$600	\$687	\$2,436-\$2,636
Mono-Block heat pump (40 gal)	Rheem Proterra Hybrid High Efficiency Tank Electric Water Heater*	Electricity	3.83	\$2,950	5-10	\$1,000-\$2,000	\$687	\$4,637-\$5,637
Non-Condensing Natural Gas Tank (40 gal)	Rheem Performance Tank Natural Gas Water Heater	Natural Gas	0.62	\$859	3-5	\$600-1,000	\$480	\$1,939-\$2,339
Condensing Natural Gas Tank (40 gal)	Rheem Performance 40k BTU High Efficiency Tank Natural Gas Water Heater	Natural Gas	0.80	\$2,995	4-6	\$800-\$1,200	\$687	\$4,482-\$4,882
Condensing Natural Gas Tankless (8.4 GPM)	Rheem Platinum Condensing 8.4 Max GPM 160K BTU High Efficiency Natural Gas Tankless Water Heater	Natural Gas	0.93	\$1,649	5-8	\$1,000-\$1,400	\$687	\$3,336-\$3,939

APPENDIX D ENGAGEMENT SUMMARY

Hot Water at Home

Public Engagement Summary

SECTION 1: PROJECT OVERVIEW

Summary of engagement approach

From November 14 - December 7, 2023 an engagement process sought feedback on the proposed regulatory changes for hot water heating equipment in single-detached and duplex homes. This process consisted of a Shape Your City page, online survey, two online public meetings, staff meetings, two focus groups, stakeholder meetings, meetings with the Renters Advisory Committee and the Persons with Disabilities Advisory Committee, and comment forms and supporting materials translated into Traditional Chinese, Simplified Chinese, Vietnamese, Tagalog and Punjabi.

Despite promoting this engagement process through our usual City methods and channels, working with community groups to share the word, direct mail, and social media, public participation during this process was low. In total, we had 101 completed surveys, 2 comments submitted in other languages, 4 attendees to a public session, and 15 participants to the focus group sessions.

This feedback from this phase showed that resident respondents were divided between thinking the proposed changes seem about right or goes too far, with impacted homeowners (people who own a detached home or duplex and use gas to heat their water) tended to think the proposed changes go too far. We heard concerns about costs to homeowners, potential impacts to renters, and if the grid could accommodate the increase in demand. We also heard confusion about some of the terms used (100% efficient) and a conflation between space and water heating.

Staff used what was heard during this phase to adjust the policy and simplify the language used to describe it. To get feedback on this iteration of the proposed policy from a broader group of residents, the City partnered with Sentis Group to conduct a representative survey from April 2 to 8, 2024 that reached 434 Vancouver residents aged 18+. The results from this survey found that resident support for the proposed changes outweighs the opposition by a wide margin.

Purpose of the Project

This framing statement guided the project - *How can we use the building code to require low carbon domestic hot water systems in detached homes at time of replacement, in a way that is equitable, integrates with existing permit processes and site constraints, and is in alignment with industry practices?*

SECTION 2: WHAT WE DID

This engagement work builds upon a previous engagement process conducted in 2021 and 2022 to inform a bundle of regulatory actions for the electrification of existing detached homes and duplexes. Two of these actions were approved at Council on May 17, 2022.

Engagement Objectives

The engagement objectives for this project were to receive feedback on:

- Draft regulations for time of replacement for domestic hot water systems
- Draft regulations to streamline renovation requirements
- Exceptions to the regulation

- On the dollar amount for home renovations that would trigger the regulation
- Supports that are needed

Overview of Engagement Tactics

Online survey	An online feedback form was created to collect feedback on the proposed regulations. Linked on the Shape Your City page The form was live from November 15 to December 10, 2023 and had 101 completes.
Multi-language comment form	Background information and a comment form were translated into Traditional Chinese, Simplified Chinese, Vietnamese, Tagalog and Punjabi. There was 1 submission in Traditional Chinese and 1 Submission in Simplified Chinese.
Ask a question on Shape Your City	The Shape Your City page included a tool where anyone can publicly submit a question to the project team. During engagement we had 3 questions submitted and answered.
Online Public Discussions	Two online public feedback sessions were offered on: <ul style="list-style-type: none"> • Tuesday, November 21 from 6:00 – 7:00pm – this session was cancelled due to lack of interest • Tuesday, December 5, from 12:00 – 1:00pm – 5 registered, 4 attended Sessions included: <ul style="list-style-type: none"> • A staff presentation of the proposed regulations and how they made these decisions • Question and answer section • Discussion on the proposed regulations These sessions were hosted on Webex with participants registering through Webex via a link from the Shape Your City webpage.
Staff workshop	The Green Building team has been working closely with other departments to develop this regulation. To share details about the proposed regulation and get feedback from a broader staff group, a workshop was scheduled on Friday, November 17 from 12:00 – 1:00pm. This was advertised through Currents - the City's intranet – and on City Insider – a newsletter emailed to staff a few times a month. Two participants signed up for this session but did not attend, so the session was cancelled.
Advisory Committee Presentations	Staff reached out to Council Advisory Committees to share information about the proposed regulation, answer questions and get feedback. The following committees were <ul style="list-style-type: none"> • Renters Advisory Committee on September 6, 2023 – 17 participants • Persons with Disabilities Advisory Committee on November 23, 2023 - 12 participants
Focus Groups	Worked with Sentis Group to run two virtual focus groups with Vancouver homeowners to get feedback on the proposed regulations. The two groups were as follows: <ul style="list-style-type: none"> • Likely renovators – those considering renovating their home in the next 5 to 10 years. Held on Wednesday, December 13 from 6:30 – 8:00pm. 9 Participants. • Non-Renovators – those who are not planning a renovation in the future. Held on Thursday, December 14 from 6:30 – 8:00pm. 6 participants. Participants were recruited through mail (1500 letters sent out), social media and through a panel recruitment tool. Focus groups were recorded and transcribed. Participants received a \$100 honorarium.

Email responses	
Industry presentations	<p>From July to December 2023, 12 industry stakeholder and professional associations were consulted by City staff from the Green Buildings Branch on proposed regulations for replacement of domestic hot water heating systems. Industry groups represented professional associations, manufacturers, and equipment installers. The purpose of engagement was to present draft code language and approach for regulating electric or high efficiency domestic hot water systems at time of renovation and replacement in single-family detached homes.</p> <p>For a complete list of groups involved, please see Section 7.</p>
Representative survey	<p>Given the low uptake on the initial round of engagement and a desire to get feedback on an updated draft of the regulations, we worked with Sentis Group to run a representative survey of Vancouver. This short online survey ran from April 2 to 8, 2024 and collected feedback from 434 City of Vancouver residents aged 18+. Results were weighted by age, gender and region to accurately reflect the City of Vancouver adult population. The results are considered accurate to $\pm 4.7\%$ (19 times out of 20).</p>

Communications Objectives

The communication objectives for this phase were to:

- Encourage participation in the SYC survey from Nov 14 – Dec 5., and engagement via focus groups and through in-language interviews to collect feedback and opinions from a wide range of residents and stakeholders on the proposed domestic hot water time of replacement / renovation regulations and related exceptions.
- Generate public awareness on the role energy-efficient equipment improvements make in taking climate action by reducing carbon emissions, while improving home comfort, bringing detached houses into alignment with new buildings, streamlining and simplifying renovation requirements and making things simpler and cheaper.
- Proactive issues management by assessing risks and developing proactive and reactive messaging to clearly describe the scope of what is being proposed and correct misinformation.

Overview of Communications Tactics

Shape Your City webpage	<p>A project website was hosted on Shape Your City with information and details of the proposed regulations, key dates and timelines, answers to commonly asked questions, and links to feedback opportunities. Background information was provided in English, Traditional Chinese, Simplified Chinese, Vietnamese, Tagalog and Punjabi.</p> <p>During the engagement period there were 700 visits to the website.</p> <p>There were 106 engaged participants (Filled out a survey or asked a question), 245 informed participants (downloaded a document, visited the FAQ, visited multiple project pages), and 544 aware participants (visited at least one page).</p> <p>Project information sheets were downloaded in English (13 downloads), Traditional Chinese (2 downloads), Simplified Chinese (1 download), and Vietnamese (1 download)</p>
Earned and pitched media	<p>On November 16, an information bulletin was sent out through the City of Vancouver’s media line to over 900 journalists, media outlets and civically interested subscribers. The</p>

	<p>bulletin invited residents to help shape proposed updates to reduce emissions from detached homes, described the proposed updates and provided the link to Shape Your City. Read it here: https://vancouver.ca/news-calendar/shape-updates-cut-home-emissions-nov-2023.aspx</p> <p>Staff also emailed the information bulletin to four journalists who write about building policy and climate action. There was no media pick-up or follow-up.</p>
Social media	<p>While the survey was live, 24 social posts (10 on Instagram, 6 on Facebook, 8 on Twitter/X) were made across the Greenest City social media channels (Twitter/X, Facebook, Instagram), with some shares occurring on City of Vancouver channels. These posts contained a mixture of survey promotion, explaining the goals of the survey/regulations, and educating about high-efficiency hot water heating equipment, most often within the same post multiple of these would be discussed.</p> <p>The metrics for these posts are as follows:¹</p> <ul style="list-style-type: none"> • Instagram: Reach – 1,992, Impressions – 2,163 • Facebook: Reach – 1,937, Impressions – 2,023 • Twitter/X: Reach – is no longer available but most likely around 2,000 or higher, Impressions – 9,052 • Totals: Reach – 3,929, Impressions – 13,238 • 41 people clicked to the SYC survey through social media: 4 from Instagram, 23 from Twitter/X, 14 from Facebook <p>28% of people who filled out the survey said they heard about it from social media.</p>
Amplifier network	<p>The Climate Emergency amplifier network was provided with an overview of proposed regulations on September 7 (with 7 members present) and November 9, with 12 members in attendance. The 150 members in the network were also asked to share information on how to participate with their networks.</p>
Greenest City Newsletter	<p>In November 2023, Hot Water at Home was a feature topic in the Greenest City Newsletter. This newsletter went to 6272 recipients. There was a 47.9% open rate, with 78 click throughs to the online survey.</p>
Promotion to staff	<p>A featured article was placed in Currents, the intranet portal for City staff, and circulated via the City Insider newsletter – along with an invitation to attend a staff webinar on the program.</p>
Promotion of multi-language opportunities	<p>We worked with Kambo to help promote the opportunity to participate in Traditional Chinese, Simplified Chinese, Vietnamese, Tagalog and Punjabi. They shared project information and survey links with 27 community partners via email and follow up phone calls. They also promoted this opportunity on in-language social media such as WeChat and WhatsApp groups.</p>

SECTION 3: WHO WE HEARD FROM

2023 Online Survey

The online survey conducted through Shape Your City on November 15 to December 10, 2023 was voluntary and a cross section of Vancouver residents participated, but the results not considered representative of the broader Vancouver population.

There were 101 responses to the online survey, of those:

- 34 of the respondents will be impacted by the proposed regulations: 32 owners and 2 renters of single detached/duplex homes in Vancouver that heat their water with natural gas.

- 45 other Vancouver residents responded to the survey, but they will not be impacted by the proposed regulations (either because of their type of home, ownership status, or current hot water heating system).
- 22 of respondents were non-residents

Of the residents who participated, 77% owned, 16% rented, 3% live in a housing co-op, 4% preferred not to say and 1% indicated other.

45% of residents who responded lived in a single detached house, 9% lived in duplex, 4% in a suite within a single detached house or duplex, 10% in a townhouse, triplex, or quadplex, 1% in a laneway home, 8% in a multi-unit building (up to 3 stories), 19% in a multi-unit building (4 stories or more) and 3% were other.

Of residents who responded, 65% heated their hot water by gas, 17% by electricity, and 8% heated both natural gas and electricity. 6% were not sure and 4% said other.

Residents lived in neighbourhoods across the City (see the list below) with the largest presentation (12% each) coming from Grandview-Woodland, Kitsilano, and Mount Pleasant. We did not hear from anyone living in the Downtown Eastside, Strathcona, Sunset, and Victoria-Fraserview.

City of Vancouver Respondents

	Total Residents	Impacted Homeowners	Non-Impacted Residents
Base	77	30	45
Grandview-Woodland	12%	10%	13%
Kitsilano	12%	13%	9%
Mount Pleasant	12%	7%	16%
Hastings-Sunrise	9%	13%	4%
West Point Grey	8%	10%	7%
Renfrew-Collingwood	6%	7%	7%
Dunbar-Southlands	5%	13%	0%
Kensington-Cedar Cottage	5%	0%	9%
Riley Park	5%	7%	4%
Killarney	4%	3%	4%
West End	4%	0%	7%
Arbutus Ridge	3%	7%	0%
Downtown	3%	0%	4%
Fairview	3%	0%	4%
Kerrisdale	3%	3%	2%
South Cambie	3%	3%	2%
Marpole	1%	0%	2%
Oakridge	1%	0%	2%
Shaughnessy	1%	3%	0%
I live at UBC	1%	0%	2%
Downtown Eastside	0%	0%	0%
Strathcona	0%	0%	0%
Sunset	0%	0%	0%
Victoria-Fraserview	0%	0%	0%
None of the above	0%	0%	0%

The age spread of residents was 20-29 years (6%), 30-39 years (19%), 40-49 years (22%), 50-59 years (17%), 60-69 years (14%), and 70+ years (14%) with 6% preferring not to say.

Residents identified as man (48%), woman (36%), non-binary/gender diverse (1%), with the rest preferring not to say (13%) or identify another way (1%).

Household income of residents skewed high, with the following ranges identified:

- 30% - Over \$150,000
- 17% - \$100,000 to under \$150,000
- 6% - \$80,000 to under \$100,000
- 12% - \$60,000 to under \$80,000
- 3% - \$40,000 to under \$60,000
- 3% - \$20,000 to under \$40,000
- 3% - under \$20,000
- 1% did not have an income and 26% preferred not to say

In terms of ethnicity, 61% of residents had a European background, 8% identified themselves as Asian, 5% as South Asian, 3% as African, 3% as Central/South American, 1% as Indigenous and 1% identified

themselves as a Musqueam Indian Band member. 4% identified another way and 18% preferred not to say.

Focus groups

Two focus groups were held in December 2023 to hear from owners of detached homes or duplexes who use natural gas to heat their water. Group one included those who were considering renovating their home in the next 5 to 40 years, and the second group had no plans for renovations.

Industry Engagement

From July to December 2023, 12 industry stakeholders and professional associations were consulted by City staff from the Green Buildings Branch on proposed regulations for replacement of domestic hot water heating systems. Industry groups represented professional associations, manufacturers, and equipment installers. The purpose of engagement was to present draft code language and approach for regulating electric or high efficiency domestic hot water systems at time of renovation and replacement in single-family detached homes.

SECTION 4: WHAT WE HEARD

How feedback was analyzed

Staff worked with Sentis Research Group to analyze the results of the survey, and the focus groups. Feedback online public dialogues and stakeholder meetings was analyzed by staff by coding the data and finding themes.

Overall impressions

From the online survey we heard:

- Resident respondents are divided between thinking the proposed changes seem about right (38%) or goes too far (42%) with the remaining residents (17%) think the changes don't go far enough.
- Impacted homeowners leaned towards feeling that the proposed changes go too far (56%)

From the homeowners focus groups we heard:

- More support for the proposed time of replacement requirements than the proposed time of renovation requirements.
- Useful insight on how the regulations and materials were communicated. We heard questions about the costing information presented (i.e. Is installation included?), terms used (i.e. 100% efficient), and the need to be clearer with technology as heat pumps to heat water were often confused with those used in space heating.

From the Industry meetings we heard:

- This is a reasonable regulatory change that reduces greenhouse gas emissions and supports industry readiness by giving lead time and clear requirements
- Industry is expecting this change, and are prepared to meet the regulatory requirements from both Vancouver and the province
- Desire for regulatory changes to be successful; nearly all groups provided recommendations and solutions to support successful implementation
- Minimal to no concern about meeting electrical demand as many old homes are undergoing electric capacity upgrades to accommodate electronics, EVs, and other demands
- Industry is expecting the transition toward regulations that electrify and are prepared to meet the new demand

- Electric resistance water heaters are the simplest to install and operate
- Industry can meet demand. Will need to be given enough notice to stock products, develop new products to meet energy requirements.
- Manufacturers are willing and ready to meet new electric demand/efficiency requirements, and new equipment (including hybrid gas/electric) will come to market within the next few years
- Permit compliance and ensuring the safe installation of equipment is important for this regulation to succeed

Though we did not hear these themes a lot, some groups recommended staff consider:

- Sequencing electrical upgrades during renovations is important, and needs to be considered early in the process if a panel upgrade is required so contractors can apply for needed permits with enough notice
- Electric resistance hot water tanks have a longer and more reliable lifespan than heat pump hot water appliances. Recommend communicating well the difference in lifespan and maintenance to the public and industry professionals.
- Adopt code changes one time per year, rather than twice. This would align with Province and make changes more predictable for industry.
- Consider changes to the electrical permit load calculations to allow for simpler hookup of new appliances

From the Advisory Committee meetings we heard:

- Both the Renters Advisory Committee and People with Disabilities Advisory Committee expressed concerns that costs for installation may be passed on to renters or that these changes could result in higher operating costs for renters
- Concerns about grid capacity
- Questions about whether radiator heating systems that used hot water would be subject to this rule.
- Questions about the longevity of the newer systems
- Desire to be working with the Province

Proposed Change #1: Time of Renovation Requirements

Currently, when a homeowner undertakes a renovation, the VBBL requires them to increase the energy efficiency by improving the airtightness of their home and adding insulation. This proposed change to the Vancouver Building By-Law would replace the energy efficiency requirements with a requirement that gas water heaters need to be replaced with a higher-efficiency water heater. This would apply to renovations over \$75,000.

From the online survey we heard:

- Those who supported the changes liked that they focus on the key emissions sources.
- Those who thought this change didn't go far enough wanted to see the energy efficiency requirements for renovations to stay and think that no fossil fuels should be allowed.
- For those who thought this proposed change went too far, they said so because they thought the changes were expensive, they disagreed with the plan, they wanted to see natural gas allowed. There were concerns around how difficult this might be to enforce, that they needed more incentives and worry that the electrical grid wouldn't be able to handle increased demand.
- Impacted homeowners were more likely to comment about the changes going too far compared with non-impacted residents.

- In terms of the cost of renovations where these regulations should apply, 35% of respondents thought that \$75,000 seems about right, 26% thought the threshold should be lower and 26% thought it should be higher (out of 77 responses)
- Impacted homeowners tend to think the threshold is about right (38%) or should be higher (41%) where non-impacted residents thought the threshold seemed about right (31%) or should be lower to capture more projects (36%).

“Passive improvements such as those of the building envelope, including air tightness and thermal resistance should remain. These passive improvements help reduce heating costs and overheating of homes during heat dome events. This is required for climate change resiliency.”
Survey respondent

“A kitchen renovation can easily cost 75K and you are going to make people change their complete heating systems? People will stop renovating or not get permits. Complete government overreach driving up cost on everything.” Survey respondent

From the homeowners focus groups we heard:

- That homeowners didn’t think they should have to address something they weren’t already planning to change during a renovation.
- \$75,000 was too low a threshold as costs can quickly escalate.
- Finding certified technicians with no central list makes it difficult to find a reliable technician
- There was comment that this could lead to unpermitted work or homeowners intentionally doing multiple smaller renovations.

From the Industry meetings we heard:

- Most groups supported the proposed removal of EnerGuide, airtightness, and attic insulation requirements in favour of addressing the source of emissions through equipment efficiency standards. Others felt the other requirements are important for meeting climate targets and recommended they stay.

From the Advisory Committee meetings we heard:

- Concerns that these costs may be passed down to renters
- That people would try to skirt the rules by putting in multiple permits to get around the \$75,000 limit

Proposed Change #2: Time of Replacement

The second proposed change to the VBBL is to require that when water heaters are replaced, that they be replaced with higher efficiency equipment that is at least 100% efficient — this includes electric water heaters, heat pump water heaters, hybrid gas/electric systems, and higher efficiency gas heat pumps.

From the online survey we heard:

- Impacted homeowners were more likely to think that the proposed changes go too far with concerns around cost, the capacity of the electrical grid, not wanting to see any changes or allowing natural gas, and there was a lot of confusion around the term “100% efficient”
- Non-impacted residents were more likely to comment that the proposed time of replacement requirements seem about right (61%) compared to impacted homeowners (15%) (out of 53 comments).

“I am grateful that this proposed change also removes barriers to implementation (removal of airtightness and attic shape requirements). Very thoughtful.” Survey respondent

“There is no need or reason to switch to electric hot water tanks. Natural gas is inexpensive, the infrastructure to deliver it is in place and it’s clean burning.” Survey respondent

From the homeowners focus groups we heard:

- This proposed change was viewed more positively than renovation
- Concerns were raised that this may lead to the need to replace the electrical panel, even though that was one of the proposed exemptions.

“I think this seems more reasonable because you know, if the BC government says everybody has to replace their water heaters by 2030 and yours breaks down, then yeah, I would.” Likely renovator focus group participant

Exemptions

To accommodate barriers, several situations have been identified where an exception to the regulation would be allowed. In these instances, a standard-efficiency natural gas water heater may be installed instead. We plan to phase these exceptions out within a few years as the market further develops and they are no longer needed.

Proposed exemptions include emergency or unplanned equipment replacement, insufficient electric panel capacity, insufficient mechanical room size, and equipment less than 3 years old since permitted installation.

From the online survey we heard:

- 44% of resident respondents who offered a comment stated that they thought the exemptions seemed about right with non-impacted residents much more likely to feel this way.
- Those who wanted to see fewer exemptions wanted to see the emergency exception removed as most tanks are replaced then and there was thought that this could be abused
- Those who wanted to see more exemptions thought that equipment less than 3 years old is too new and wanted to see this age higher. There were also comments that exemptions should be permanent, there should be a low-income exception, or ones for tankless water heaters.

“I think these exceptions are too broad! Basically anyone could avoid doing the work!” Survey respondent

“I would change the limited time opportunity for these exceptions and make those permanent. How would the insufficient mechanical room issue going to fixed in 3 years?” Survey respondent

From the homeowners focus groups we heard:

- That exemptions should be in place longer.
- Exempting equipment that was three years or newer seemed wasteful and the age should be increased.

“My gosh, I mean, are we really into such a throw away society that things are being installed three years ago are considered to be old? That to me is a real red flag for me. I would like industry to report on how old equipment has been lasting.” Likely renovator focus group participant

From the Industry meetings we heard:

Groups tended to trend towards supporting the regulations with the inclusion of temporary exceptions for certain barriers that may be present for homeowners. Some dominant themes that emerged from engagements include:

- Ensuring high permit compliance rate will be important for success
- Several groups expressed concern that the exception allowing gas appliances if the home does not have sufficient space for an electric tank may be misused
- Support to keep exceptions in place until market and industry are ready (rather than remove exceptions on a specific date)

From the Advisory Committee meetings we heard:

- That there should be an exemption added for combined space and hot water systems like radiant floors and radiators
- That exemptions will go away over time

SECTION 5: WHAT WE DID WITH WHAT WAS HEARD

Based on what we heard, the following changes were made to the draft regulations:

- Increased the cost threshold for the renovation requirement from \$75,000 to \$150,000
- Changed the exemption for the renovation requirement so it would not apply if it has been less than 5 years since permitted installation of equipment (up from 3 years)
- Added exemptions for combined systems that also heat the home (common with homes with radiant floors or radiators)
- Simplified the language, including moving away from the term 100% efficient

SECTION 6: WHAT WE HEARD FROM THE REPRESENTATIVE SURVEY

Given the low participation rate during the first round of engagement and the changes that were made based on what was heard, a representative survey was conducted to get an overview of how these updated changes were landing.

To accomplish this, the City worked with Sentis Group to conduct a representative survey from April 2-8, 2024.

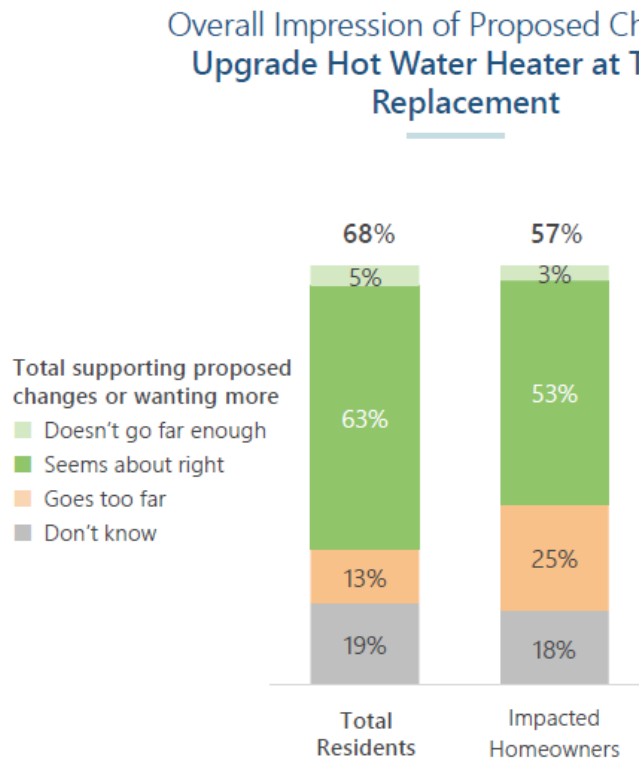
Who we heard from

In total, 434 Vancouver residents ages 18+ were sourced from online panels to yield a demographically representative sample of City residents. Results have been weighted by age, gender and region to accurately reflect the City of Vancouver adult population. Results on the total sample are accurate to $\pm 4.7\%$ (19 times out of 20).

What we heard – Proposed Requirement to Upgrade Water Heater at Time of Replacement

- Residents are largely supportive of the proposed change to upgrade equipment when it needs to be replaced.
- 63% of respondents thought that upgrades at time of replacement seemed about right, 5% thought it didn't go far enough, 13% thought it went too far, and 19% did not have an opinion.
- A slight majority of impacted homeowners (53%) fully supported the change, 3% thought it didn't go far enough, 25% thought it goes too far, and 18% did not have an opinion.
- Those who agreed with the changes thought it was reasonable, it makes sense, the costs were reasonable and would save money over time, that it helps address climate change and would save energy.

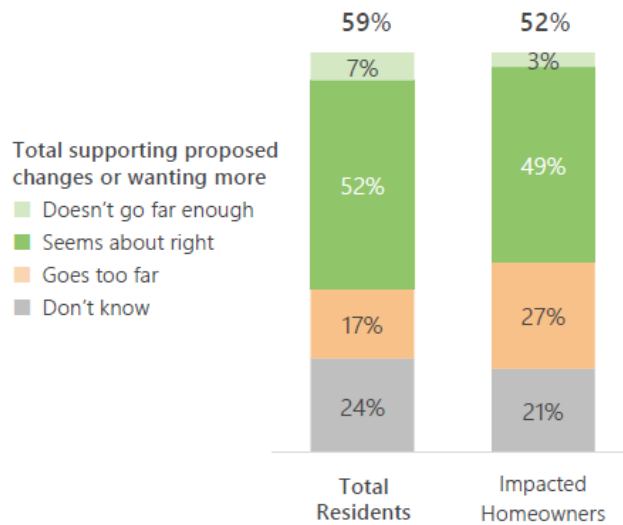
- Those who thought it went too far were concerned about cost and that the type of water heater installed should be the choice of the homeowner.



What we heard – Proposed Requirement to Upgrade Water Heater at Time of Renovation

- 52% thought the changes seemed about right, 7% thought they didn't go far enough, 17% thought they went too far and 24% did not have an opinion.
- Amongst impacted homeowners, half support these changes (49%), 3% thought they didn't go far enough, 27% thought they went too far and 21% did not have an opinion.
- Those who agreed with these changes thought that the costs were reasonable, that the timing makes sense as renovations are already being done, that it's a reasonable approach, timeline and cost threshold. That it helps to address climate change and can save energy were also mentioned.
- Those who thought the regulation went too far were concerned about cost and generally at the high cost of living. There were also comments that homeowners should not be forced to install high efficiency equipment and it is wasteful to replace something that isn't broken.

Overall Impression of Proposed Change #2: Upgrade Hot Water Heater at Time of Renovation



What we heard overall

- Support for these proposed changes outweighs the opposition by a wide margin.
- Impacted homeowners are also supportive, but by a slightly lesser margin.
- That one in five residents lacked an opinion about the proposed changes.

SECTION 7: LIST OF STAKEHOLDERS ENGAGED

Organization	Industry type
Architectural Institute of BC (AIBC)	Professional Association
Bradford White Corporation	Manufacturer
Engineers and Geoscientists of BC	Professional Association
Fortis BC	Energy Provider
Homebuilders Association Vancouver (HAVAN)	Professional Association
Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI)	Professional Association
Rheem Manufacturing	Manufacturer
Thermal Environmental Comfort Association (TECA)	Professional Association
Several Contractors (unnamed)	Installation Professionals

Appendix E: Redline of Vancouver Building By-law Amendments in Appendix A

This document is being provided for information only as a reference tool to highlight the proposed amendments. The draft amending by-laws attached to the Council report RTS No. 15208 entitled Updating Efficiency Standards for Water Heaters in Existing Detached Homes represent the amendments being proposed to Council for approval. Should there be any discrepancy between this redline version and the draft amending by-laws, the draft amending by-laws prevail.

RED TEXT: proposed VBBL changes to be effective January 1, 2027.

Section 11.7 Alterations for Building Energy and Emissions Performance

11.7.1 Energy Retrofit Design Building Classification

11.7.1.5. Residential Buildings of 1 to 3 Storeys

1) Except as otherwise required in this Subsection, *alterations* to energy systems or components of a *building*, described in Sentence 10.2.1.5.(1), shall comply with

...

d) the domestic hot water requirements of Article 10.2.2.12. **or a uniform energy factor of not less than 1.0**, except the system may be gas-fired with a uniform energy factor of not less than 0.78 or a thermal efficiency of not less than 90% **where**

- v. **the *alteration* is in a residential building containing more than 2 principal dwelling units,**
- vi. **the *building* mechanical room, storage or service spaces have insufficient space to accommodate the footprint, height, or manufacturer-specified space requirements of the new equipment,**
- vii. **the existing electrical panel has insufficient circuit or amperage capacity to accommodate the new equipment, or**
- viii. **the existing domestic hot water system is part of a combined system that also provides space-heating;**

Appendix F: Redline of Vancouver Building By-law Amendments in Appendix B

This document is being provided for information only as a reference tool to highlight the proposed amendments. The draft amending by-laws attached to the Council report RTS No. 15208 entitled Updating Efficiency Standards for Water Heaters in Existing Detached Homes represent the amendments being proposed to Council for approval. Should there be any discrepancy between this redline version and the draft amending by-laws, the draft amending by-laws prevail.

RED TEXT: proposed VBBL changes to be effective February 28, 2025.

Section 11.2. Upgrade Application

11.2.1. Upgrade Requirements

11.2.1.4. Upgrade Requirements for a Residential Building Containing not more than Two Principal Dwelling Units

Table 11.2.1.4.(2)

Energy Efficiency Upgrade Requirements for Residential Buildings containing not more than Two Principal Dwelling Units Forming part of Sentence 11.2.1.4.(2)

	EnerGuide Assessment ⁽¹⁾	Air tightness upgrades ⁽²⁾	Attic and Sloped Roof Insulation ⁽³⁾	Hot Water Heating ⁽⁴⁾	Space Heating
Alteration construction (\$) value					
\$0.00 to \$149,999	N	N	N	N	N
[rows deleted]					
\$150,000 to \$249,999	N	N	N	Y	N
≥\$250,000	Y ⁽¹⁾	Y	Y	Y	Y
[rows deleted]					

Notes to Table 11.2.1.4.(2):

(1) An EnerGuide Assessment completed within the last 4 years must be submitted, a post-construction assessment must also be completed.

(2) Where EGH>5 air changes per hour, air sealing is required.

(3) Where attic insulation <R12 (2.11RSI), increase to R28 (4.93RSI); where attic insulation ≥R12 (2.11RSI), increase to R40 (7.04RSI); Insulation in existing attics shall not exceed R43.7 (7.7RSI). All flat roof and cathedral ceiling insulation shall be upgraded to ≥R14 (2.47RSI).

(4) Domestic hot water equipment must be replaced in compliance with the domestic hot water requirements of Article 10.2.2.12. or a uniform energy factor of not less than 1.0, except the system may be gas-fired with a uniform energy factor of not less than 0.78 or a thermal efficiency of not less than 90% where: the building mechanical room, storage or service spaces have insufficient space to accommodate the footprint, height, or manufacturer-specified space requirements of the new equipment; the existing electrical panel has insufficient circuit or amperage capacity to accommodate the new equipment; the existing domestic hot water system is part of a combined system that also provides space-heating; the existing domestic hot water

equipment was installed with a valid permit within the previous five years; or, equivalent emissions reduction measures are completed as *acceptable* to the *Chief Building Official*.

Section 11.4. Alternative Compliance Measures for the Conversion of Existing Buildings

11.4.7. Conversion of an Existing Non-Strata Building to a Strata Property

11.4.7.2. Alternative Compliance Measures for Energy Upgrades

- 2) An existing residential *building* containing not more than two principal dwelling units may be converted into 2 or more strata lots, if the entire *building* is
 - a. upgraded to comply with the domestic hot water heating requirements in Sentence 10.2.2.12.(1), and
 - b. upgraded to comply with electric heating requirements in Sentences 10.2.2.13.(1) and 10.2.2.14.(1).