

TO: MAYOR & COUNCIL

FROM: GENERAL MANAGER PLANNING AND DEVELOPMENT

SUBJECT: ZERO CARBON STEP CODE IMPLEMENTATION

PURPOSE: To recommend amendments to City policies and bylaws for Zero Carbon Step Code implementation.

RECOMMENDATION

THAT staff be authorized to amend the Part 3 Green Building Policy and Low Carbon Energy System (LCES) Policy to align with ‘Zero Carbon Performance’ for Part 3 buildings by January 1, 2024, as outlined in Section 3.4 of the report titled “Zero Carbon Step Code Implementation” dated December 11, 2023; and

THAT the policy for Part 9 residential buildings, as outlined in Section 3.3 of the report titled “Zero Carbon Step Code Implementation” dated December 11, 2023, be adopted, and staff be authorized to bring forward the Building Bylaw amendments necessary to adopt Zero Carbon Step Code and new carbon pollution standards for Part 9 buildings, beginning with Strong Carbon Performance by January 1, 2024 and Zero Carbon Performance by January 1, 2025.

EXECUTIVE SUMMARY

This report presents the results of engagement with parties interested in Energy Step Code and Zero Carbon Step Code implementation and makes recommendations to bring forth amendments to the City’s Part 3 Green Building Policy, Low Carbon Energy System Policy, and Building Bylaw to meet Council directions and Climate Action goals.

1.0 POLICY SECTION

Requiring new buildings to meet standards for lower carbon emissions aligns with the following Council-adopted plans and strategies:

- *Climate Action Framework (2020)*;
- *Corporate Strategic Plan (2022)*;
- *Environmental Sustainability Strategy (2016)*;
- *Community Energy and Emissions Plan (2016)*;
- *Zero Emissions Building Retrofit Strategy (2023)*;
- *Social Sustainability Strategy (2011)*; and
- *Economic Development Strategy (2007)*.

The creation of a new Zero Carbon Step Code (Zero Carbon SC) is enacted by the Province (Ministry of Housing, Building and Safety Standards Branch), by amending the Building Act General Regulation (Ministerial Order No. M40) and the BCBC (Ministerial Order No. BA2023 8). For Part 3 Buildings, Energy Step Code and Zero Carbon Step Code

are implemented by Sections 10.2 (Energy Efficiency) and 10.3 (Greenhouse Gas Emissions) of the BC Building Code (BCBC). The relevant sections of the BCBC for Part 9 buildings are Sections 9.36.6 and 9.37.

2.0 BACKGROUND

The Council Report entitled New Energy Efficiency and Carbon Pollution Standards in the BC Building Code (May 8, 2023) informed Council of regulatory amendments to the BC Building Code (BCBC) for energy efficiency and carbon pollution. Arising from this report, Council directed staff to:

- Engage with interested parties on an implementation strategy for aligning Burnaby's Part 3 Green Building Rezoning policy and Building Bylaw with the Energy and Zero Carbon Step Codes to require 'Zero Carbon Performance' for Part 3 buildings by January 1, 2024, and
- Engage with interested parties on an implementation strategy for adopting Zero Carbon Step Code and new carbon pollution standards for Part 9 buildings, beginning with 'Strong Carbon Performance' by January 1, 2024 and 'Zero Carbon Performance' by January 1, 2025.

3.0 GENERAL INFORMATION

3.1 Draft Implementation Strategy for Engagement

In response to the direction from Council, staff drafted an implementation strategy, including technical requirements, schedules and timelines for both Zero Carbon Step and Energy Step Code, prepared communication materials, including information presented on the City of Burnaby website, and undertook engagement with the building community by way of a presentation at a Builder Breakfast on September 26, 2023, an online survey, and correspondence with representatives of the Urban Development Institute.

The draft approach for implementation is summarized in 'City of Burnaby: proposed Zero Carbon Step Code and Energy Step Code implementation' (Attachment 1).

3.2 Public Survey

Results of the public survey are presented in Attachment 2.

Highlights are as follows:

- 20 surveys were completed.
- Most respondents reported as being moderately to very well informed about Energy Step Code and Zero Carbon Step Code.
- For Part 9 buildings, respondents identified a number of challenges with building to the highest steps of the Energy Step Code (beyond Step 3), including the time it takes to master construction details, availability of required expertise, and ensuring performance at completion.
- For Part 9 buildings, most respondents reported that there are no barriers to implementing Zero Carbon Ready electric space and hot water systems.
- For Part 3 buildings, respondents identified several challenges to building to higher steps of the Energy Step Code, including design impacts to building form, incremental cost increases, and availability of required expertise.

- For Part 3 buildings, the majority of respondents reported that there are no barriers to implementing zero carbon ready electric space heating systems, but some challenges were still noted, including electrical service and availability of appropriate equipment.

The survey also contained open ended questions. Notable responses are synthesized as follows:

- Several respondents identified that the period of notice is too short and that projects already in the design phase under the current Green Building policy, but not able to achieve 2nd Reading by the end of the year would require significant redesign.
- Several respondents identified advancing to Step 3 of the Energy Step Code by January 1, 2024 would be challenging for high rises >6 stories and that this policy change would effect buildings already under design to meet the current low carbon energy system compliance pathway.
- The potential for additional electrical connection fees and infrastructure if projected electric load could not be met was noted.

3.3 Implementation for Part 9 Buildings

To meet Council direction for Part 9 residential buildings, the following is recommended for adoption as a Council policy with amendments to the Building Bylaw to follow:

All new Part 9 residential buildings applying for a building permit must meet the following minimum requirements laid out in Sections 9.36.6 (Energy Step Code) and 9.37 (Greenhouse Gas Emissions) of the BC Building Code:

Beginning January 1, 2024:

- Energy Step Code, Step 3
- Zero Carbon Step Code, EL-3 (Strong Carbon Performance)

Beginning January 1, 2025:

- Energy Step Code, Step 3
- Zero Carbon Step Code EL-4 (Zero Carbon Performance)

These would be mandatory requirements upon amendment to the Building Bylaw. The Building Bylaw amendments would be brought forward in January 2024. Upon the adoption of this reports recommendations, the bylaw amendments would be in process, and permits received after can be held until the bylaw amendment is complete.

3.4 Implementation for Part 3 Buildings

The Part 3 Green Building Policy and Low Carbon Energy System (LCES) Policy will be amended to one compliance pathway in accordance with Sections 10.2 and 10.3 of the BC Building Code:

- Energy Step Code, Step 2
- Zero Carbon Step Code, EL-4 (Zero Carbon)

In-stream rezoning applications that have progressed to 2nd Reading by December 31, 2023 would not be subject to the new requirements. These projects would proceed through the development approval and building permit process according to the current requirements for building energy efficiency and carbon performance established by the existing Green Building Rezoning Policy. Therefore, any rezoning applications that have not Received Second Reading by December 31, 2023 will be subject to the new policy on January 01, 2024.

A second phase of policy work scheduled for 2024 will consider transitioning from a rezoning policy to containing new Energy Step Code and Zero Carbon Step Code requirements as amendments to the Building Bylaw and a schedule for advancing to higher steps of the Energy Step Code as outlined in the draft implementation strategy.

Also recommended is that the Part 3 Green Building Policy and LCES Policy will be amended to exempt new buildings connecting to the existing Burnaby Mountain District Energy System. The second phase of policy work will consider how an existing DEU such as this one aligns with Zero Carbon Step Code.

3.5 Issues for Consideration

Zero Carbon Step Code requires electrification of space heating and domestic hot water systems. New developments will be required to demonstrate load requirements and are responsible for distribution system upgrades if there is not adequate power to meet the additional load on their site. BC Hydro is currently reviewing its extension policies and ways to reduce timelines for system upgrades. Builders and property owners may incur some additional costs as part of their overall project as a result.

4.0 COMMUNICATION AND COMMUNITY ENGAGEMENT

Not applicable

5.0 FINANCIAL CONSIDERATIONS

Not applicable

Respectfully submitted,

E. W. Kozak, General Manager Planning and Development

ATTACHMENTS

Attachment 1 – City of Burnaby Proposed Zero Carbon Step Code & Energy Step Implementation

Attachment 2 – BC Energy Step Code & Zero Carbon Step Code Proposed Implementation Timeline Survey

REPORT CONTRIBUTORS

This report was prepared by Mark Sloat, Planner 3 and reviewed by Erica Lay, Manager Climate Action and Energy and Lee-Ann Garnett, Deputy General Manager, Planning and Development

City of Burnaby: Proposed Zero Carbon Step Code and Energy Step Implementation.

Last updated September 15, 2023

Part 3 Buildings

New large (**Part 3**) buildings over 3 storeys or 600 sq. m footprint, with residential, business, personal services and mercantile occupancies.

Current requirements

- May 1, 2023: all new building permits have to meet the minimum of Step 2 of [BC Energy Step Code](#).
- For projects seeking rezoning, buildings are subject to Green Building Rezoning Policy requirements and have to meet the minimum of Step 3 of the Energy Step Code, OR Step 2 with a Low-Carbon Energy System and greenhouse gas emission limits.

Proposed new requirements arriving in 2024

- The City intends to move away from a rezoning policy to containing new Energy Step Code and Zero Carbon Step Code requirements as amendments to the Building Bylaw.
- January 1, 2024, all new Part 3 buildings applying for a building permit would need to meet the following minimum requirements in Sections 10.2 (Energy Efficiency) and 10.3 (Greenhouse Gas Emissions) of the BC Building Code:
 - Energy Step Code, Step 3
 - Zero Carbon Step Code, EL-4 (Zero Carbon Performance)

Implementation

- In-stream rezoning applications that have progressed to 2nd Reading by December 31, 2023 would not be subject to the new requirements. These projects would proceed through the development approval and building permit process according to the current requirements for building energy efficiency and carbon performance established by the existing Green Building Rezoning Policy.
- The new requirements would no longer include a 'step up / step down' approach with alternative compliance pathways.
- Technical work is underway to align Burnaby's future district energy plans with Zero Carbon Step Code compliance.
- Some rezoning requirements for efficient mechanical systems and energy benchmarking and reporting may be retained in a rezoning policy.

Draft Energy Step Code and Zero Carbon Step Code requirements and timeline for Part 3 new buildings

Part 3 Buildings	2023	2023	January 1, 2024	January 1, 2027	January 1, 2030
Group C Residential Occupancies, six stories or less	Part 3 Green Building Rezoning Policy (2019): Step 3, or Step 2 with Low Carbon Energy System GHG emission limits	Transition away from Green Building Rezoning policy to an amended Building Bylaw	Step 3	Step 4	Step 4
Group C Residential Occupancies, six stories or more			EL-4 Zero Carbon Ready	EL-4 Zero Carbon Ready	EL-4 Zero Carbon Ready
Hotels and Motels					
Group D Offices (Businesses and Personal Services)			Step 2	Step 3	Step 3
Other Group D and E (Mercantile) occupancies			EL-4 Zero Carbon Ready	EL-4 Zero Carbon Ready	EL-4 Zero Carbon Ready
<p>Implementation</p> <ul style="list-style-type: none"> - In-stream rezoning applications that have progressed to 2nd Reading by December 31, 2023 would <u>not</u> be subject to the new requirements. These projects would proceed through the development approval and building permit process according to the current requirements for building energy efficiency and carbon performance established by the existing Green Building Rezoning Policy. - Technical work is underway to align Burnaby’s future district energy plans with Zero Carbon Step Code compliance. - Some rezoning requirements for efficient mechanical systems and energy benchmarking and reporting may be retained in a rezoning policy. 					

Part 9 Buildings

New (**Part 9**) buildings with residential occupancies that are 3 storeys or less and have a floor area of less than 600 sq. m. Examples include single-family homes, duplexes, townhomes, rowhouses and small apartments.

Current requirements

- May 1, 2023: all new building permit applications must meet Step 3 of the [Energy Step Code](#)
- No carbon performance requirement

Proposed new requirements arriving in 2024 and 2025

All new Part 9 residential buildings applying for a building permit would need to meet the following minimum requirements laid out in Sections 9.36.6 (Energy Step Code) and 9.37 (Greenhouse Gas Emissions) of the BC Building Code:

Beginning January 1, 2024

- Energy Step Code, Step 3
- Zero Carbon Step Code, EL-3 (Strong Carbon Performance)

Beginning January 1, 2025:

- Energy Step Code, Step 3
- Zero Carbon Step Code EL-4 (Zero Carbon Performance)

Implementation

- Building permits received on or after the dates noted above are subject to the new requirements.
- For Energy Step Code, beyond 2024 the City may consider options to either accelerate adoption of higher steps or harmonize with expected updates to the BC Building Code in 2027 and 2032 to reach the highest steps.

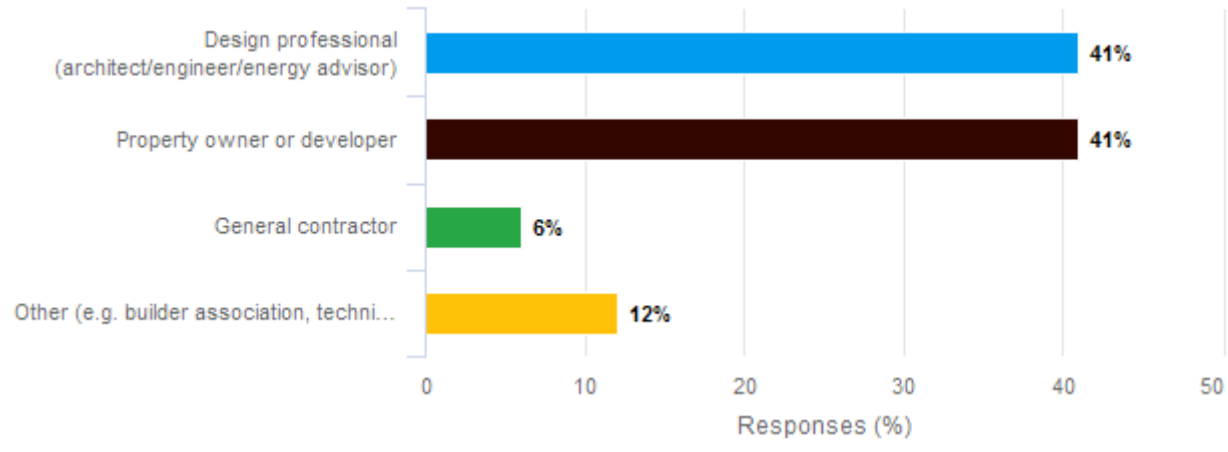
Draft Energy Step Code and Zero Carbon Step Code requirements and timeline for Part 9 new buildings

Part 9 Buildings	May 1, 2023	January 1, 2024	January 1, 2025	January 1, 2027	January 1, 2030
Single or two family dwellings	Step 3	Step 3	Step 3	Step 4	Step 5
Laneway homes	No carbon requirements	EL-3 Strong Carbon	EL-4 Zero Carbon Ready	EL-4 Zero Carbon Ready	EL-4 Zero Carbon Ready
Townhomes and apartment buildings up to 3 storeys					
Implementation					
- Building permits received on or after the dates noted above are subject to the new requirements					

BC Energy Step Code and Zero Carbon Step Code Proposed Implementation Timeline Survey

2023-11-27 19:30

Which of the following best describes you?



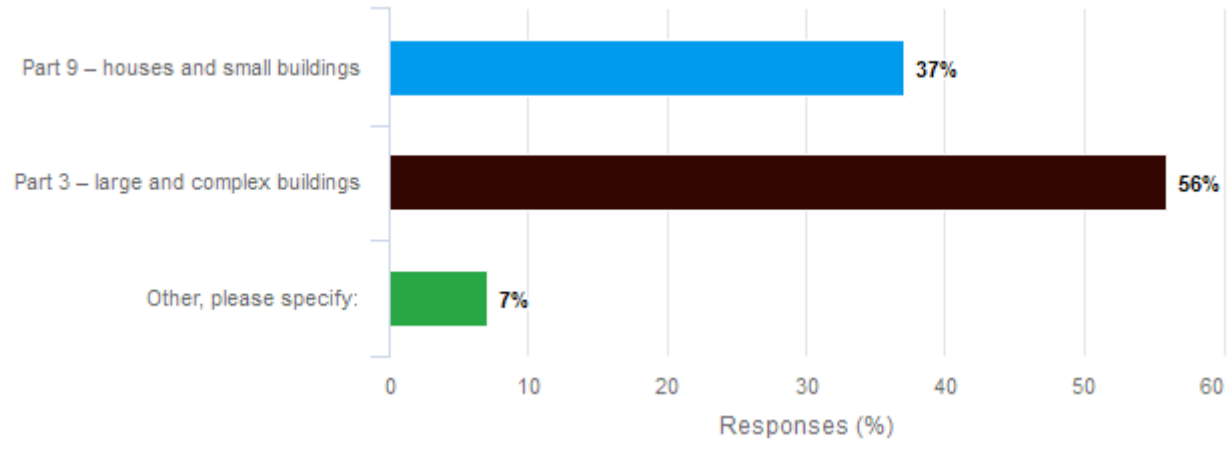
	%	Frequency
Design professional (architect/engineer/energy advisor)	41.18%	7
Property owner or developer	41.18%	7
General contractor	5.88%	1
Other (e.g. builder association, technical support, energy utility representative), please specify:	11.76%	2
Total		17

Other, please specify:

"Local government staff (not Burnaby)

"Capacity building organization"

What types of new developments are you/your firm working on in Burnaby?



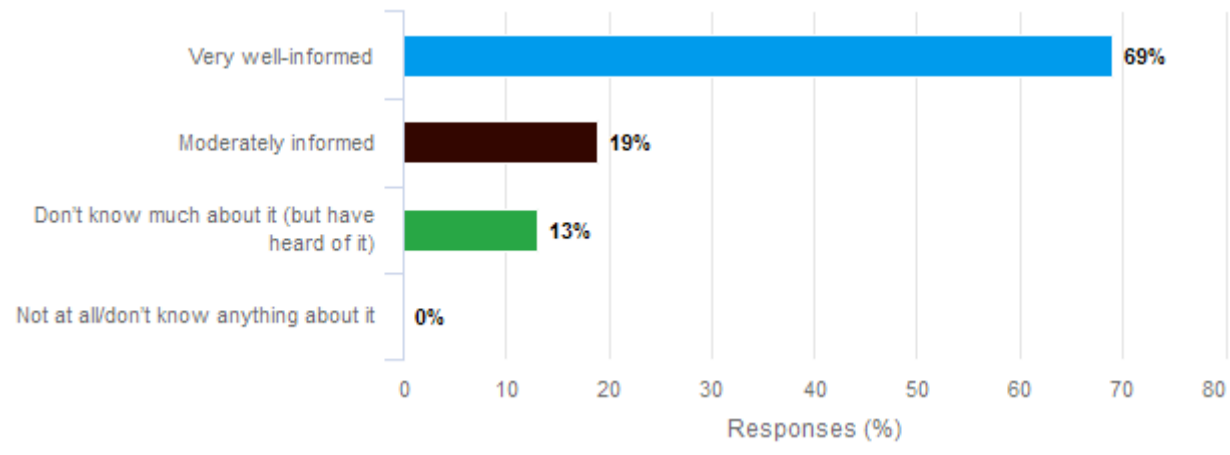
	%	Frequency
Part 9 – houses and small buildings	37.04%	10
Part 3 – large and complex buildings	55.56%	15
Other, please specify:	7.41%	2
Total		27

Other, please specify:

"Industrial"

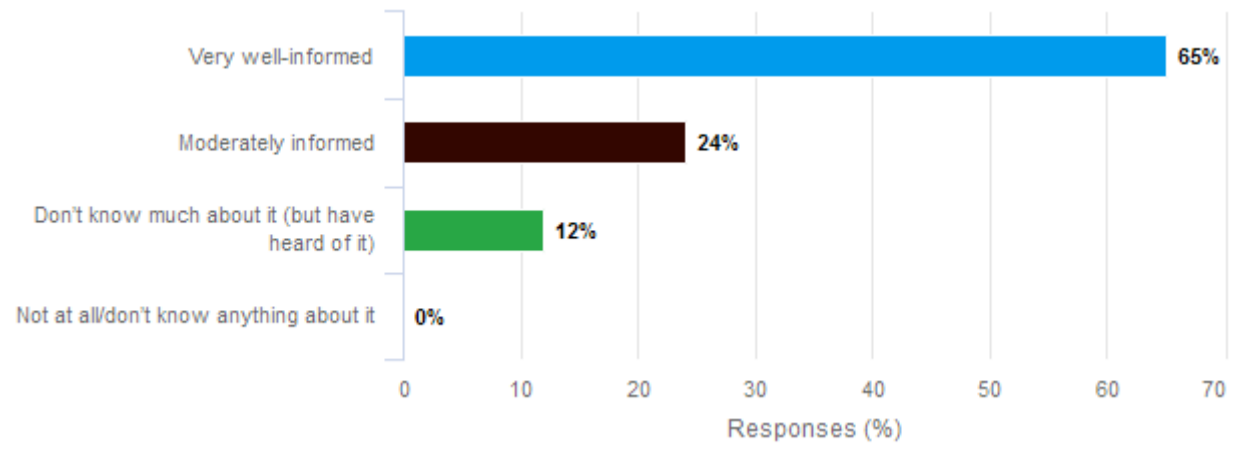
"P3 and P9, not in Burnaby"

How well-informed are you about BC Energy Step Code?



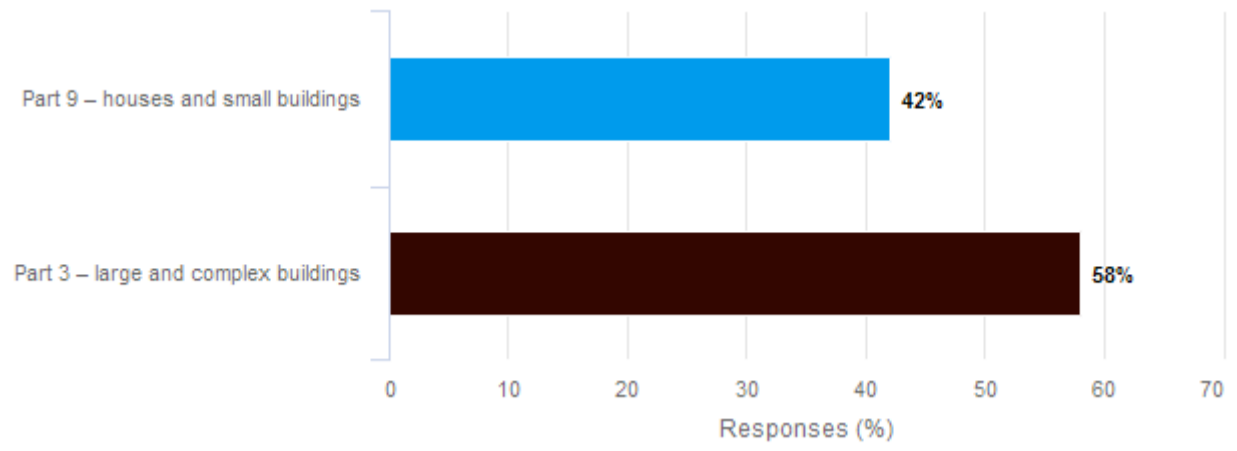
	%	Frequency
Very well-informed	68.75%	11
Moderately informed	18.75%	3
Don't know much about it (but have heard of it)	12.50%	2
Not at all/don't know anything about it	0.00%	0
Total		16

How well-informed are you about BC Zero Carbon Step Code?



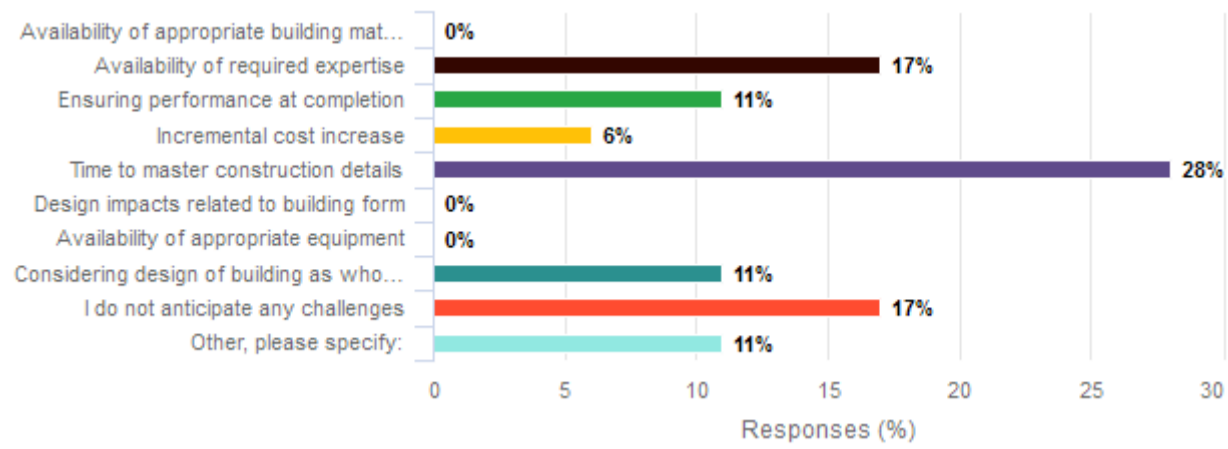
	%	Frequency
Very well-informed	64.71%	11
Moderately informed	23.53%	4
Don't know much about it (but have heard of it)	11.76%	2
Not at all/don't know anything about it	0.00%	0
Total		17

Please indicate which types of buildings you would like to provide feedback on (check all that apply):



	%	Frequency
Part 9 – houses and small buildings	42.31%	11
Part 3 – large and complex buildings	57.69%	15
Total		26

For Part 9 new buildings, please select the top two challenges you anticipate in building construction projects which go beyond Step 3 of the Energy Step Code.



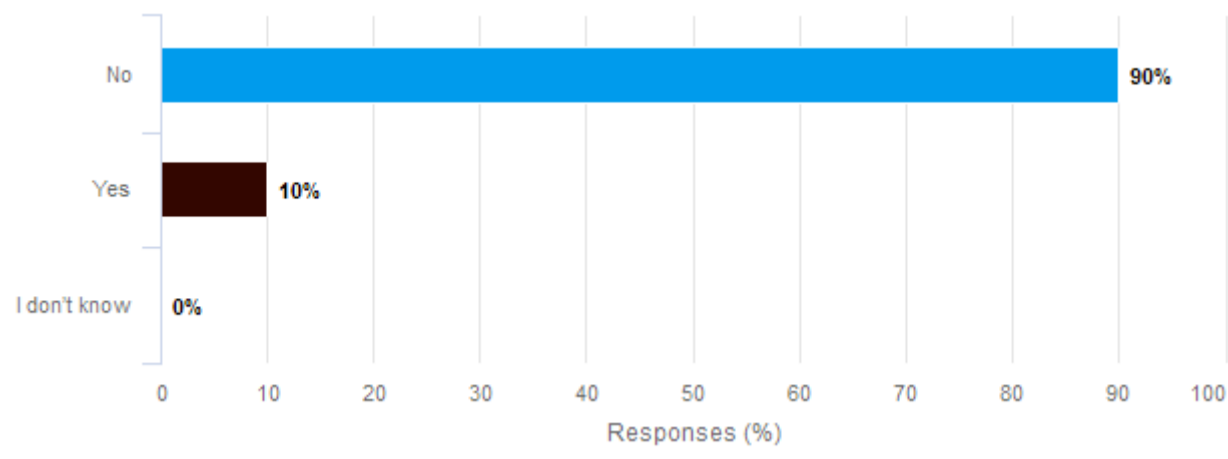
	%	Frequency
Availability of appropriate building materials	0.00%	0
Availability of required expertise	16.67%	3
Ensuring performance at completion	11.11%	2
Incremental cost increase	5.56%	1
Time to master construction details	27.78%	5
Design impacts related to building form	0.00%	0
Availability of appropriate equipment	0.00%	0
Considering design of building as whole system	11.11%	2
I do not anticipate any challenges	16.67%	3
Other, please specify:	11.11%	2
Total		18

Other, please specify:

"Initial incremental cost increase for the first project or two."

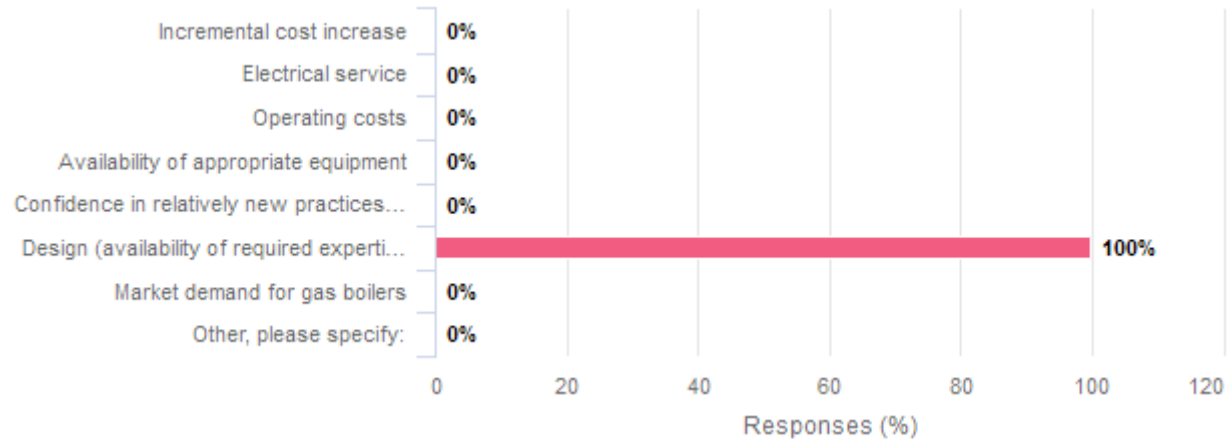
"I do not anticipate any challenges *as long as other jurisdictions continue to advance alongside Burnaby and there is good training/education for builders and building officials"

Do you feel there are barriers to implementing zero carbon ready electric space heating systems in new Part 9 buildings?



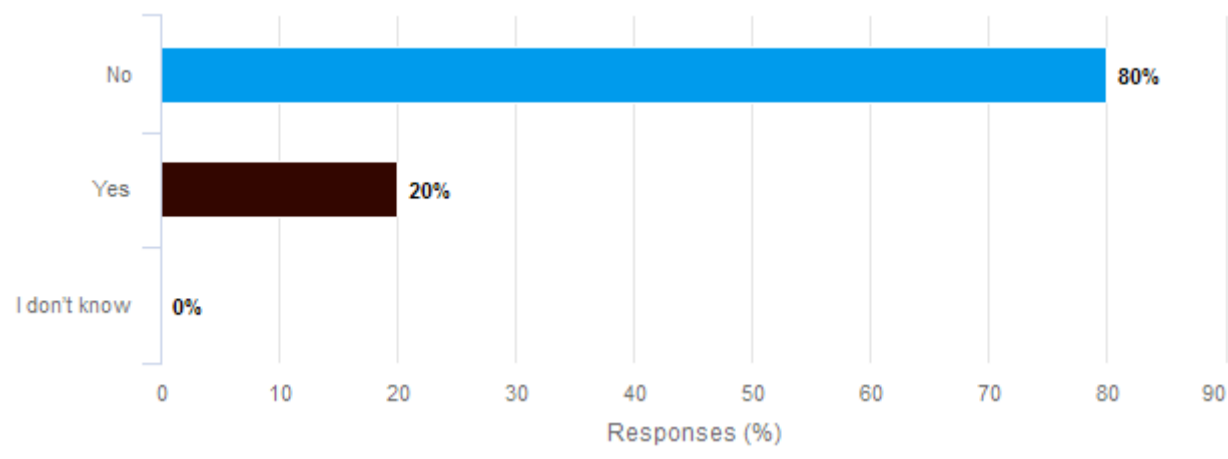
	%	Frequency
No	90.00%	9
Yes	10.00%	1
I don't know	0.00%	0
Total		10

What do you feel are the top two barriers?



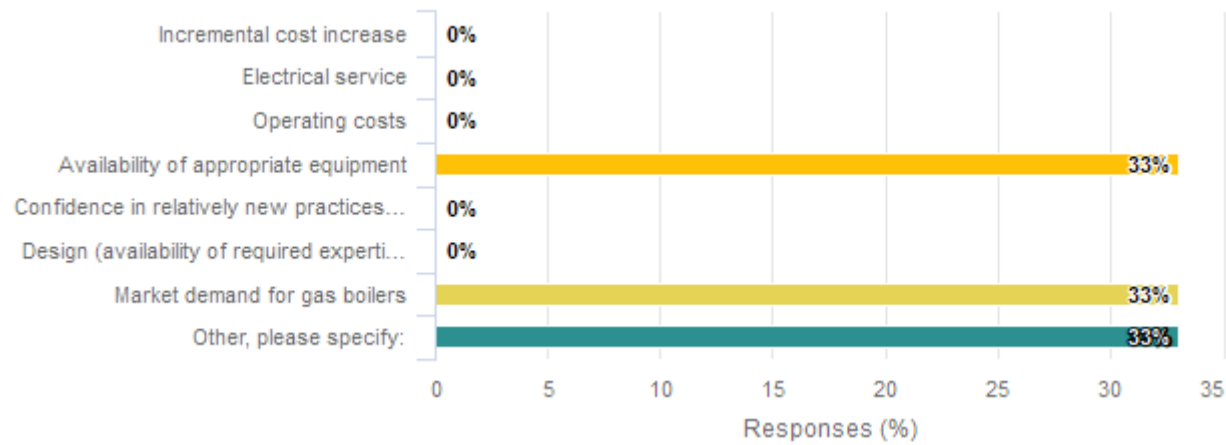
	%	Frequency
Incremental cost increase	0.00%	0
Electrical service	0.00%	0
Operating costs	0.00%	0
Availability of appropriate equipment	0.00%	0
Confidence in relatively new practices/equipment	0.00%	0
Design (availability of required expertise)	100.00%	1
Market demand for gas boilers	0.00%	0
Other, please specify:	0.00%	0
Total		1

Do you feel there are barriers to implementing zero carbon ready electric domestic hot water systems in new Part 9 buildings?



	%	Frequency
No	80.00%	8
Yes	20.00%	2
I don't know	0.00%	0
Total		10

What do you feel are the top two barriers?



	%	Frequency
Incremental cost increase	0.00%	0
Electrical service	0.00%	0
Operating costs	0.00%	0
Availability of appropriate equipment	33.33%	1
Confidence in relatively new practices/equipment	0.00%	0
Design (availability of required expertise)	0.00%	0
Market demand for gas boilers	33.33%	1
Other, please specify:	33.33%	1
Total		3

Other, please specify:

"Availability of labour who know the systems"

Based on the timeline above for Part 9 new buildings, what are the biggest challenges or barriers you face to building construction projects which meet the requirements of the highest steps of the Energy Step Code and Zero Carbon Step Code?

"Don't move too fast, let the industry complete current steps first. Industry has made massive leaps forward and needs time to settle. When embodied carbon is considered Step 2 can have lower Carbon Emissions than Step 5."

"implementing a high-performance air barrier, especially if builders still use the interior poly method (as opposed to an external air barrier approach). proper sizing of the air-source heat pump and ducting required, and ensuring installation enables the needed airflow. preventing the use of natural gas ""back-up"" systems which are then used as the principal heating system."

"Resistance of some designers and other consultants to going beyond business as usual."

"A lot of the industry will require training. BC Housing has mandatory ESC training. Organizations like HAVAN also have training for their members. HPCN also offers training that is applicable to new construction. Manufacturers and suppliers also offer training for the products used to achieve high levels of airtightness or thermal performance. The industry will have to actively train up for this adoption schedule, but the training opportunities are there. CoB could help ease this increased demand for training by hosting monthly or bimonthly builder's breakfasts like Surrey, New West, ToL do. I also think a big challenge will be the additional workload imposed on City staff as new permits come in that are non-compliant. LGCAP funding could be used to add staff to assist with this contractor/designer learning curve."

"Entrenched influence of the gas industry seeding doubt and misinformation. These practices are not rocket science, just require commitment to evolve with the times."

What supports are required to meet these challenges or to remove barriers to build to the highest steps of the Energy Step Code and Zero Carbon Step Code?

"Need a new generation of plumbers and installers who have come up on these systems and know the ins and outs- aren't trying to learn something new after working w/ gas for 20+ years"

"See above, follow CoV for Embodied Carbon consideration."

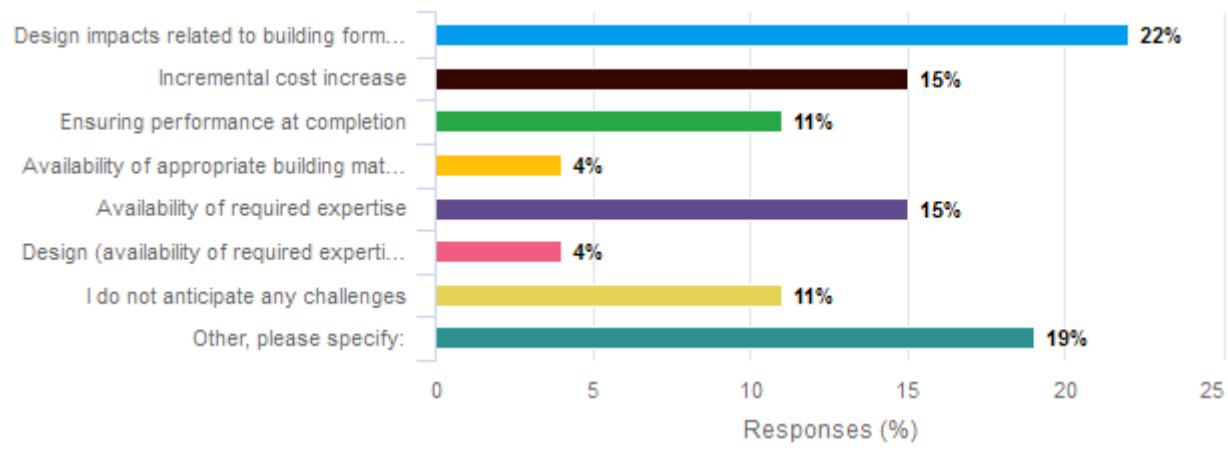
"Make training in airtightness, and installing effective ventilation available to contractors and trades. Consider the use of multiple compliance pathways (i.e. "step down" options allowing builders to trade off energy efficiency with low-carbon performance) to give builders more flexibility in transitioning to high-performance buildings."

"Required training for designers and installers especially around building envelope and heat pumps."

"See above. An important strategy is to showcase leading examples of Step 5, EL4 homes that are built on a budget. Once the community is convinced or is shown that it can be done on a budget or cost effectively, they will put their energy towards achieving the requirement rather than resisting it."

"Industry training; building official training; communications and education about case studies of successful projects."

Please choose the top two challenges you anticipate for building to highest steps of the Energy Step Code for Part 3 buildings.



	%	Frequency
Design impacts related to building form and exterior insulation	22.22%	6
Incremental cost increase	14.81%	4
Ensuring performance at completion	11.11%	3
Availability of appropriate building materials	3.70%	1
Availability of required expertise	14.81%	4
Design (availability of required expertise)	3.70%	1
I do not anticipate any challenges	11.11%	3
Other, please specify:	18.52%	5
Total		27

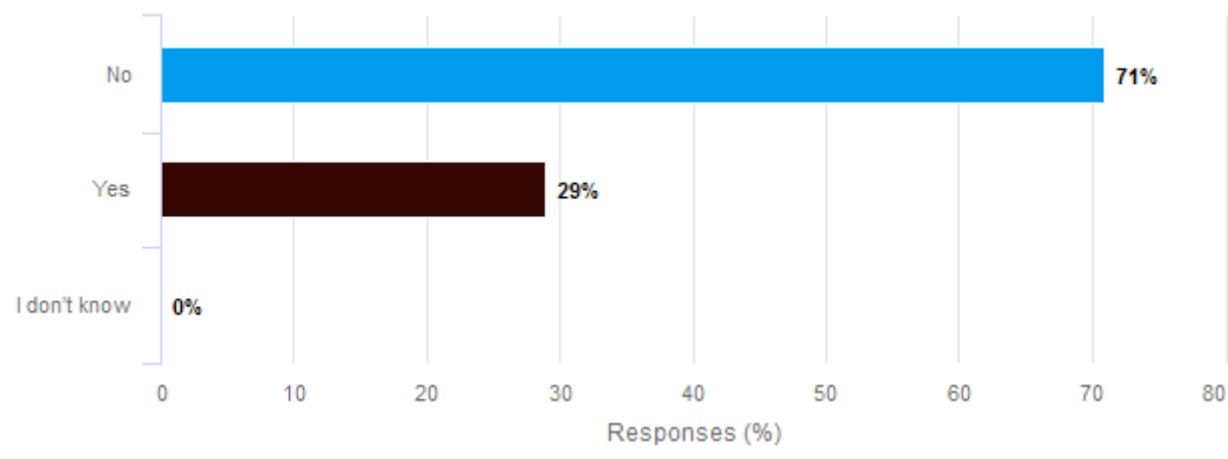
Other, please specify:

"Educating buyers of the cost increase to their purchase as a result of the increased energy and zero carbon step codes"

"Too short notice to implement by Jan 2024."

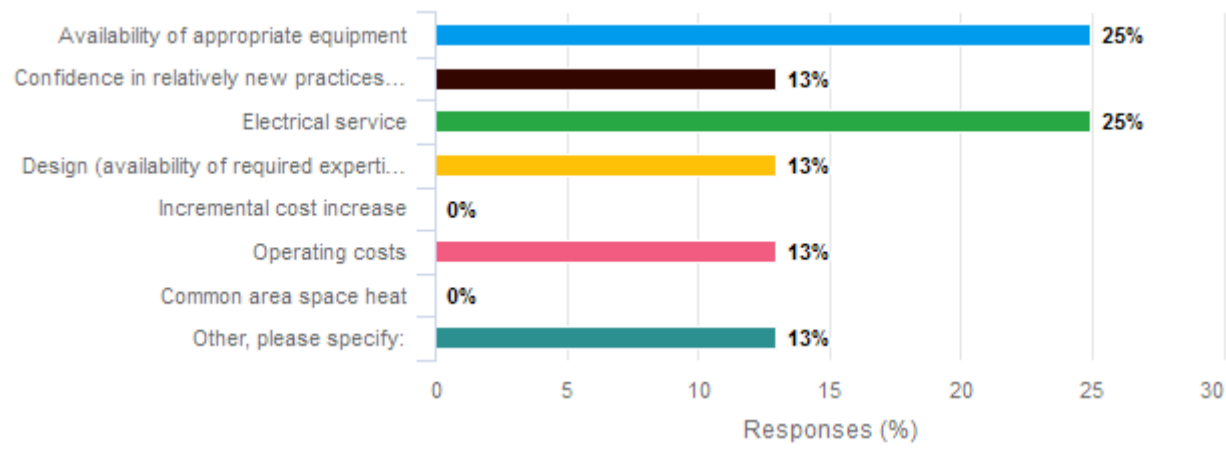
"first few projects will likely cost more"

Do you feel there are barriers or challenges to implement zero carbon ready electric space heating systems in new Part 3 buildings?



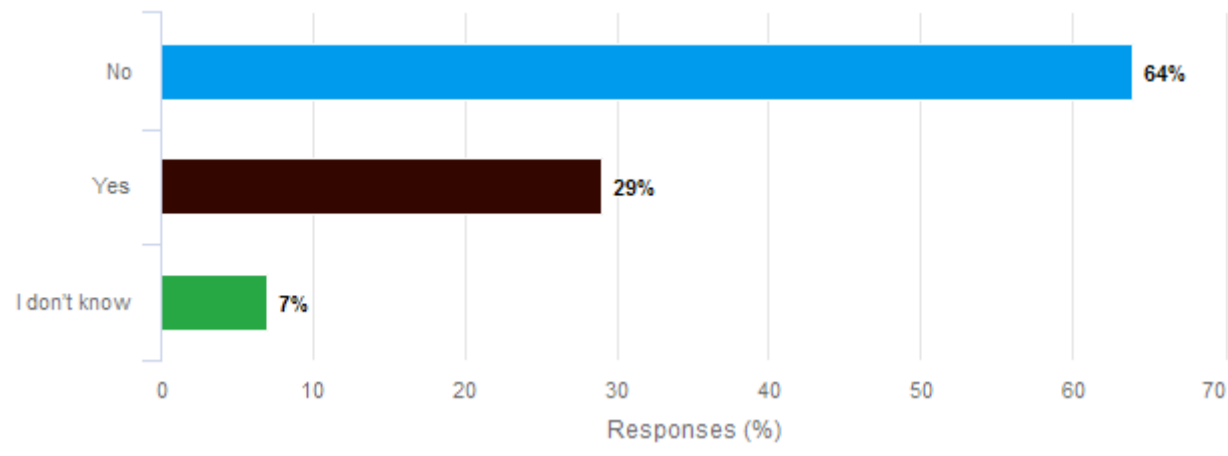
	%	Frequency
No	71.43%	10
Yes	28.57%	4
I don't know	0.00%	0
Total		14

Please choose the top two challenges you anticipate for using zero carbon ready electric space heating systems in new Part 3 buildings:



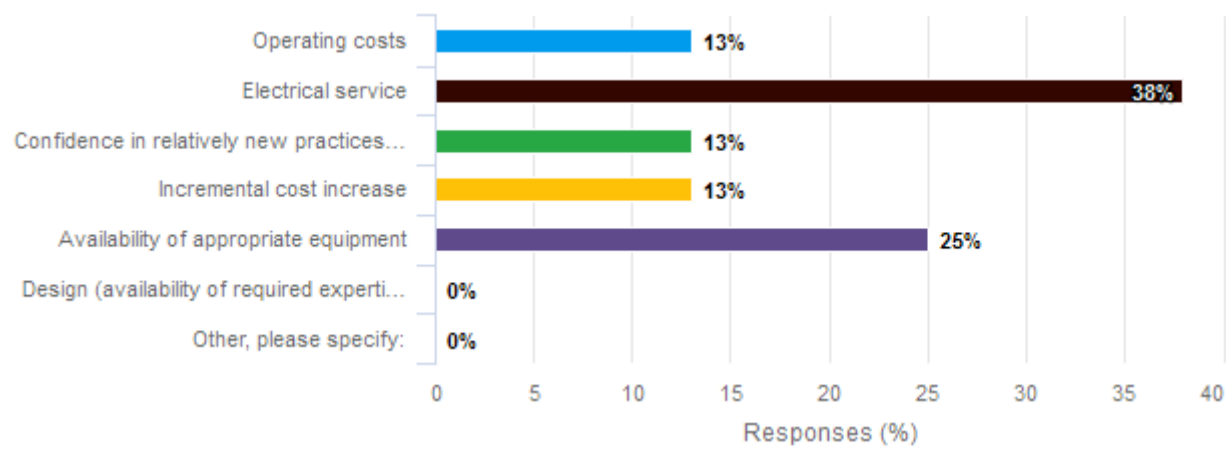
	%	Frequency
Availability of appropriate equipment	25.00%	2
Confidence in relatively new practices/equipment	12.50%	1
Electrical service	25.00%	2
Design (availability of required expertise)	12.50%	1
Incremental cost increase	0.00%	0
Operating costs	12.50%	1
Common area space heat	0.00%	0
Other, please specify:	12.50%	1
Total		8

Do you feel there are barriers to implementing zero carbon ready electric domestic hot water heating systems in new Part 3 buildings?



	%	Frequency
No	64.29%	9
Yes	28.57%	4
I don't know	7.14%	1
Total		14

Please choose the top two challenges you anticipate for using zero carbon ready electric domestic hot water heating systems in new Part 3 buildings:



	%	Frequency
Operating costs	12.50%	1
Electrical service	37.50%	3
Confidence in relatively new practices/equipment	12.50%	1
Incremental cost increase	12.50%	1
Availability of appropriate equipment	25.00%	2
Design (availability of required expertise)	0.00%	0
Other, please specify:	0.00%	0
Total		8

Based on the below timeline to reach the highest step of the Energy Step Code and new Zero Carbon Step Code, what do you see as the biggest challenges for new Part 3 buildings?

"Additional project costs associated with increased construction costs for building systems and additional time associated with constructing and testing to a higher standard which will ultimately be passed down to the consumer who are already stretched thin financially when purchasing a new home."

"Targeting Step 3 on 6-storey+ residential in a short period will be very challenging. There are lots of buildings at design that are under Step 2 + LCES from the current Green Buildings Policy that will not have their 2nd reading before Jan 1, 2024. The change to Step 3 will require redesign with significant impacts on shape and massing. I'd highly request postponing the Step 3 for 6-storey+ concrete buildings to End of 2024 in lieu of beginning of 2024."

"See Part 9 replies. Too fast, let things settle. Wait for embodied carbon considerations to be integrated in Vancouver."

"The implementation by Jan 1st 2024 is too short notice. We have designs that are well under way that won't get to second reading by December 31st, 2023. Having to start from scratch will cause a significant burden on the project and will delay much needed rental properties from coming to market."

"Too short of notice as they will have major impacts on envelope and mechanical systems design."

"The proposed code change doesn't consider positive effects of energy & cost savings that are achieved through connecting to Low carbon District energy systems. District energy systems offer a huge advantage in economies of scale and provide resiliency and synergies through combination of multiple loads. This proposed code change is set towards a discrete building-based systems which will cost more and offer less resilient infrastructure."

What supports will help to reduce barriers or challenges to build to the highest steps of Energy Step Code by 2027 and Zero Carbon step code?

"Subsidies from all levels of government which will allow the amount of new housing that is needed to meet demand to be constructed in a manner that is economically feasible."

"I am a member of a reupdated [redacted] in BC. Concrete construction is not ready for Step 4 yet mainly on the Envelope side. The technologies are getting better but still far from achieving Step 4. I'd highly recommend reconsidering the dates (postponing) for Step 3 and Step 4 implementation on the concrete buildings."

"Postpone of the Step 3 concrete/6-storey + to 2025 to allow for more notice."

"Consideration for Low carbon District energy & allowance for a moderate target for buildings connecting to DE should be encouraged for wider adoption. This would provide a community level better energy use and efficiency, while promoting resiliency. Also reduces embodied carbon significantly in reducing the number of equipment's (heat pumps and boilers) used to serve redundancy."

"Consider the use of multiple compliance pathways (i.e. "step down" options allowing builders to trade off energy efficiency with low-carbon performance) to give builders more flexibility in transitioning to high-performance buildings."

"More design staff dedicated to zero carbon step code projects and simplified connection process for larger projects like what is available for smaller projects (Express Connection)"

"More training, industry sharing insight with one another, showcasing examples of projects that have achieved this already (zebx.org, etc.) and having a CoB permitting and inspection department that can support this important transition."

"Industry education and training. Organizations such as ZEIC are helping."