Table 11: Code adoption scenarios

Pathways	Scenario	Description
-	Baseline	Follows the provincial timeline for the Energy Step Code (ESC) and the Zero Carbon Step Code (ZCSC).
#1	Voluntary Intervention	Follows the provincial timeline for the ESC and the ZCSC but jurisdictions will use incentives and targeted intervention (i.e., permit fast-tracking, financial incentives, density bonusing, and rezoning requirements) * to encourage the highest step of the ZCSC and the highest step of the ESC ahead of time.
#2	Accelerated Energy Step Code (Incremental)	Jurisdictions adopt an accelerated timeline for the ESC, bringing the year of each step forward. The ZCSC follows the provincial timeline.
#3	Accelerated Energy Step Code (Leapfrog + LCES Option)**	Jurisdictions adopt an accelerated timeline for the ESC, leapfrogging to the highest step for each building type from 2025, but provide the option of the second highest step for each building type if a low-carbon energy system (LCES) is used. The ZCSC follows the provincial timeline, but if an LCES it is assumed to be equivalent to achieving the 'Zero' step of the ZCSC.
#4	Accelerated Zero Carbon Step Code (Incremental)	Jurisdictions adopt an accelerated timeline for the ZCS, bringing the year of each step forward. The ESC follows the provincial timeline.
	Accelerated Zero Carbon Step Code (Leapfrog)	Jurisdictions adopt an accelerated timeline for the ZCS, leapfrogging requirements for the 'Moderate' and 'Strong' steps and going straight to requiring 'Zero' (the highest step) from 2026***. The ESC follows the provincial timeline.
#5	Accelerated Energy and Zero Carbon Step Code	Jurisdictions adopt an accelerated timeline for the ZCS, leapfrogging requirements for the 'Moderate' and 'Strong' steps and going straight to requiring 'Zero' (the highest step) from 2026***. They also adopt an accelerated timeline for the ESC, bringing the year of each step forward.
	Alignment with CoN	Jurisdictions adopt the same timelines for the ESC and ZCSC as proposed by the City of Nanaimo.

- It is assumed that there are no incentives or targeted interventions to encourage steps above what is required by the timelines in each scenario apart from the 'Voluntary Inventory' scenario.

*As a regional government, RDN does not have the same powers as the municipalities in their region. RDN can only offer permit fast-tracking and financial incentivization, while municipalities in the region (e.g., Lantzville, Parksville and Qualicum Beach) could also pursue rezoning requirements and density bonusing.

**For the purposes of modelling it is assumed that 50% of buildings opt for the LCES Option. Introba has heard through previous industry engagement that currently achieving higher levels of the ESC can be challenging, whereas many buildings are already being built with all-electric or low-carbon energy systems. Hence the uptake of this option is expected to be high.

***The CoN is planning to require Zero for all buildings from July 2024, except for 4-6 storey MURBs, which will go to Zero in Jan 2026. This date is intended to align with that second move.

A summary of the results for each jurisdiction can be found in the tables below. These tables note the cumulative emissions savings by 2030 and by 2050 as a result of adopting each pathway.

Note that while the City of Nanaimo (CoN) is a member municipality of the RDN, it has not been included in this analysis as they have already put forward a proposal to Council based on the same modelling exercise. However, the scenarios and timelines explored for the CoN vary slightly to those explored here for the other member municipalities; as such, the results can not be totalled to give overall savings for the RDN. The only comparable scenario is the 'Alignment with CoN' scenario, for which it is estimated that the CoN could expect cumulative emissions savings of 3,800 tonnes by 2030 and 24,800 tonnes by 2050. If all member municipalities adopted the pathway as proposed by the CoN, it is estimated that the RDN could expect cumulative emissions savings of 5,300 tonnes by 2030 and 34,700 tonnes by 2050.

Table 12: Cumulative Emissions Savings by 2030 (tCO2e)

Scenario	Lantzville	Parksville	Qualicum Beach	Electoral Areas
Baseline	-	-	-	-
Voluntary Intervention	19	94	39	181
Accelerated ESC (Incremental)	2	7	3	15
Accelerated ESC (Leapfrog+LCES Option)	56	262	94	477
Accelerated ZCSC (Incremental)	54	233	89	243
Accelerated ZCSC (Leapfrog)	69	297	113	308
Accelerated ESC & ZCSC	70	303	116	323
Alignment with CoN	118	545	245	601

Table 13: Cumulative Emissions Savings by 2050 (tCO2e)

Scenario	Lantzville	Parksville	Qualicum Beach	Electoral Areas
Baseline	-	-	-	-
Voluntary Intervention	129	661	254	1178
Accelerated ESC (Incremental)	11	49	18	97
Accelerated ESC (Leapfrog+LCES Option)	452	2236	760	3747
Accelerated ZCSC (Incremental)	427	1897	70.8	1919
Accelerated ZCSC (Leapfrog)	545	2420	901	2438
Accelerated ESC & ZCSC	556	2467	918	2534
Alignment with CoN	796	3691	1562	3915

To better understand the results in Table 12 and Table 13 and the impact of each pathway has over time, it is helpful to explore:

- The annual GHG emissions as a result of annual new floor area (Figure 6)
- The annual GHG emissions as a result of cumulative new floor area (Figure 7)
- The cumulative GHG emissions from cumulative new floor area (Figure 8)

Though the following figures show the results for Electoral Areas, the commentary is applicable to all other jurisdictions. All other jurisdictions' results are presented in Appendix A.

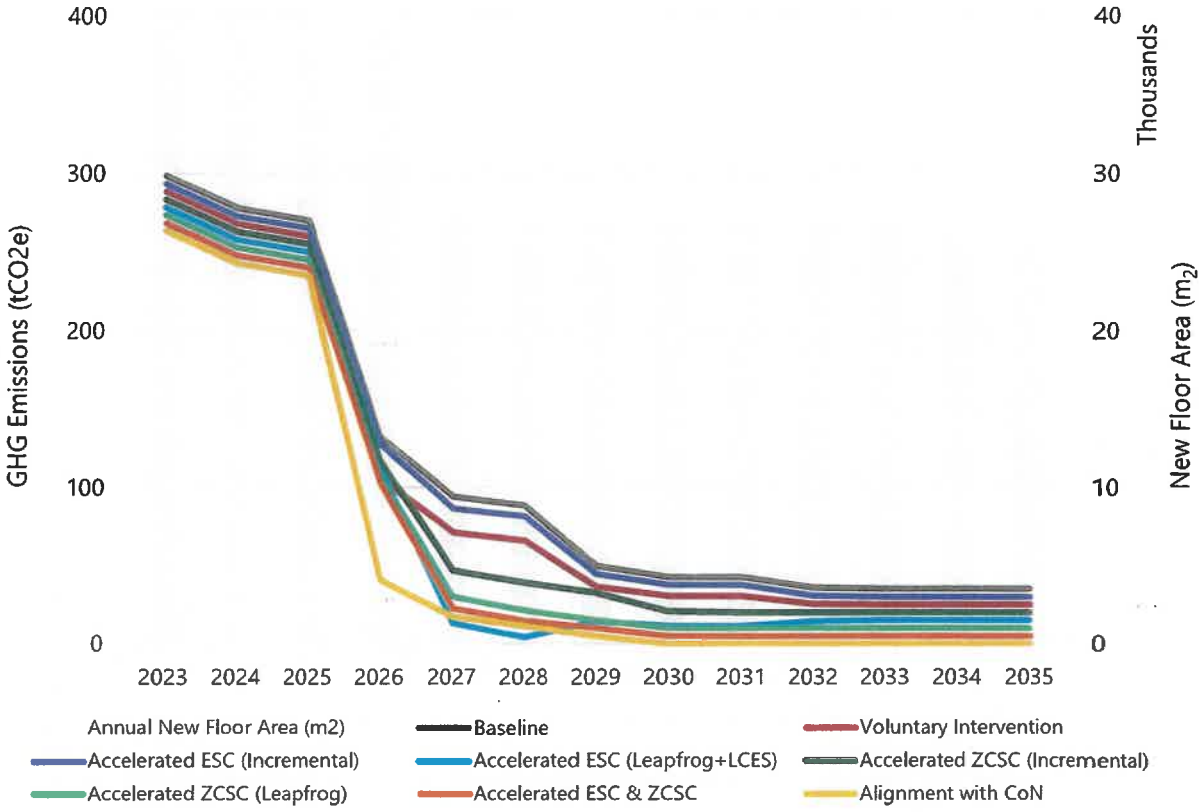


Figure 6: Annual GHG Emissions from Annual New Floor Area – Electoral Areas

Exploring annual GHG emissions from new annual floor area, the following observations can be made:

- Differences in GHG emissions between scenarios are not seen until 2026. This is because 2024 is the first year in which a step of the Zero Carbon Step Code is encouraged or required ahead of the provincial timeline in any of the scenarios, and there is a lag of 2 to 3 years between when buildings are permitted and when they are constructed.
- Differences in GHG emissions between scenarios over the baseline are predominately due to whether any new floor area is required or encouraged to meet steps of the Zero Carbon Step Code ahead of the provincial timeline. The difference is greater in scenarios that include an accelerated timeline for the Zero Carbon Step Code.
- In 2033 GHG emissions associated with the new floor area is equal in all scenarios. This is because 2030 is the first year the highest step of the Zero Carbon Step Code is required in all scenarios (and there is an assumed lag of 2 to 3 years).
- In the scenario where the Energy Step Code timeline is accelerated incrementally, there is no difference in GHG emissions compared to the baseline. This is because the Energy Step Code drives energy use reduction, not GHG emissions reduction. In the scenario where the Energy Step Code timeline is accelerated and there is an LCES option, it is LCES option that drives emission reduction.

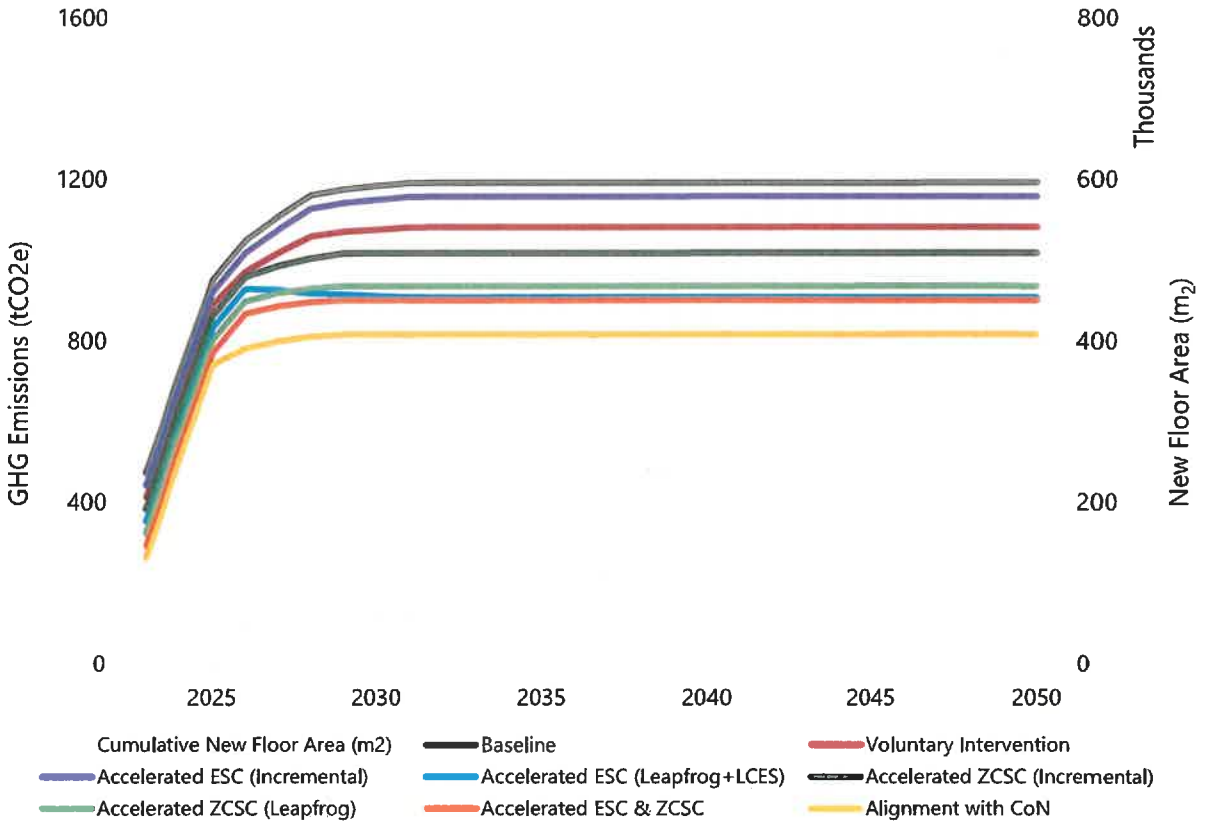


Figure 7: Annual GHG Emissions from Cumulative New Floor Area – Electoral Areas

When looking at annual emissions from cumulative new floor area, the following can be observed:

- Once new buildings are constructed, they continue to emit the same GHG emissions each year (assuming they are not retrofitted).
- The difference in annual emissions associated with cumulative new floor area increases significantly between 2025 and 2030, reflecting buildings permitted between 2022 and 2027.
- The difference remains constant from 2033 given that the 'Zero' step of the Zero Carbon Step Code is required from at least 2030 in all scenarios.
- Annual emissions across all scenarios continue to increase slowly with new floor area because the emissions associated with the highest steps of both the Energy Step Code and Zero Carbon Step Code are still not completely zero, the model assumes that there is still some natural gas use.

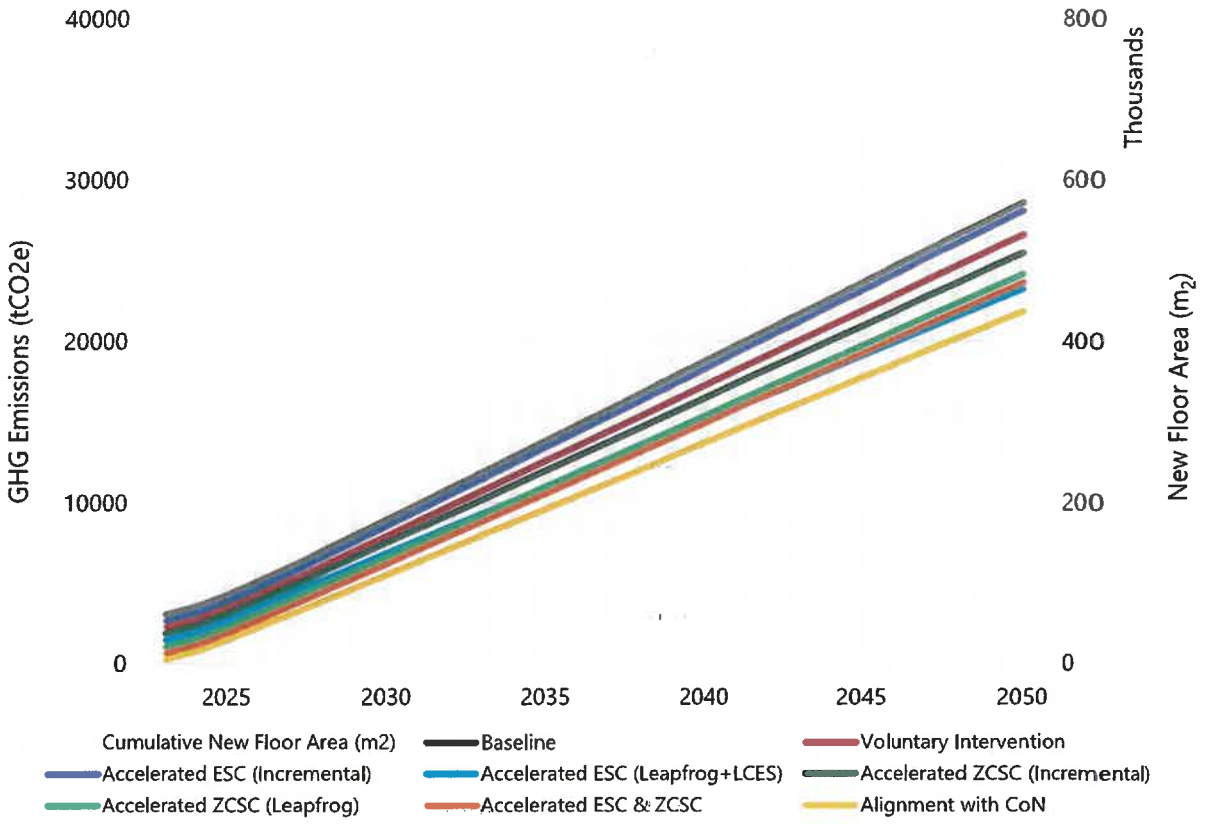


Figure 8: Cumulative GHG Emissions from New Floor Area - Electoral Areas

As a result of the differences in annual GHG Emissions (see Figure 7) the difference in cumulative emissions between each scenario grows year on year (see Figure 8). This provides a rationale for early action, as every fossil fuel heated building that is built today, will continue to produce emissions for the 15–20-year lifespan of the heating system.

Evaluation of Options

The five pathways were evaluated based on carbon savings, cost of implementation, industry readiness, alignment with other jurisdictions, and co-benefits. Evaluation criteria used represent a mix of quantitative and qualitative metrics, each of which were ranked using a three-point scale: poor, moderate, and good. Criteria included:

- **Carbon savings.** The cumulative carbon savings in 2030 and 2050.
- **Capital costs.** The average incremental capital costs (ICC) for building construction.
- **Energy costs.** The qualitative estimate on the impacts on energy costs, equity and affordability
- **Future retrofit costs** The qualitative estimate on the future construction costs for retrofits to comply with local and provincial regulations.
- **Climate resilience.** The climate resilience improvement (e.g. overheating and power outages).
- **Industry readiness**. The current level of industry readiness for meeting requirements (based on engagement).
- **Regional consistency**. The level of alignment with proposed approaches with leading local governments on Vancouver Island.
- **Cost to local government**. A qualitative estimate of the implementation and administration costs to local government.

Legend: Good Moderate Poor

Pathways	Carbon Savings	Capital Costs	Energy Costs	Future Retrofit Costs	Climate Resilience	Industry Readiness	Regional Consistency	Cost to Local Government
#1: Voluntary Intervention	2030: 2% 2050: 3%	Will vary depending on the pathway, and ICC may be partially offset by financial and non-financial incentives	Buildings built to baseline BCBC are the least efficient of the five pathways resulting in highest utility costs	Most buildings would be built to baseline BCBC and require a heating system replacement due to forthcoming provincial regulations	Most buildings would be built to baseline BCBC and not have increased resilience.	Most buildings will not be impacted.	Many LGs have not implemented ZCSC or ESC and are using the provincial backstop or voluntary measures.	Costs associated with rebates and lost permit/tax revenue.
#2: Accelerated Energy Step Code	2030: 0% 2050: 0%	0-4% ICC	High-efficiency building envelope will result in lower utility costs	Most heating system would need to be upgraded at time of replacement due to forthcoming provincial regulations	Higher performance envelope would increase thermal resilience in case of power outage	Industry has experience with the middle steps of the ESC, but noted barriers with achieving top step for some building types.	Not aligned with any LGs on Vancouver Island	Negligible costs
#3: Low-carbon Energy System Pathway	2030: 6% 2050: 11%	0-4% ICC	High-efficiency building envelope will result in lower utility costs	If ESC pathway was pursued, heating system would need to be upgraded at time of replacement due to forthcoming provincial regulations	High-performance envelope would increase thermal resilience to power outages or electric heat pump system would incorporate cooling to protect against extreme heat	Industry has experience with electrical heating systems, but challenges in achieving top step of ESC for some building types. LCES provides greater flexibility.	Not aligned with local governments on Vancouver Island. Many LGs are moving away from LCES pathway, in favor of direct regulation with ZCSC	Negligible costs
#4: Accelerated Zero Carbon Step Code	2030: 7% (leapfrog) 6% (incremental) 2050: 14% (leapfrog) 11% (incremental)	0-2% ICC	High-efficiency heating equipment will result in lower utility costs compared to baseline, but likely higher than with a high-performance envelope	Would not need to be retrofitted	Electric heat pump system would incorporate cooling to protect against extreme heat.	Industry has experience with electrical heating systems. Some concerns were raised with limiting energy sources such as RNG.	Aligned with Nanaimo, Victoria, and Saanich.	Negligible costs
#5: Accelerated Energy and Zero Carbon Step Code	2030: 7% 2050: 14%	0-6% ICC	High-efficiency building envelope and heating equipment will result in lowest utility costs	Would not need to be retrofitted	Higher performance envelope would increase thermal resilience to power outages, and electric heat pumps would incorporate cooling.	Industry has experience with the middle steps of the ESC, but noted barriers with achieving top step for some building types.	ZCSC implementation is aligned with Nanaimo, Victoria, and Saanich	Negligible costs

Recommendations for Step Code Adoption

Based on the feedback from the engagement and the modelling and analysis results, Introba recommends prioritizing Zero Carbon Step Code adoption. The recommended approach includes adoption of the Zero level of the Zero Carbon Step Code by 2025 and the adoption of the top step of the BC Energy Step Code by January 2027 (see Table 14). This is approach prioritizes carbon performance, but also recognizes the benefits of energy efficiency.

Table 14. Recommended Approach Accelerated Zero Carbon Step Code and BC Energy Step Code

Building type		Proposed Approach		
		Bylaw adoption Jan 1, 2024	Jan 1, 2025	Jan 1, 2027
Part 9	Single family dwelling, duplex, or townhomes	**Measure only** *i.e. measure and report on carbon*	**Zero Carbon** Performance	**Step 5**
Part 3	Residential (e.g. apartment building, hotels, and motels)	**Measure only** *i.e. measure and report on carbon*	**Zero Carbon** Performance	**Step 4**
	Commercial (e.g. office and retail)	**Measure only** *i.e. measure and report on carbon*	**Zero Carbon** Performance	**Step 3**
Rezoning or incentives (optional)		**Top step of BC Energy Step Code**	**Top step of BC Energy Step Code**	n/a

**RNG will not be considered a compliance pathway to achieving zero carbon requirements*

The earlier implementation of the Zero Carbon Step Code emerged as a priority based on the following rationale:

- **Carbon reductions.** The modelling indicates that accelerating the implementation of the Zero Carbon Step Code is the only pathway that results in significant carbon savings. The cumulative emissions reductions throughout the region if the Zero Carbon Step Code were implemented in 2024 would be 5,900 tonnes by 2030 and 38,400 tonnes by 2050.
- **Avoided cost of retrofits.** Buildings built today with high-emissions energy sources will also need to be retrofitted in the future to achieve climate targets and comply with forthcoming Provincial regulations. Future-proofing new buildings today, by building to zero carbon, will be more cost-effective and less disruptive in the long run.
- **Affordability.** Analysis shows that the Zero Carbon Step Code will only result in a marginal increase in incremental capital cost (0-2% depending on the building type), and in most cases will decrease utility costs through the use of a high-efficiency electric heat pump.
- **Resilience.** With the implementation of the Zero Carbon Step Code it is expected that more buildings will have access to cooling supplied through electric heat pumps. This will protect residents from overheating, and in some cases save lives, with increasing summer temperatures and extreme heat events.

- **Industry and staff readiness.** Both staff and industry indicated a high level of readiness for building high-performance buildings in the Region and recognized the urgency for addressing emissions from buildings.
- **Regional alignment.** Alignment throughout the RDN and Vancouver Island was emphasized as highly desirable for industry members. Consistent with the proposed approach below, Saanich, the City of Victoria, and the City of Nanaimo will be implementing the 'Zero' requirement of the Zero Carbon Step Code for Part 9 and Part 3 buildings in 2023/24. This timeline may not be feasible for the RDN, however, implementing this similar approach on a longer timeline will create consistency for industry in the medium and long-term.

RNG for Zero Carbon Step Code Compliance

At this time, it is also recommended that the RDN exclude the use of Renewable Natural Gas (RNG) for compliance with the Zero Carbon Step Code. There is currently no mechanism to ensure that a building using RNG for Zero Carbon Step Code compliance continues to use RNG after occupancy and does not switch to conventional natural gas. However, there is currently a FortisBC submission to the BCUC to address this issue.

More importantly perhaps is that there is a limited supply of RNG, and many energy and climate experts advocate that it should be reserved for hard-to-electrify sectors (e.g. heavy industry and aviation). If the context changes, and there is increased certainty about RNG supply, and a mechanism to ensure continuity of use throughout the life of a building this requirement could be revised. [27]

With respect to the limited supply of RNG, FortisBC's forecasts suggest that they will be able to supply 23 petajoules of RNG to their customers by 2032[28]. To put that into context, 23 petajoules represents approximately 10% of FortisBC's current (2021) annual gas demand, 228 petajoules[29]. A recent study prepared by Envint Consulting and Canadian Biomass Energy Research Ltd estimates that the potential supply of RNG within B.C. was 8.9 petajoules per year in 2021 and can be expected to marginally increase to 9.5 petajoules per year by 2030[30]. To put these numbers in context, these estimates suggest that the contracts that Fortis anticipates for 2023 will harvest approximately 32% of the total RNG potential in BC, and that if FortisBC was able to harness all the RNG potential in BC, local RNG would only meet approximately 41% of the 23 PJ that FortisBC plans to supply by 2032

[27] Introba. Renewable Natural Gas: What Role will it Play in Building Decarbonization in BC? 2023. https://issuu.com/deepgreenengineering/docs/introba_rng_availability_may31

[28] FortisBC Energy Inc. Revised Renewable Gas Program Application – Stage 2 (Application). 2022. https://www.cdn.fortisbc.com/libraries/docs/default-source/about-us-documents/regulatory-affairs-documents/gas-utility/220527-fei-2021-rg-program-application-errata-may-27-2022-ff.pdf?sfvrsn=23360af8_0

[29] FortisBC Energy Inc. 2022 Long Term Gas Resource Plan. 2022. Filed May 9, 2022. https://www.cdn.fortisbc.com/libraries/docs/default-source/about-us-documents/regulatory-affairs-documents/gas-utility/220509-fei-2022-ltgrp-ff.pdf?sfvrsn=cbf19584_0.

[30] Envint Consulting et al. B.C. Renewable and Low-Carbon Gas Supply Potential Study. 2022. https://www.cdn.fortisbc.com/libraries/docs/default-source/news-events/bc-renewable-and-low-carbon-gas-supply-potential-study-2022-03-11.pdf

Implementing the highest level of the BC Energy Step Code in 2027, will result in some additional benefits, listed below. The BC Energy Step Code implementation is a lower priority than the ZCSC as it will not result in carbon savings, and the provincial building code already requires fairly efficient buildings.

- **Reduced utility bills.** Efficient buildings require smaller heating loads, resulting in lower utility bills.
- **Manage electricity load.** Higher efficiency requirements will help reduce the need for electrical capacity upgrades and help the provincial government manage growing electricity demand.
- **Increase resilience.** Efficient buildings maintain indoor temperatures for longer periods of time in the case of a power outage.
- **Certainty and consistency for industry.** Through the engagement, industry and staff engagement noted that frequent changes to Code and variation between local governments were an ongoing challenge, that required training, education, and awareness. This approach will create consistency with leading local governments on Vancouver Island, and minimize building code changes by moving straight to the top steps of the BC Energy Step Code and Zero Carbon Step Code as opposed to implementing incremental change every few years.

Incentives, such as density bonusing, can also be used in the near term to support the industry in gaining experience with the energy efficiency requirements in advance of the 2027 implementation date.

Important Next Steps

To support and ease the implementation of the recommended or an alternate approach, there are a number of supports that the RDN may wish to consider. These represent best practice and include:

- **Clear communication and supporting materials.** The recommendation in this report charts an implementation plan to 2030 for the Zero Carbon Step Code and the BC Energy Step Code to provide a clear and long-term signal to industry. Creating a communication and outreach plan to convey these requirements prior to implementation in 2024 will be critical to give industry time to adapt and prepare.
- **Removal of regulatory barriers.** Industry members indicated that current bylaws and guidelines create disincentives and challenges for achieving higher levels of performance. These include form and character guidelines, setback, height, floor area and noise bylaws. RDN and partner municipalities should review existing bylaws and explore amendments to remove barriers for high-performance buildings (see Low-carbon Policy Toolkit for summary of best practices).[31]
- **Training and support for industry.** Industry members indicated that there was a need for training on specific design solutions and processes (e.g. air sealing and IDP). Training opportunities are available to attract new workers and support upskilling through the Home Performance Stakeholder Council, BCIT, ZEBx, EGBC, TECA, etc. RDN can explore how to leverage these programs and increase industry access and participation for local builders and designers. Some examples of supporting actions that emerged through the engagement and analysis include promotions, subsidies, local offerings of specific courses, and regular builder breakfasts. RDN can also amplify existing resources

[31] Brendan McEwan and Devon Miller. Low-carbon Building Policy Toolkit. 2021. https://docs.communityenergy.ca/wp-content/uploads/2021-03-19_BCH_LCB_Toolkit_Final.pdf

(e.g. BC Housing Builder Insights, Design Guide, ZEBx case studies, etc.) and support the development of local case studies to help share lessons learned and best practices.

- **Educating home and building owners.** Many home and building owners are still resistant to investing in high-performance buildings. RDN and partner municipalities can support industry by communicating the value proposition of high-performance buildings and dispelling common misconceptions.
- **Working with BC Hydro to support electrical service upgrades.** Local governments also play a role in supporting BC Hydro with electrical service upgrades. Local requirements, like underground transmission lines, can significantly increase both the timelines and costs of these upgrades. RDN and partner municipalities should work with BC Hydro to understand how to better support this process.

Supporting Renewable Energy

Renewable energy is often promoted alongside high-performance buildings to deepen carbon reductions, support grid decarbonization, reduce utility costs, and increase resilience. BC, however, has a very clean electrical grid, with 98% of electricity generated through renewable sources. This means that all-electric buildings are already near zero emissions without any onsite renewable energy. While renewable energy systems can also increase resilience and energy independence, they need to be employed at a relatively large scale and paired with energy storage to create a notable impact at either the building or the community level. For this reason, onsite renewable energy is not strongly incentivized through existing policies and programs (e.g. net-metering and rebates) at the provincial or local level in BC.

While local governments cannot currently require renewable energy through the building code, they can provide incentivizes through rezoning applications, sustainability checklists, rebates, permit fast-tracking and other similar policy tools. At time of writing, RDN provides $250 incentives to homes located in the Electoral Areas for renewable energy systems including solar hot water, solar photovoltaic, geo-exchange (ground-source or water-source), micro and small wind. RDN also provides funding if a variance permit is required for height. [32] This section explores the onsite renewable energy technologies that can be used in BC, with recommendations on how they could be supported in the RDN.

Onsite Renewable Energy Technologies

Solar Photovoltaic

Solar photovoltaic (PV) technologies convert sunlight into electrical energy, which can be used to power most uses within a home. Captured energy can be either utilized in real-time or stored in batteries and utilized to offset utility electricity use. Onsite solar PV is not subject to utility demand charges and, paired with battery storage, can be used to reduce, or offset peak load charges, potentially reducing utility costs, and increasing resilience in the case of power outage. However, onsite PV panels can only generally only supply a portion of a home or building's electricity needs (depending on the size of the array) and will generally require a supplemental power source due to the intermittency of the electricity produced. Considering the current electricity supply from BC Hydro's grid is a reliable and mostly carbon neutral source of power, implementation of solar technologies does not contribute to significant GHG emissions reductions.

[32] Regional District of Nanaimo. Renewable Energy Systems Rebate. https://www.rdn.bc.ca/renewable-energy-systems

Solar and Resilience

Solar energy technologies can play an important role in strengthening an energy system's resilience in two ways:

- First, solar generation can be distributed as opposed to centralized. This means individual buildings can host their own solar systems to meet some or all of their power needs. Technically, residential solar panels alone are not enough to make a home or building resilient. This is because solar systems generally depend on the electrical grid to produce power—and, for safety reasons, they're designed to switch off if the grid power cuts out. For solar panels to produce power on their own, they need two things: a properly configured inverter and a storage system. The solar inverter generates alternating-current power from the solar panel's direct-current output; while the storage system, like a battery, can keep power steady amid changes in output and building loads.
- Second, solar electricity can be stored and discharged without the need for fuel deliveries, unlike conventional diesel generators, which are the most common source of emergency backup power. In a long outage, solar and its associated energy storage can continue delivering power, even at night, to homes and businesses.

Solar Hot Water

Solar hot water systems can be used to supply at least a portion of the hot water for showers, dishwashers, clothes washers, farm operations and even in-floor heating. In BC, almost all solar hot water systems work on the principle of pre-heating or supplementing domestic hot water. Instead of cold-water lines feeding a hot water tank or on-demand heater, solar pre-heated water from the solar storage tank is fed in. Solar hot water systems can usually provide between 40 -60 % of an average household's annual hot water demand, and have the added benefit of storing energy in the form of water without the need for a battery (unlike solar PV).

Small Scale Batteries

Battery storage devices enable energy from renewable sources to be stored and then released when the power is needed most. Several applications being actively explored and piloted by government and utilities. For example:

- Using solar and onsite batteries as a replacement for a backup diesel generator for large institutional buildings (e.g., healthcare facilities).
- Using battery storage to reduce demand charges for large businesses or institutional customers. These batteries could also reduce consumption during the hottest and coldest times of the year when demand for electricity is highest.
- Using small-scale batteries to reduce the need for infrastructure upgrades caused by short-term demand spikes.

The cost, availability and effectiveness of this technology has come down in recent years; however, the capital and maintenance costs for the battery significantly increase project costs when compared to a grid tied solar system. Further, while batteries are not widely used in residential or commercial buildings today, battery technology is rapidly evolving and becoming increasingly viable for small- and large-scale applications. Likewise, emerging technologies, like bi-directional electric vehicle charging –where electric vehicles can provide backup power to buildings or feed their power back into the grid – are being explored and tested.

District Energy Systems

District energy systems are characterized by one or more central plants producing hot water, steam, and/or chilled water, which then flows through a network of insulated pipes to provide hot water, space heating, and/or air conditioning for nearby buildings. District energy systems are best suited to large projects, including downtowns (or central business districts), college and university campuses, hospitals and healthcare facilities, airports, military bases, and industrial complexes. By combining loads for multiple buildings, district energy systems create economies of scale that help reduce energy costs and enable the use of high-efficiency technologies such as combined heat and power (CHP).

District energy systems can be fueled with fossil fuels, such as natural gas, coal, and fuel oil, or renewable energy sources such as biomass, biogas, landfill gas, municipal solid waste, geothermal, solar thermal, and electricity. For compliance with Zero Carbon Step Code requirements, these systems would need to use low-carbon fuel sources. Due to the high-upfront cost and economies of scale needed to make these projects feasible, they are generally limited to large scale multi-building developments.

Recommendations for Supporting Renewable Energy in the RDN

While some options do exist for onsite renewable energy technologies, their broad application is not currently expected to manifest as a result of their high cost and limited benefits for resilience and emissions reductions. Policy levers that require or incentivize the widespread implementation of renewable energy (e.g. rebates, rezoning requirements, density bonusing, reduced permit fees, expedited permitting, and DPAs) are therefore not recommended, but that this effort be instead focused on removing barriers and streamlining the process of adopting these technologies where home and building owners do wish to include them. To this end, the following three-pronged approach is recommended:

4) **Remove barriers to renewable energy.** Enable motivated home and building owners to easily pursue and implement onsite renewable energy systems by streamlining the permitting process. Review existing permitting requirements to identify existing barriers and opportunities for simplifying the approval and implementation processes for solar PV, solar hot water heaters, and batteries.

5) **Encourage onsite renewable energy for specific applications.** Specific use cases for onsite renewable energy will provide greater community benefits and may warrant targeted incentive programs. For example, the RDN could support resilience by identifying areas experiencing more frequent or prolonged power outages, and providing incentives for solar with battery storage. Likewise, district energy systems can be beneficial for large scale new development and could be encouraged for any large greenfield developments where the right conditions exist. However, there are likely limited opportunities for this type of development within the Electoral Areas.

6) **Support innovation.** The RDN can support innovative technologies and applications of renewable energy through corporate facilities and demonstration projects. This could include employing battery storage technologies, supporting the use of solar PV for EV charging facilities[33], exploring vehicle-to-grid charging, etc.

[33] BCIT. Blueprint for Canada's future electric vehicle charging stations. https://www.bcit.ca/applied-research/smart-microgrid/energy-oasis/

Appendix A: Modelling

Methodology

The implementation timelines of the Energy Step Code and the Zero Carbon Step Code in each scenario are detailed in Table 15.

Table 15: Modelling assumptions

<table>
<tr><th rowspan="2">Scenario</th><th rowspan="2">Building Type</th><th colspan="3">Energy Step Code</th><th colspan="3">Zero Carbon Step Code</th></tr>
<tr><th>3</th><th>4</th><th>5</th><th>Moderate</th><th>Strong</th><th>Zero</th></tr>
<tr><td rowspan="4">Baseline</td><td>Part 9</td><td>N/A
Current Step</td><td>2027
-</td><td>2032
Highest Step</td><td rowspan="3">2024</td><td rowspan="3">2027</td><td rowspan="3">2030</td></tr>
<tr><td>Part 3 Residential</td><td>2027
-</td><td>2032
Highest Step</td><td>N/A</td></tr>
<tr><td>Part 3 Commercial</td><td>2027
Highest Step</td><td>N/A</td><td>N/A</td></tr>
<tr><td>Voluntary</td><td colspan="5">No early uptake of higher steps</td></tr>
<tr><td rowspan="4">Voluntary Intervention</td><td>Part 9</td><td colspan="3" rowspan="3">As per Baseline</td><td colspan="3" rowspan="3">As per Baseline</td></tr>
<tr><td>Part 3 Resi</td></tr>
<tr><td>Part 3 Com</td></tr>
<tr><td>Voluntary</td><td colspan="6">10%* of the new floor area is built to the 'Zero' step of the ZCSC each year before it is required.</td></tr>
<tr><td rowspan="4">Accelerated ESC (Incremental)</td><td>Part 9</td><td>N/A
Current Step</td><td>2025
-</td><td>2028
Highest Step</td><td colspan="3" rowspan="3">As per Baseline</td></tr>
<tr><td>Part 3 Residential</td><td>2025
-</td><td>2028
Highest Step</td><td>N/A</td></tr>
<tr><td>Part 3 Commercial</td><td>2025
Highest Step</td><td>N/A</td><td>N/A</td></tr>
<tr><td>Voluntary</td><td colspan="5">No early uptake of higher steps</td></tr>
<tr><td rowspan="4">Accelerated ESC (Leapfrog + LCES Option)</td><td>Part 9</td><td>N/A
Current Step</td><td>N/A
Skipped</td><td>2025
Highest Step
Or Step 4 and Zero (LCES)</td><td colspan="3" rowspan="3">As per Baseline
Or Zero (LCES) if a lower ESC step is pursued</td></tr>
<tr><td>Part 3 Residential</td><td>N/A
Skipped</td><td>2025
Highest Step
Or Step 3 and Zero (LCES)</td><td>N/A</td></tr>
<tr><td>Part 3 Commercial</td><td>2025
Highest Step
Or Step 2 and Zero (LCES)</td><td>N/A</td><td>N/A</td></tr>
<tr><td>Voluntary</td><td colspan="5">Assumes no voluntary measures, hence no early uptake of higher steps</td></tr>
<tr><td rowspan="3">Accelerated ZCSC (Incremental)</td><td>Part 9</td><td colspan="3" rowspan="3">As per Baseline</td><td rowspan="3">2024</td><td rowspan="3">2025</td><td rowspan="3">2028</td></tr>
<tr><td>Part 3 Resi</td></tr>
<tr><td>Part 3 Comm</td></tr>
</table>

	Voluntary	Assumes no voluntary measures, hence no early uptake of higher steps					
Accelerated ZCSC (Leapfrog)	Part 9	As per Baseline			2024	N/A Skipped	2025
	Part 3 Resi						
	Part 3 Comm						
	Voluntary	Assumes no voluntary measures, hence no early uptake of higher steps					
Accelerated ESC & ZCSC	Part 9	N/A Current Step	2025 -	2028 Highest Step	2024	N/A Skipped	2025
	Part 3 Residential	2025 -	2028 Highest Step	N/A			
	Part 3 Commercial	2028 Highest Step	N/A	N/A			
	Voluntary	Assumes no voluntary measures, hence no early uptake of higher steps					
Alignment with CoN	Part 9	As per Baseline			N/A Skipped	N/A Skipped	2024 Except for 4-6 storey MURBs which will be in 2026
	Part 3 Resi						
	Part 3 Comm						
	Voluntary	Assumes no voluntary measures, hence no early uptake of higher steps					

*There is little to no data available on the uptake of different incentives and targeted interventions (such as permit fast-tracking, financial incentives, density bonusing, and rezoning requirements). An uptake of 10% has been assumed based on the insights from jurisdictions within the RDN but it is worth noting that an uptake anywhere in the range of 5 to 25% would not change the results significantly enough to affect the commentary in this report. Insights from jurisdictions within the RDN included:

- The City of Nanaimo reported that of the 57 multifamily development permit applications they received from May 1, 2020, to May 1, 2023, nine committed to at least one step above the minimum Step Code, roughly 16%, and four of those nine, committed to going two steps above.
- As a regional government, RDN does not have the same powers as the municipalities in their region. RDN can only offer permit fast-tracking and financial incentivization, while municipalities in the region (e.g., Lantzville, Parksville and Qualicum Beach) could also pursue rezoning requirements and density bonusing.
- RDN currently offers a $1,000 rebate as part of their Sustainable Development Checklist, which anecdotally has had limited uptake.
- The building permit process in Lantzville and Qualicum Beach is already relatively fast, so fast-tracking would not provide a strong incentive for builders and developers.

The model applies greenhouse gas emission intensities (GHGIs) to projections of new floor area to estimate future greenhouse gas emissions. GHGIs were developed for each potential step combination of the Energy Step Code and Zero Carbon Step Code (e.g., Step 3 with Moderate Carbon Performance, Step 4 with Moderate Carbon Performance, Step 3 with Strong Carbon Performance, etc.) for the different building types subject to the two Codes. For each building type the step combination and GHGI applied in a given year varies with each scenario as a result of different implementation timelines.

For each jurisdiction, projections of new floor area were based on existing floor area and percentage growth projections for each building type provided by the RDN. Building types included in the modelling are as follows:

- Single Family Detached (Part 9)
- Single Family Attached (Part 9)
- Apartments (Part 3 Residential)
- Hotel (Part 3 Residential)
- Office (Part 3 Commercial)

- Retail (Part 3 Commercial)

The GHGIs applied to the new floor area are based on the GHGI targets set out in the Zero Carbon Step Code and projections of the emission factor for grid electricity. The Zero Carbon Step Code requires fixed emissions factors of 0.011 $kgCO_2e/kWh$ for electricity and 0.180 $kgCO_2e/kWh$ for natural gas to be used to demonstrate compliance with the GHGI targets.

These emissions factors and estimates of total energy use for a given step of the Energy Step Code were used to determine what the maximum amount of natural gas energy use could be, with the remainder being electricity energy use, whilst still complying with the GHGI targets. Emissions factors were then reapplied to this breakdown of natural gas and electricity energy use to determine new GHGIs, where the emission factor for electricity decreases with time to reflect the Clean Electricity Delivery Standard (a requirement that 100% of electricity delivered in the province be generated by clean, renewable sources by 2030. The approach of establishing the maximum amount of natural gas energy use reflects a worst-case scenario and the potential use of fossil fuel backup systems. However, it is important to note that the model also reflects buildings that are anticipated to be built all-electric irrespective of the adoption pathway. Building permit data provided by the City of Nanaimo shows that since the step code adoption in April 2020, 30% of Part 9 buildings and 70% of Part 3 buildings are already being built all-electric. In all of the scenarios, the respective new floor area is modelled to be all-electric from the first modelled year for all jurisdictions. In the Electoral Area's it is assumed that a higher proportion of Part 9 buildings would already be all-electric given that there are some areas without gas services. Based on the mapping of building permits from the latest 5 years, conducted by RDN, its assumed that 65% of Part 9 buildings in Electoral Areas would be built all-electric from the first modelled year in all scenarios.

The model also assumes a lag between permitting and finished construction: 2 years for Part 9 buildings, and 3 years for Part 3 buildings.

Results

Full results for the Electoral Areas are presented in the main body of this report. Results for the other member municipalities are provided on the following pages.

Lantzville

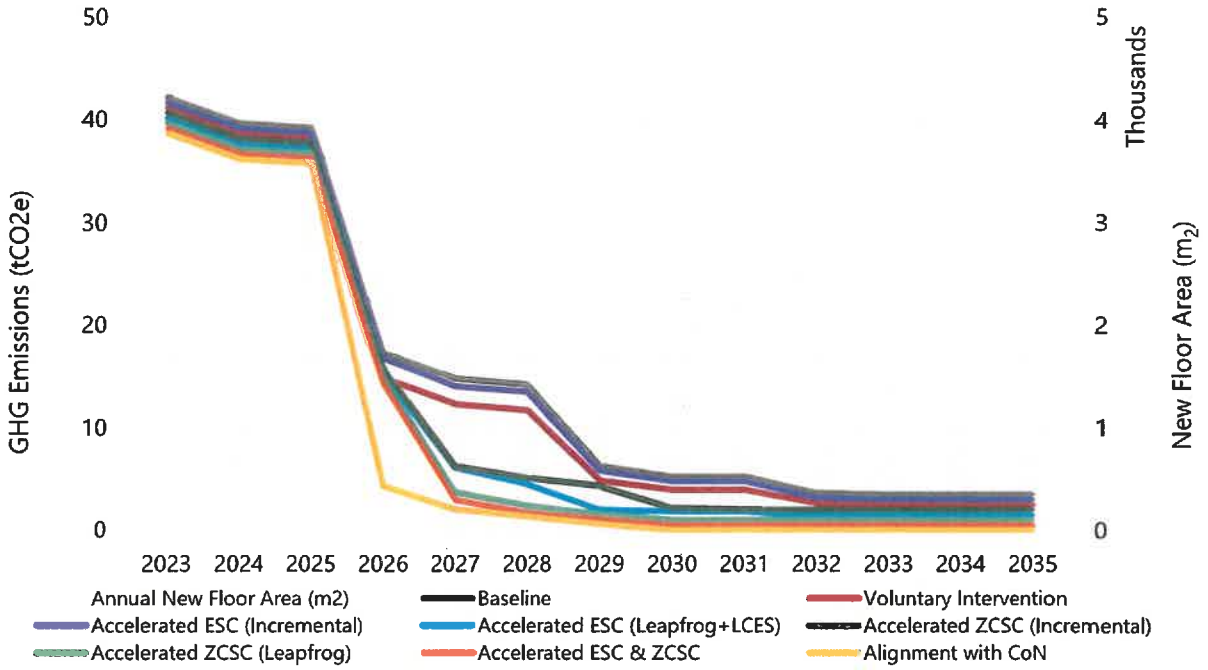


Figure 9: Annual GHG Emissions from Annual New Floor Area - Lantzville

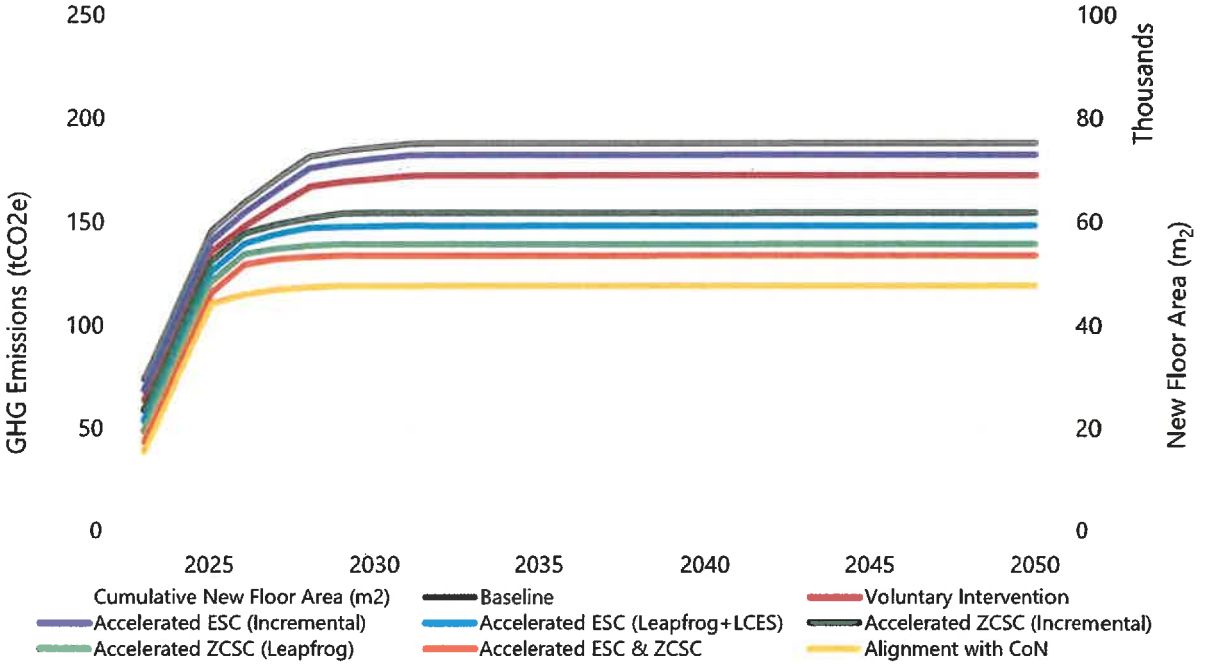


Figure 10: Annual GHG Emissions from Cumulative New Floor Area – Lantzville

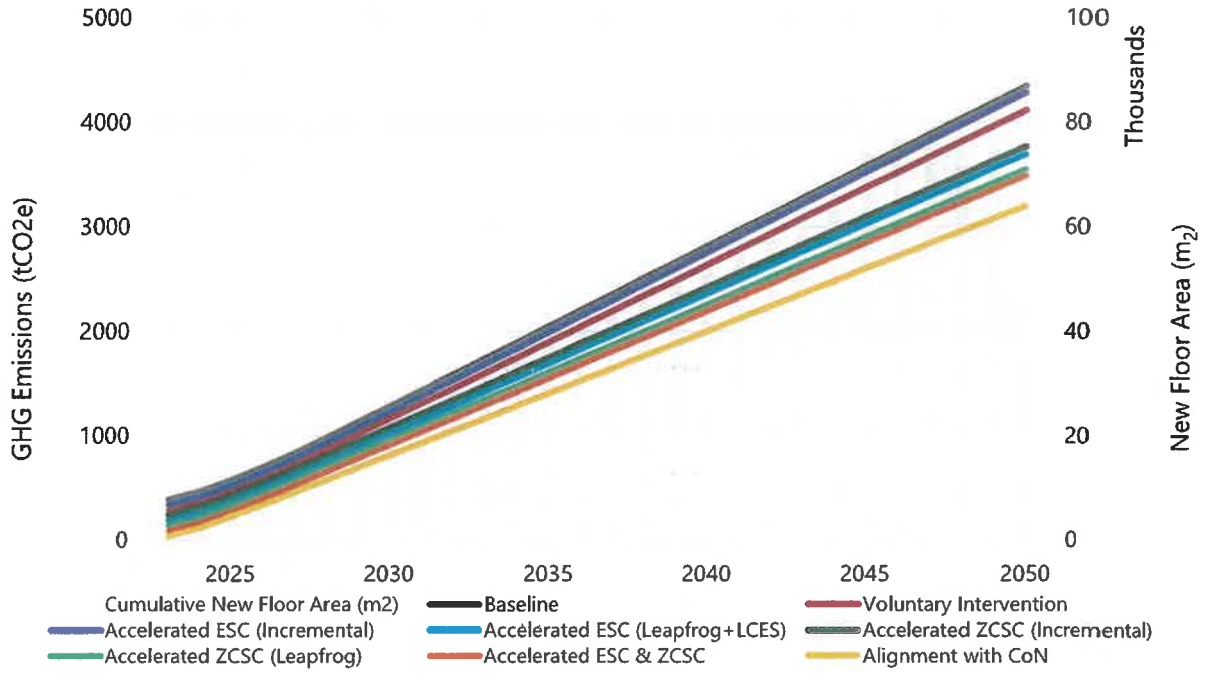


Figure 11: Cumulative GHG Emissions from New Floor Area - Lantzville

Parksville

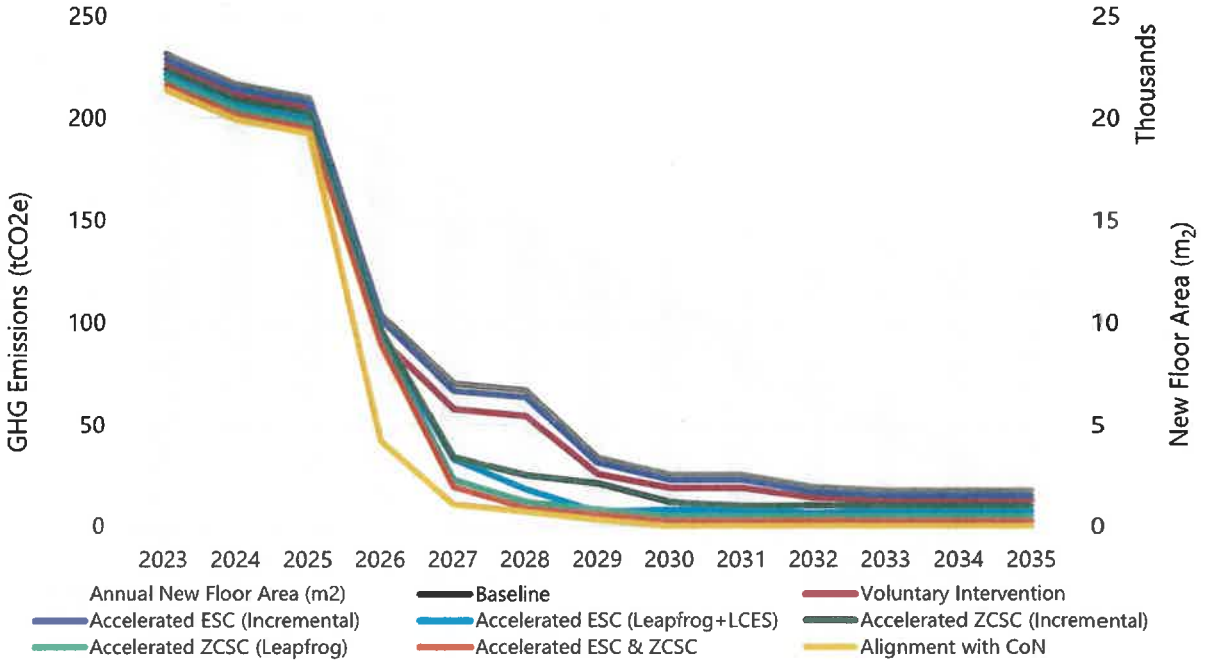


Figure 12: Annual GHG Emissions from Annual New Floor Area - Parksville

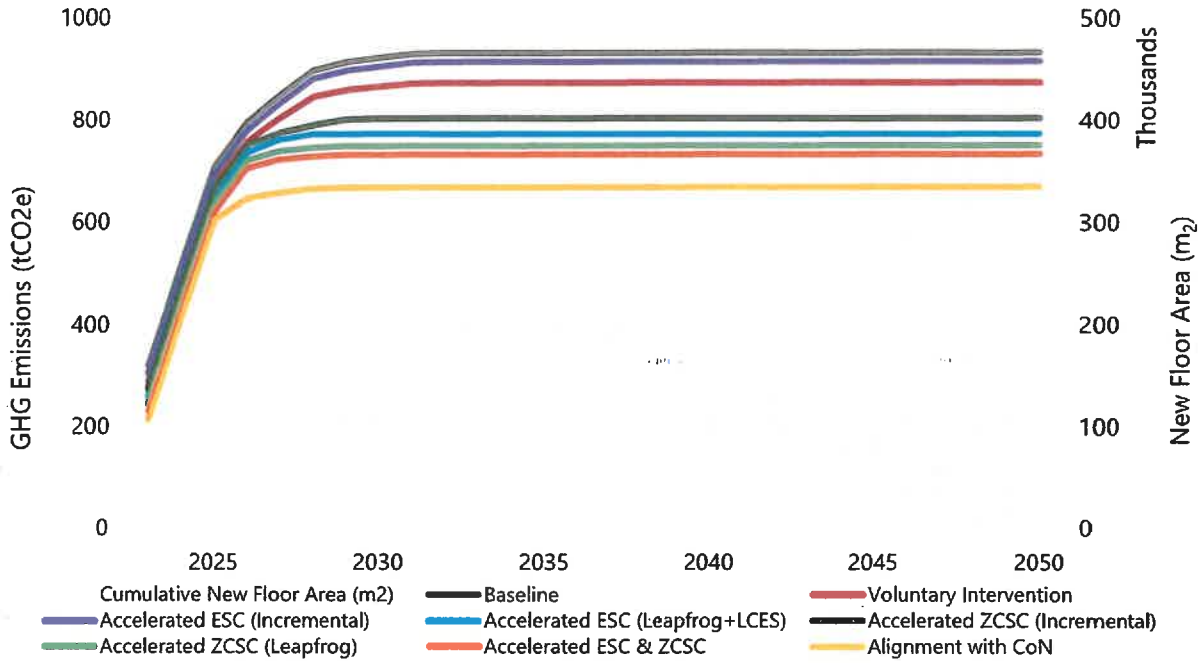


Figure 13: Annual GHG Emissions from Cumulative New Floor Area – Parksville

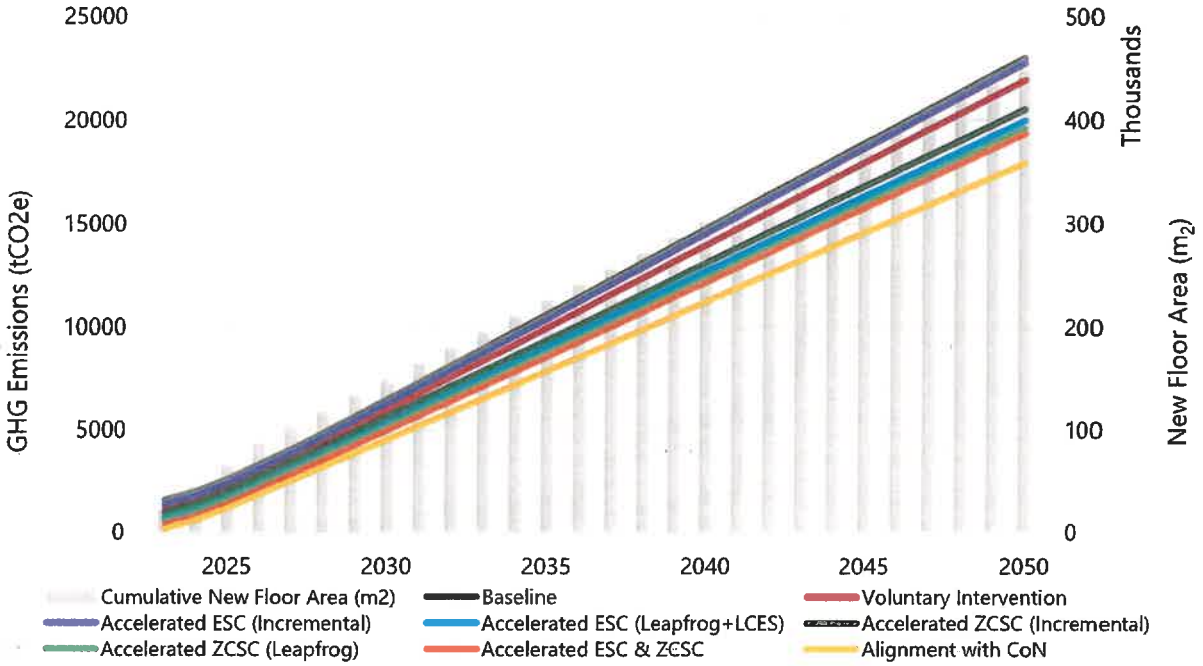


Figure 14: Cumulative GHG Emissions from New Floor Area - Parksville

Qualicum Beach

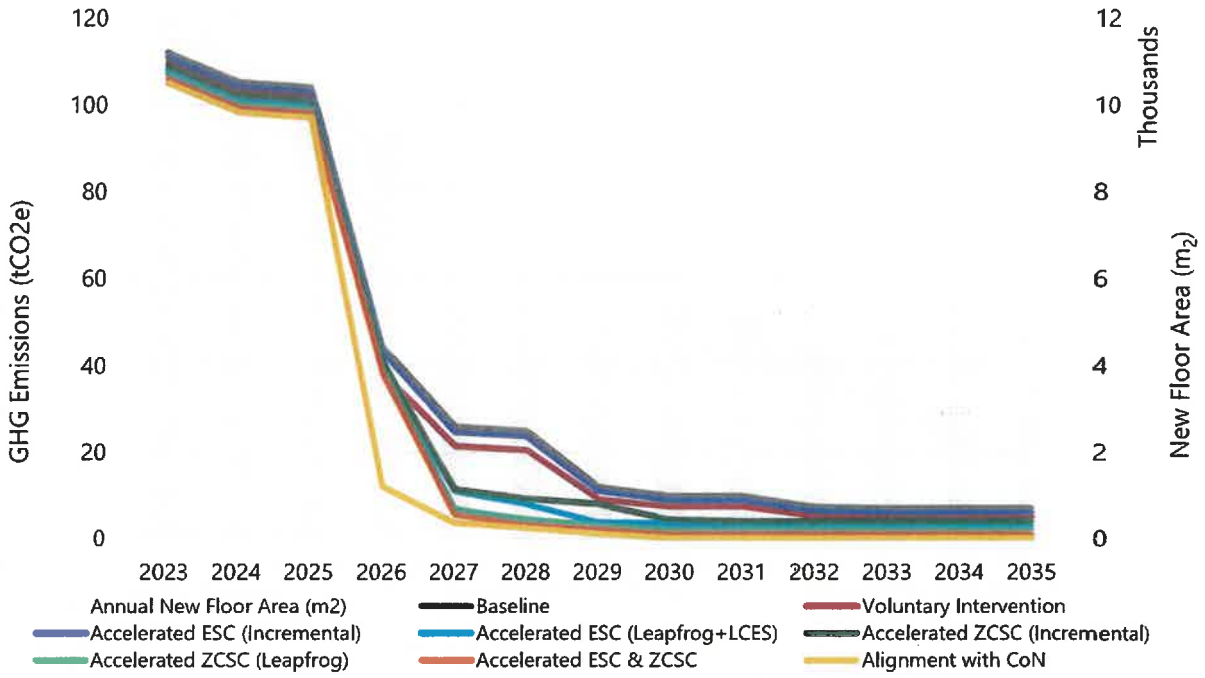


Figure 15: Annual GHG Emissions from Annual New Floor Area – Qualicum Beach

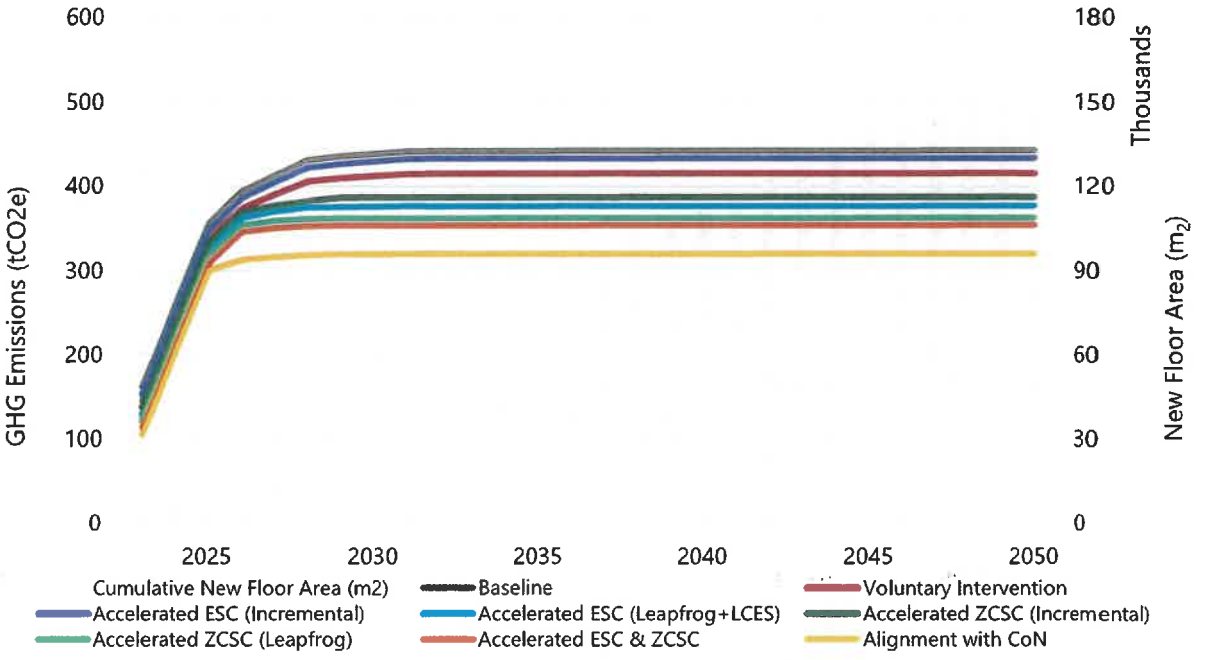


Figure 16: Annual GHG Emissions from Cumulative New Floor Area – Qualicum Beach

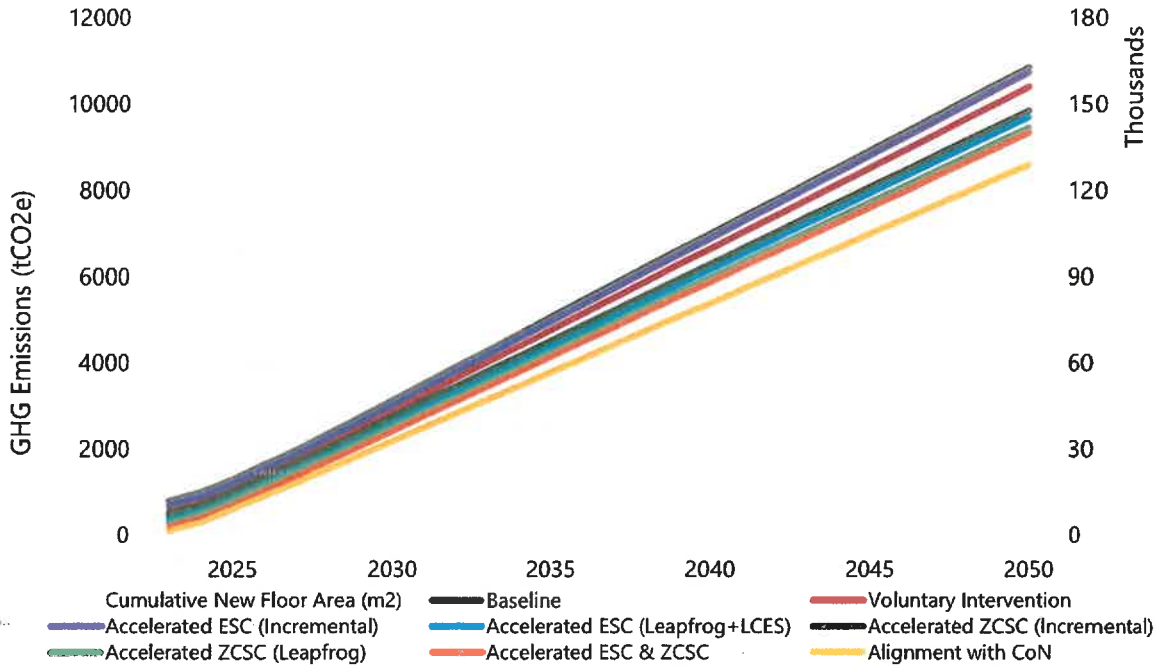


Figure 17: Cumulative GHG Emissions from New Floor Area – Qualicum Beach

Appendix B: Adoption of Zero Carbon Step Code in BC Local Governments

City of Nanaimo (Proposed Approach)

Table 16. City of Nanaimo Energy Step Code and Zero Carbon Step Code Implementation Timeline

Part 9 Buildings	Implementation Timeline		
	At time of bylaw adoption	July 1, 2024	N/A
Single Family Dwelling, duplex, or townhomes	Base Code (Energy Step 3) + Measure-only Zero Carbon Step Code	Base Code (Energy Step 3) + Zero Carbon Performance	N/A
Part 3 Buildings	May 1, 2023	July 1, 2024	January 1, 2026
Residential and Commercials	Base Code (Energy Step 2) + Measure-only Zero Carbon Step Code	Base Code (Energy Step 2) + Zero Carbon Performance	Energy Step 3 + Zero Carbon Performance

City of Victoria

Table 17. City of Victoria Energy Step Code and Zero Carbon Step Code Implementation Timeline[34]

Part 9 Buildings	Implementation Timeline		
	May 1, 2023	November 1, 2023	N/A
Single Family Dwelling, duplex, or townhomes	Base Code (Energy Step 3)	Base Code (Energy Step 3) + Zero Carbon Performance	N/A
Part 3 Buildings	May 1, 2023	July 1, 2024	November 1, 2024
Residential (4-6 storey)	Energy Step 3	Energy Step 3 + Zero Carbon Performance	Energy Step 3 + Zero Carbon Performance
Residential (+6 storey)	Base Code (Energy Step 2)	Base Code (Energy Step 2)	Base Code (Energy Step 2) +Zero Carbon Performance
Commercial	Base Code (Energy Step 2)	Base Code (Energy Step 2)	Base Code (Energy Step 2) +Zero Carbon Performance

[34] City of Victoria. BC Energy Step Code. https://www.victoria.ca/EN/main/residents/planning-development/development-services/green-buildings.html#:~:text=When%20and%20how%20are%20these,buildings%20by%20November%201%2C%202024.

Saanich

Table 18. Saanich Energy Step Code and Zero Carbon Step Code Implementation Timeline[35]

Part 9 Buildings	Implementation Timeline		
	May 1, 2023	November 1, 2023	N/A
Single Family Dwelling, duplex, or townhomes	Base Code (Energy Step 3) + Measure only Carbon	Base Code (Energy Step 3) + Zero Carbon Performance	N/A
Part 3 Buildings	May 1, 2023	July 1, 2024	November 1, 2024
Residential (4-6 storeys)	Base Code (Energy Step 2) + Measure Only Carbon	Base Code (Energy Step 2) + Zero Carbon Performance	Base Code (Energy Step 2) + Zero Carbon Performance
Residential (+6 storey)	Base Code (Energy Step 2) +Measure Only Carbon	Base Code (Energy Step 2)	Base Code (Energy Step 2) + Zero Carbon Performance
Commercial	Base Code (Energy Step 2) + Measure Only - Carbon	Base Code (Energy Step 2)	Base Code (Energy Step 2) + Zero Carbon Performance

City of Richmond

Table 19. City of Richmond Energy Step Code and Zero Carbon Step Code Implementation Timeline[36,37]

Building type		Implementation Timeline		
		Oct 1, 2023	January 1, 2025 to December 31, 2026	After January 1, 2027
Part 9	Single Family Dwelling, duplex, or townhomes	Step 5 + Moderate Carbon *or* Step 4 + Strong Carbon *or* Step 3 + Zero Carbon	Step 5 + Strong Carbon *or* Step 4 + Zero Carbon	Step 5 + Zero Carbon
Part 3	Residential concrete towers	Step 3 + TBD ZCSC level *or* Step 2 TBD ZCSC level	Step 4 + TBD Carbon Level or Step 3 Carbon Level	Step 4 + TBD Carbon Level
	Residential low/mid-rise	Step 4 + TBD ZCSC level *or* Step 3 TBD ZCSC level	Step 4 + TBD Carbon Level	Step 4 + TBD Carbon Level
	Office & retail buildings	Step 3 + TBD ZCSC level *or*	Step 3 + TBD Carbon Level	Step 3 + TBD Carbon Level

[35] Saanich. BC Energy Step Code and Zero Carbon Step Code. https://www.saanich.ca/EN/main/community/sustainable-saanich/bc-energy-step-code-and-carbon-pollution-standard.html

[36] City of Richmond. Energy Step Code. Part 3 Buildings. 2023. https://www.richmond.ca/__shared/assets/building4051958.pdf

[37] City of Richmond. Energy Step Code: Part 9 Buildings Overview. 2023. https://www.richmond.ca/__shared/assets/building3751347.pdf

		Step 2 TBD ZCSC level		
	Hotels and Motels	Step 4 + TBD ZCSC level *or* Step 3 TBD ZCSC level	Step 4 + TBD Carbon Level *or* Step 3 TBD Carbon Level	Step 4 + TBD Carbon Level

Resort Municipality of Whistler

Table 20. Resort Municipality of Whistler Energy Step Code and Zero Carbon Step Code Implementation Timeline[38]

Building type		Implementation Timeline	
		January 2024	2026 onward
Part 9	Single Family Dwelling, duplex, or townhomes	Step 4 + Strong Carbon Performance	Step 4 + Zero Carbon Performance
	SFD or duplex with in-ground basement floor area exclusion	Step 5 + Strong Carbon Performance	Step 5 + Zero Carbon Performance
Part 3	Residential	Step 3 + Strong Carbon Performance	Step 3 + Zero Carbon Performance
	Commercial	Step 2 + Strong Carbon Performance	Step 3 + Zero Carbon Performance

[38] Resort Municipality of Whistler. BC Energy Step Code. 2023. https://www.whistler.ca/business/land-use-and-development/building/bc-energy-step-code/#:~:text=Working%20towards%20the%20top%20level,only%20low%20carbon%20heating%20systems.

Appendix C: Industry Workshop Summary

Part 3 Buildings

Q1 What are the challenges and opportunities associated with building to net zeroenegry-ready, zero carbon, or both?

Challenges

Themes	Comment
Policy	• Need for overall alignment between programs and requirements • ZCSC: o Projects in design may be affected by new code changes if in stream
Energy Modelling	• Need to ensure modellers know what climate zone they are working in (CZ4) • Need to clarify what weather files to use • Differences between modelling requirements between CMHC and ESC • TEDI can be the issue - while achieving GHG targets
Design requirements (Form)	• Challenge of lower window-wall ratio when views are important • Addressing public expectation for building form e.g. stepped buildings to reduce massing • Form and character can be difficult for some of the planners. Getting into that "boxy look" • TEDI is hard to achieve unless you are building a box.

Infrastructure requirements (BC Hydro)	• Limitations with electrical service, sizes and costs of transformers
	• ZCSC:
	  o Limited BC Hydro capacity
	  ▪ Sometimes this leads to reverting to gas (MUA, commerical kicthens, hot water)
	  ▪ Slow response times – can take 12 months Results in the need to add natural gas in some buildings
	  ▪ Compounded by EV charging requirements.
	  ▪ Require calculations to be completed early in design
	  ▪ Require energy management systems to manage demand
	• ZCSC + ESC:
	  o Don't have the answers on how to supply energy

Industry capacity & supply chain	• Getting blower door tests done is a challenge in Victoria
	• ZCSC:
	  o Staffing challenges at BC Hydro and Local Goverments to get things approved
	  o Retrofits are more challenging than new construction.
	• ZCSC + ESC:
	  o New Technologies can be difficult to apply
	  o Cost of HVAC units are going up due to hype
	  o Long lead times for supply of units – can take up to 18 months.
	  o The effort and cost of decarb/retrofit is greater than addressing at the new construction.
	  o Industry capacity and supply chains

Financial challenges	• Cost of electrical transformers
	• Cost associated with higher building performance (Step 4).
	  o Cost difference between Step 2 and 3 is quite negligible (can be dealt with through building shape). This can be addressed right from start. Step 4 is the challenge.
	  o Cost - step 3 seems to be easy but getting to - but getting beyond this is challenging.
	  o Qualicum beach form and character guidelines have a specific look. Can drive up cost to both meeting higher step code
	• Electrical utility costs are high
	• Cost of HVAC units increasing due to demand

Retrofits	• ZCSC + ESC: o Need to be mindful of whether we can do this with renovations now too

Opportunities

Themes	Comment
Acceptance	• **ZCSC:** o With low-carbon electricity and reduced loads buildings, not too difficult generally. o If ew can adopt a lower step to satrt (i.e. step 2 of the ZCSC) which gives multiple opportunities • **ZCSC + ESC:** o Don't struggle for new buildings.
Policy (Program rollout)	• **ZCSC:** o Don't implement aggressive timelines, allow flexibility while market transforms
Design	• Energy modelling would help to understand opportunties for increased insulation • Getting energy modelling involved earlier, before development permit, and before form and character. • Fuel less important if your building energy efficient from the beginning. • **ZCSC + ESC:** o No challenges with maybe the exception of commercial kitchens
Innovation	• **ZCSC + ESC:** o Opportunity to innovate and push boundaries
Funding	• BC Housing and CMHC funded builders.
Leveraging existing tools and knowledge base	• **ZCSC:** o Compliance tools available for Part 3 buildings o GHG is already a reported metric for Part 3 buildings – opportunity to move beyond just measuring. • **ZCSC + ESC:** o Opportunity for knowledge sharing from a good base of Engineers and Architects
Messaging	• Driver for energy efficiency isn't necessarily emissions, its lifecycle costs for owners.

Q2 Is the industry ready to build to these levels of performance today? Why/not?

Industry is ready

Theme	Comment
Past examples	• School districts are moving towards electrification -BC Hydro upgrades. • **ZCSC:** o Evidence shows that it is possible to build to GHG targets. • **ZCSC + ESC:** o New buildings are already being built to high standards. It's existing buildings that are the problem. o Recognize spending some time and money to achieve a good level of air tightness can save a lot on HVAC and utility costs. o Buidlings are put together by multiple specilaized team, if the designs are clear then the teams will build to it.
Incentives	• People motivated to do Step Code because of the CMHC funding. • Developers have a business motivation. Reducing costs is important.

Industry is not ready

Theme	Comment
Industry Capacity/ Education	• There is a shift/upskilling needed on HVAC controls. • The skills are there. Capacity is not. • The Jump to ESC Step 2 in municipalties that haven't adopted the ESC yet means everyone will need to learn all at once – will likely see bottlenecks • There are so many levels of polices, which makes it difficult. • ZCSC + ESC o Need to educate contractors and trades on how things are now being done differently; contracting "this is how we've always done it" o Contractor/trades engagement to raise awareness (e.g. envelope, heating, plumbing, insulation, etc.) o On the Island, urban centres are a little more disparate, can't borrow from nearby centres as in Greater Toronto Area (GTA). o Overall industry is ready for both ESC and ZCSC, just a lack of trades and capacity o Takes time to change the mindset. o New buildings are already being built to high standards. It's existing buildings that are the problem.
Incentives	• ZCSC + ESC o A lot of developers don't understand why they need to be building to higher levels. They want to build and sell. It's incentives that appeal to developers. o Incentivization is important. o Developers have a business motivation. Reducing costs is important. o People motivated to do Step Code because of the CMHC funding.
Supply Chain	• ZCSC: o Can't throw more money to address labour shortarges and supply chains. This is part of the reason why shortcuts are being taken. There is conflict of interest. Economics and performance. • ZCSC + ESC: o Supply chain is a general concern to buildings, not just high peformance buildings
Air tightness requirements	• Self adhered membrane – this is a big change and need to get trades up to speed • Reluctance to take on the risk of committing to a certain level of air sealing. • More difficult in smaller, rural areas
Perception of natural gas	• ZCSC: o Developers still want access to gas, because the perception is that gas is more cost effective o Lowers operational costs for developer o Gas fireplaces, heating, etc. are driven by preferences. o Huge incentives for Fortis BC. o Fortis BC are easier and faster to work with
Affordability Impacts	• ZCSC + ESC: o Can the market bear the additional costs. What are the affordability impacts. Can rent increase to cover additional costs of construction.
Design approach	• ZCSC: o Human nature to shortcut. We need checklists and tests along the way, and not be reliant on the energy model at the end to double check requirements have been met. o Designer's need to be responsible for coordination of design elements.

Q3 What types of support would you or your peers need to build to be ready?

Theme	Comment

Support from local goverment	**Streamline processes**
	• Reduced approval timelines.
	• ZCSC:
	  o One of the bigger problems isnt skills or knowledge. Its the processes. Processes need to speed up if timelines are going to be accelerated.
	  o Council decisions process also slow downs the process
	  o Communty groups get to involved and it slows down the process. They need to be pulled back / process needs to be reevaluted.
	• ZCSC+ESC:
	  o Streamlined approval process for BP and DP for buildings going further.
	City Design guidelines
	• Updated municipal design guidelines
	• Rezoning. Develop OCPs that set out expectations.
	• Low-income housing doesn't need to be integrated to mid-income housing.
	  o Not everything needs to be affordable.
	Alignment
	• Information sharing between permit application reviewers to improve consistency between municipalities
	• ZCSC+ ESC:
	  o Consistent adoption across the region would help in training/clarification of requirements
	Clarity and support
	• Provide clarity/support for implementation impacts for in-stream applications
	• Municipalities could provide more clarity to designers re: weather files, CZs, etc.
	Incentives and rebates
	• Tax incentives. Don't put CACs (Community Amenity Contributions) on.
	• Density Bonuses.
	• Municipalities to offer more incentives.
	• ZCSC:
	  o Need for an equivalent rebate program to FBC to dissentivize gas connections
	  o Incenitivize through scaling permitting fees in line with ESC/ZCESC commitment i.e. commitment to higher step results in a lower permiting fee.
	  ▪ Cost/timeline for the developer shorten if higher commitments are made.
	Partner with BC Hydro
	• ZCSC:
	  o Work with BC Hydro to help facilitate connection/upgrades
	  o Advise that team's should look to engage with BC Hydro earlier in the process

Supply chain	• ZCSC+ ESC: Supplier and manufacturers. Trying to find the high effiency products. If you can't get the product, than you have to go with an alternate product. Might mean compromising on performance

Knowledge sharing and eductaion/awareness	**Costs**
	• Case studies need to include costs
	• ZCSC + ESC:
	  o Need current numbers on potential costs to showcase what should be expected
	Training
	• Training for industry around air barriers
	• Builders breakfasts - need to focus on where the gaps are (e.g. trades)
	Awareness of current resources
	• BC Housing has a fair numbers of resources.
	  o Making those things accessible - reducing barriers and costs.
	• ZCSC + ESC:

	○ Case study/tangible examples -creating visibility around how both ZCESC and ESC can be done. ○ Case studies are helpful -- challenges, lessons, learned. Shared with the rest of the industry. ○ Lessons learned are great. Need to be willing to share the successes and failures. **Education of value proposition** • **ZCSC:** ○ Emphasize ease/value of zero carbon in the region • **ZCSC + ESC:** ○ Need to shift understanding of what can be done, and that we can't be doing this.

Part 9 Buildings

Q1 What are the challenges and opportunities associated with building to net zeroenegry-ready, zero carbon, or both?

Challenges

Themes	Comment
Policy barriers	• Zoning Bylaws need to be aligned with performance e.g. requirements for glass and articulation • Bylaws can be disincentives to energy efficiency i.e. increased impact of gross floor area (GFA) from insulation • Municipal bylaws - maximum gross floor area / height restrictions and thicker walls/ deeper roof insulation • Form and character guidelines in some communities are incompatible with upper steps of BC Energy Step Code • **ZCSC:** ○ Fast rollout - need time to share / absorb new info
Client preferences	• Challenge of client preference for views vs. solar orientation • **ZCSC:** ○ Will be hard to separate from certain options/preferences (gas) ○ Older clients often want gas, ability to quickly turn on gas fireplace -allowing a gas backup is a mistake ○ Consumers/builders strongly attached to natural gas, may be some challenges separating them from it. ○ On-demand hot water (natural gas) is popular ○ "Cultural" Gas use such as fire places and cooking are hard to talk people out of despite health and other reasons not to. ○ Gas Marketing is misleading and there is a lot of it
Industry Capacity/ Education	• ***Training/Awareness*** ○ Mechanical trades need to improve- risk of improper design ○ HVAC- sizing matters, need better training HVAC industry (installers, design) ○ Mark showed that these buildings can be built to same costs - industry just needs to understand it's posible ○ Learning curve for all parties / building familiarity ○ • **ZCSC:** ○ Not enough training / information available ○ New regulations = new learning curve ○ Lack of awareness of ZCSC compared to ESC , might need more more time/education ○ Need more case studies showing the actual cost savings associated with gas in our climate. Meter fees really hurt the economics • **ZCSC+ESC**

	○ Assumption that ZCES will cost a lot more • ***Engagement*** ○ It's the builders who are not in the room who are going to have issues. • ***Design challenges*** ○ Challenges to overcome - i.e. full electrification of large homes, but there are workarounds
Supply Chain	• Embodied carbon challenges - most concrete alternative products only minimal improvements • Need to market to production builders - use/make products consumers wants
Financial challenges	• Impact on affordability • **ZCSC:** ○ BC Hydro Connection Fees

Opportunities

Themes	Comment
Program rollout	• Messaging to convey this move as an opportunity, not challenge • Incremental steps between 4-5 isn't much and not hard to achieve • **ZCSC + ESC** ○ Municipalities need to remember this is performance based, not prescriptive (be open to legal workarounds) ○ Opportunity: adopting both at the same time will reduce length of learning curve. ○
Client preferences	• Customers are already requesting Energy Efficient buildings (ESC) • **ZCSC:** ○ Little push back from clients on electric ○ Younger clients tend to prefer electric
Financial	• Opportunity = Cost savings • Integrated design process - will save money and time in long run
Past experience	• Many builders are building at or close to higher steps already • Building to ESC was easier than originally anticipated • **ZCSC:** ○ Like step code, will probably find out it's easier and cheaper than originally thought to build to ZCESC. Would like a bit of time to understand the zero carbon code, but in the end we'll probably find out its easy, so why not adopt it. • **ZCSC + ESC** ○ Even with the higher capital costs, it's cheaper to use better systems
Supply Chain	• **ZCSC:** ○ Technology is there /available
Alternative fuels	• **ZCSC:** ○ Langford RNG project- way to mitigate gas impact. Challenge of including RNG
Embodied Carbon	• Include Embodied Carbon in assessment ○ Agree that this is very improtant. Aluminum, concrete, steel, glass have a really high embodied carbon. ○ Reduce concrete- impact on embodied carbon
Design Approach	• Encourage energy modeling at the front end- rather then at permitting • Think of ongrade parking as a low-carbon solution • Focus on air tightness, makes everything else easier • Lots of workarounds so not concerned. Can still have gas backup, cooking, outdoor fireplaces.

	• ZCSC + ESC o Once at higher levels of step code it makes sense to do zero carbon. Some challenges with larger homes but there are ways to design around this.

Q2 Is the Industry ready to build to these levels of performance today? Why/not?

Industry is ready

Theme	Comment
Industry capacity	• If knowledgeable energy advisors available to support/model/IDP etc.
Past examples	• Yes, this is status quo for most already • Yes Step 3 is standard practice - Higher steps are also easy assuming design is done well. Gets very hard/ expensive if design is not done with Energy considered. • ZCSC: o Vast majority of new builds are already meeting the higher steps o Lots of work arounds available so don't see a huge issue - can still have gas bbqs/ secondary heating etc. o Mechanical systems are readily available and easy to understand for most • ZCSC + ESC: o General consensus: Building community will adapt, could be messy at first. o In many cases industry is already doing low-carbon and energy efficient buildings. Would likely be a small move to do both Yes.
Policy	• ZCSC: o Consensus from builders in the room: The building industry will adapt if regulations are put in. There will be some grumbling at the start but they'll adapt.
Partial readiness	• Some builders will care and adopt faster than others • Will eventually become the new norm (like heat pumps) • ZCSC + ESC: 50% of builders may be ready

Industry is Not Ready

Themes	Comment
Industry Capacity/ Education	• No, but there has been plenty of opportunity to learn/adopt • Lack of skilled trades o Need to educate those on site- skilled trades level, mechanical side o Industry training key- need to get it built right, not just design focused • Increased cost to Step 3 painless, but it takes time and training • Need to roll out training program ASAP if rapid adoption of high steps ZCSC: • Lack of awareness could be an issue- ZCESC hasn't been promoted as much as ESC. • Trade knowledge and home owner knowledge has some gaps
Policy	• Bylaws need to be implemented region wide -reduces risk of building to a lower standard – Needs to happen at large scale.
Design approach	• Starts with right design at the beginning -really important, people need to understand that.

Q3 What types of support would you or your peers need to build to be ready?

Theme	Comment

Support from local goverment	**Policy**
	• Remove zoning bylaws
	• **ZCSC:**
	  o Need regulation, otherwise will not happen at scale.
	
	Incentives
	• **ZCSC:**
	  o Permit, development cost charges (DCC) or other cost reductions for the types of buildings the city wants
	  o Higher permit fees for digging up the road – to disincentivze gas connection over electric connection.
	• **ZCSC + ESC**
	  o City can offer support or reductions in cost / timeline in permitting tax or DCC
	
	Training
	• Design education of Council. Design panels- design review can challenge higher step code levels
	• Need building inspection to understand that code is performance based - sometimes can focus too much on prescriptive - more training for building officials.
	• Training/competence on Step Code should be part of builder licensing (provincial)

Industry capacity	• Knowledgeable Energy Advisors • Really need to increase HVAC trades capacity/ competence/culture • Definitely require mid-construction blower door tests.

Knowledge sharing and eductaion/awareness	**Awareness**
	• There is already a lot of information out there - builders just need to make time and take responsibility.
	• **ZCSC:**
	  o RDN to encourage networking, local capacity building. Easier for larger municipalities with existing critical mass of experience.
	  o Critical mass of members with experience important to encourage networking
	  o Probably need focused awareness outreach with production builders
	
	Training
	• Education is needed
	• Door-knocking and onsite outreach with spec builders important - educating the ones who don't show up to CHBA
	• Modeling of homes important - in the model can show the builders the small adjustments ended to meet higher steps
	• **ZCSC:**
	  o More outreach/education around what Zero Carbon requirements are, what is allowed/not allowed
	  o Lack of training for certain trades (i.e. HVAC; mechanical)/industry culture
	•

Incentives	• Incentives are needed
	  o Financial incentives specifically to support Integrated Design Process (IDP)
	  o Training in High-performance building results in building permit cost reduction
	  o BC Hydro incentive should be brought back - convinced many builders to move to electrification from gas - very effective when it still allowed for something like a gas bbq

Consumer awareness	• **ZCSC:** o Training for home owners o Help with messaging to consumers on low-carbon benefits, argument for zero carbon - e.g. instant hot water is popular

Plenary Discussion

Is alignment between municpalities in the RDN or Vancouver Island important to you? Why/Why not?

Theme	Comment
Alignement is important	• Challenge of different requirements in different jurisdictions - the more aligned the better o Crucial that they get on the same page; ESC adoption as a past example • Will always have differences of opinion, need to be realistic of what level of consistency can be achieved; maybe at least agree on a baseline or base level definitions. • Councils always seem to want to one up each other. • If the consistency is for a high standard then definitely, yes. Consistency would be a huge benefit.
Consequences of misalignment	• Different timelines = different speeds; building expertise and capacity would benefit from repeat applications of the same steps. • If one municipality that is adjacent to other jurisdictions, different requierments will cause developer/ builders to move to those that have lower expectations regarding energy consumption and GHG emission -this exacerbates the uptake
Advantages	• Have an "island economy" - should reap the benefits and help the industry

Appendix D: Staff Workshop Summary

Q1 Have any of these policy options been considered or tried by your municipalities in the past? If so, with what result?

Theme	Comment
BC Energy Step Code	• Not that I'm aware of *(Regional District Nanaimo)* • Yes, as a condition of rezoning*(Qualicum Beach)* • Have stayed in step with the provincial government, but Council wants to accelerate to Step 5 (only in specific cases). Was looked at as part of RDN Climate Action Technical Advisory Committee (CATAC) (see LCES entry) *(District of Lantzille)* • Step 3 Part 9, Step 2 Part 3. Density bonus and rezoning policy for higher steps *(City of Nanaimo)*
Low-carbon Energy System Pathway	• No *(Regional District Nanaimo)* • Looked at as option by RDN's climate action technical advisory committee (CATAC) - was one of the top 5 recommendations, but not implemented as we focused on the top 3 priorities. *(Regional District Nanaimo)* • Not considered in Lantzville *(District of Lantzille)* • Not yet *(Qualicum Beach)* • LCES rezoning policy - DS *(City of Nanaimo)*
Financial Incentives (e.g. building permit fee rebate or rebates)	• Nothing Yet for Lantzville *(District of Lantzille)* • RDN Sustainable Development rebate for high-efficiency buildings (up to $1000) since 2012, but low uptake. *(Regional District Nanaimo)* • yes, DCC reductions for acheiving energy efficiency standards *(Qualicum Beach)* • Provincial government will be making changes to density and finance so will hopefully include sustainability criteria
Permit Fast Tracking	• Suggestion only *(Regional District of Nanaimo)* • Often suggested as an incentive for many legitimated needs. How do you choose what to fast-track e.g. affordable housing, day cares, medical buildings? So that's a No *(CoN), (Qualicum Beach)* • Not in LV, Permitting is quite fast already, unlikely to incentivize *(District of Lantzille)*
Density Bonusing	• Our zoning bylaw includes density bonusing in exchange for achieving higher Step Code levels than required. Seen some uptake *(City of Nanaimo)* • Yes, in theory. But most developments don't need the bonus density *(Qualicum Beach)* • Not in Lantzville *(District of Lantzville)* • The idea of density bonusing has come up through Council discussion, but nothing more formal yet *(District of Lantzville)* • Requires a balance of priorities, but is a very flexible tool *(City of Nanaimo)* • Includes Step Code as a category option- previously referenced ASHRAE (*City of Nanaimo)* • Provincial government will be making changes to density and finance so will hopefully include sustainability criteria

Q2 What are the pros and cons associated with each option, from the perspective of permitting timelines, efficacy/uptake from the industry, staff capacity, overall feasibility, other?

Pathway	Theme	Comment
Energy Efficient Buildings	**Design**	**Guideline conflicts** • Design Guidelines *(City of Nanaimo)* • The town's design guidelines encourage features that compromise energy efficiency *(Qualicum Beach)* • We have heard concerns design guideline conflict and have plans to review ours *(City of Nanaimo)* • Form and character guideline conflicts • Wall depth/floor area calculation conflicts, and roof • Location of houses (i.e North-facing homes with large windows) • Related to design, is public expectation for stepped buildings *(City of Nanaimo)*
	Education and local capacity	• Builder and resident education - fears about cost increases • Limited access to materials/ labour (I've heard that there are very few external insulation companies locally)
	General	• Influx of applications ahead of changes. This is experience for Energy Step Code and assume would apply to Zero Carbon Step Code *(City of Nanaimo)*
Low-carbon Buildings	**Industry capacity**	• Low education among public/ builders (Regional District of Nanaimo
	Natural gas/RNG	• Desirability of natural gas (e.g. heating water, gas stove, gas fireplace) • Fortis rebates and low install costs for NG • Potential compliance challenges with RNG? Fuel switching back.
	Concerns re electrification	• Areas that experience longer power outages
	Unintended consequences	• Prioritizing Zero Carbon over Energy Step Code is taking the short-term gain over the long-term - Don't want to give up benefits of efficiency
Low-carbon and Energy Efficient Buildings	**Industry Capacity**	• Not very well informed builders overall • There will be a perceived conflict between affordability and higher efficiency standards *(Qualicum Beach)*
	Local Government Capacity	• On-going changes can be hard for industry (and staff) to manage in-stream applications • Some concerns re: capacity to review applications *(District of Lantzille)* • Not a very intense process overall for Building Officials, new requirements won't add much time to the review; need to ensure drawing set for P9 matches info from Energy Advisor (EA)
	Incentivization	• Need to encourage rather than punish the right approach

Q3 What kinds of support, training, or other resources would you need or want to help support the implementation of these options?

Theme	Comment
Awareness & Education	• More engagement opportunities for public/industry *(Regional District of Nanimo)* • Case studies showing design procedures to industry members - need to know where to start • More education about the business case for energy efficiency. Appeal to people's wallets *(Qualicum Beach)* • Showcase local builders that are successfully implementing higher step code standards • Constant changing regulations creating challenges • Thermal comfort - heat pumps are better than floor board heaters. How can we communicate these benefits to builders and homes owners. • Plain language explanation of requirements for residents (why it's important, how much will it increase costs)
Permiting process	• Step Code isn't creating any backlog around permitting issues. Application review is pretty straight forward. Make sure we have crystal clear requirements. • Need to front-load permits - ask for things earlier when you still have leverage • Perhaps a better understanding of provincial/Federal funding opportunities and conveying this to developers as opportunities at the outset of projects • Building permit fees are adequate, planning permit fees already too low. You can't reduce these further for incentives. They are not yet at cost recovery. If they were closer to cost recovery you could use them for incentives and hire more staff.
Policy updates	• Heat pump setback requirements may need to be reduced- can be a barrier • Move towards performance based approach in bylaws and guidelines • City of Nanaimo - historical and come from OCP. There are a number of fundamental principles. There is sensitivity around height. • Need to review Form and Character guidelines • Historic neighbourhood plans - these are the ones that are harder to amend. How to allow more flexibility • we need to explore ways to make buildings that comply with design guidelines without adding all the dormers and extra corners *(Qualicum Beach)*

Appendix E: Summary of Industry Survey Responses

Summary of Industry Survey Responses: Regional District of Nanaimo

Regional Strategy for Net Zero Buildings and Localized Energy Generation

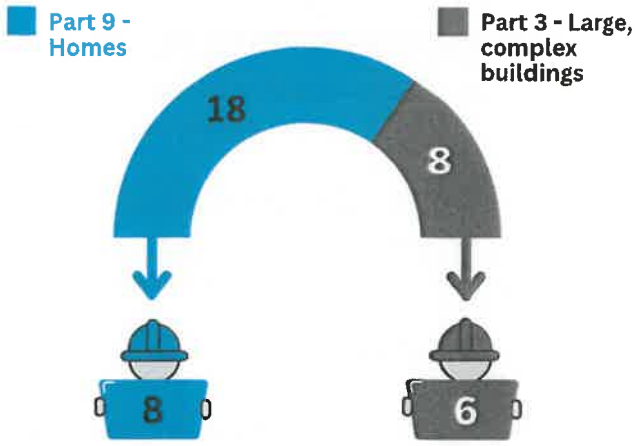
26 Survey Responses Recorded

- **7** Home Builders
- **3** Contractors
- **4** Developers
- **2** Energy Advisors
- **4** Consultants
- **1** Energy Modeller



Most respondents **strongly agreed** with the following statement: **"There is a need to improve both energy efficiency and reduce carbon emissions in new buildings."**

Type of Buildings Respondents Primarily Worked On



8 respondents have **experience** building or designing to **Step 5** of the Step Code for **Part 9 Buildings**

6 respondents have **experience** building or designing to **Step 4** of the Step Code for **Part 3 Buildings**



Top responses to the **benefits** of building to higher levels of the ***BC Energy Step Code*** were:

1. Increased comfort for occupants
2. Lower carbon footprint
3. Lower utility bills and healthier and safer buildings



Common **challenges** of building to higher levels of the ***BC Energy Step Code*** were:

1. Costs of design and construction
2. Home/building owners do not understand or value energy efficiency
3. Lack of industry capacity



Common **challenges** of designing/constructing buildings with **electric heating and water systems** were:

1. Home owner preference does not align with electrification
2. Requiring upgrades to electrical services
3. Home owners do not understand or value low carbon space heating and hot water systems



Top responses when asked what **supports** would help to implement higher levels of the ***BC Energy Step Code*** were:

1. Financial incentives to offset additional costs
2. Permit fast-tracking
3. Training and education for industry



Additional challenges are: **city bylaws or design guidelines conflict with or constrain** the achievement of energy-efficient buildings.

The **City of Nanaimo** was the most common response when asked which municipality guidelines constrain the achievement of energy-efficient buildings.



It is preferred that **all local governments in the RDN** have the **same requirements** for energy efficiency even if it means having to meet **higher levels** of Energy Step Code **across the region.**

Industry Survey Responses

Regional Strategy for Net Zero Buildings and Localized Energy Generation

Summary of Responses

- There were **26 total** responses.
    - Most respondents surveyed were **home builders** (7 responses).

- The **most common area of work** was the RDN Electoral Areas (21), followed by the City of Nanaimo (19).
    - Many also work outside of the RDN but on Vancouver Island (18).

- Most of the respondents design or construct **Part 9 buildings** (18 responses).

- Most respondents **had experience** with building to Level 3 or higher of the BC Step Code for **Part 9 Buildings.**
    - Only 4 respondents had **no experience** with Level 3 or higher;
    - 8 respondents had Step 5 experience;
    - 11 had Step 4 experience;
    - 10 had Step 3 experience.

- The **experience with building to Level 3 or higher** of the Step Code for Part 3 buildings had a similar breakdown:
    - Only 1 respondent had no experience with Level 3 or higher;
    - 6 respondents had Step 4 experience;
    - 7 respondents had Step 3 experience;
    - 5 respondents had Step 2 experience.

- **Most respondents strongly agreed** with the following statement: "There is a need to improve both energy efficiency and reduce carbon emissions in new buildings."

- **Top responses** to the **benefits of building to higher levels** of the Energy Step Code were:
    - 19: "Increased comfort for occupants";
    - 18: "Lower carbon footprint";
    - 18: "Lower utility bills";
    - 18: "Healthier and safer buildings".

- **Top responses** regarding the following **challenges of designing or constructing to higher Step Code** levels were:
    - 20: "Cost – Costs of design and construction are higher for energy efficient buildings".
    - 15: "Awareness and Understanding – Home/building owners do not understand or value energy efficiency".

- 13: "Industry capacity – Local contractors, consultants or other service providers with the skills necessary to build to higher levels are unavailable".

- **The City of Nanaimo was the most common response** when asked which City bylaws or design guidelines conflict with or constrain the achievement of energy efficient buildings.

- The **top 3 responses** when asked **what supports would help** to implement higher levels of the BC Energy Step code were:
  - (16) Financial incentives to offset additional costs
  - (13) Permit fast-tracking
  - (12) Training and education for industry on technologies and processes for building energy-efficient buildings

- Most respondents had experience with electric-based systems in Part 9 buildings with **heat pumps for space heating being the most common.**
  - For **Part 3 buildings**, however, half of respondents did not have any experience with electric-based systems

- When asked what they saw as the **primary benefits of building an electrified building** (Zero Carbon Step Code), respondents chose **"lower carbon footprint"** (20 times) as the most common option followed by "healthier and safer buildings" (13 times).

- When asked what the **challenges were when designing/constructing buildings electric heating and water systems** the most common response was **"home/building owner preference does not align with electrification"** (16 times) closely followed by **"requiring upgrades to electrical services"** (14 times).

- When asked **what supports are needed to implement the Zero Carbon Step Code**, the top 3 responses were:
  - (12) Financial incentives to offset additional costs
  - (11) Education for industry on Zero Carbon Step Code requirements
  - (11) Awareness building for homeowners

- When asked how important consistent requirements for energy efficient and low carbon buildings were across local governments, the most common response was that it was **preferred that all local governments in the RDN have the same requirements for energy efficiency** even if it mean having to meet higher levels of Energy Step Code across the region.
  - There was only **half as much support** for the same regulations of the **Zero Carbon Step Code across the RDN.**

- Most respondents worked for **small companies** (19 respondents).

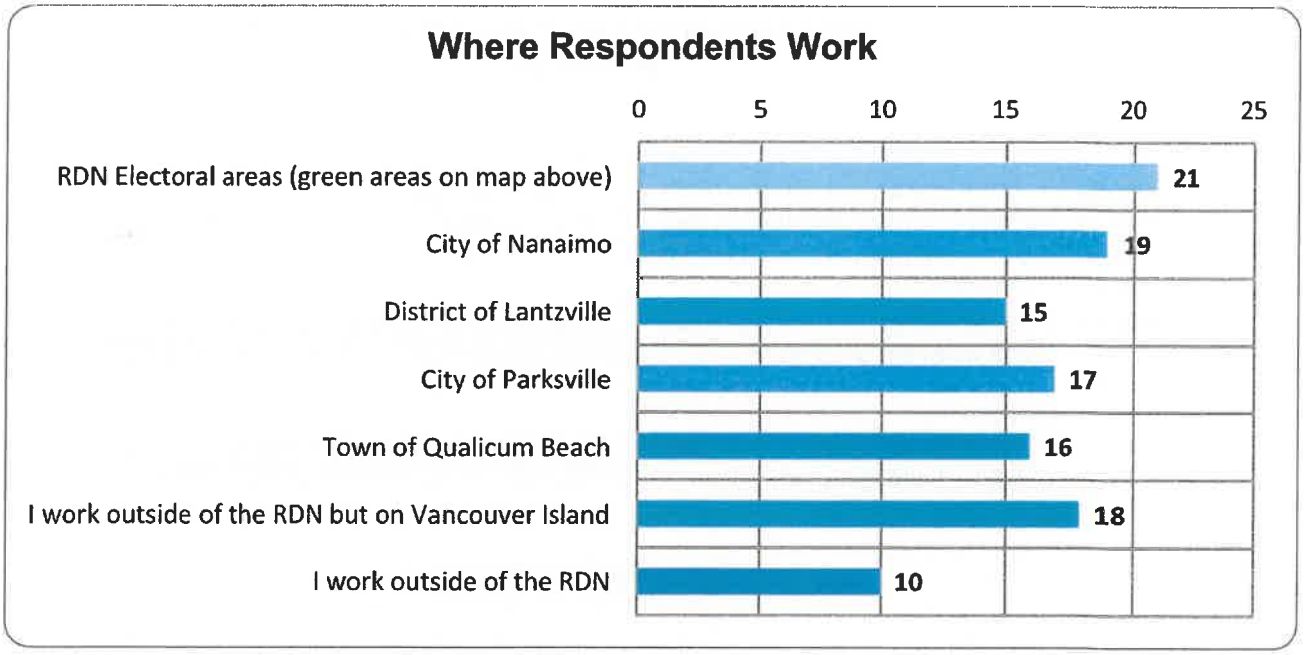
Question 1) Which sector do you work in?

Which sector do you work in?	
Home Builder	7
Developer	4
Energy advisor	2
Energy modeller	1
Contractor	3
Consultant	4
Other (please specify)	5

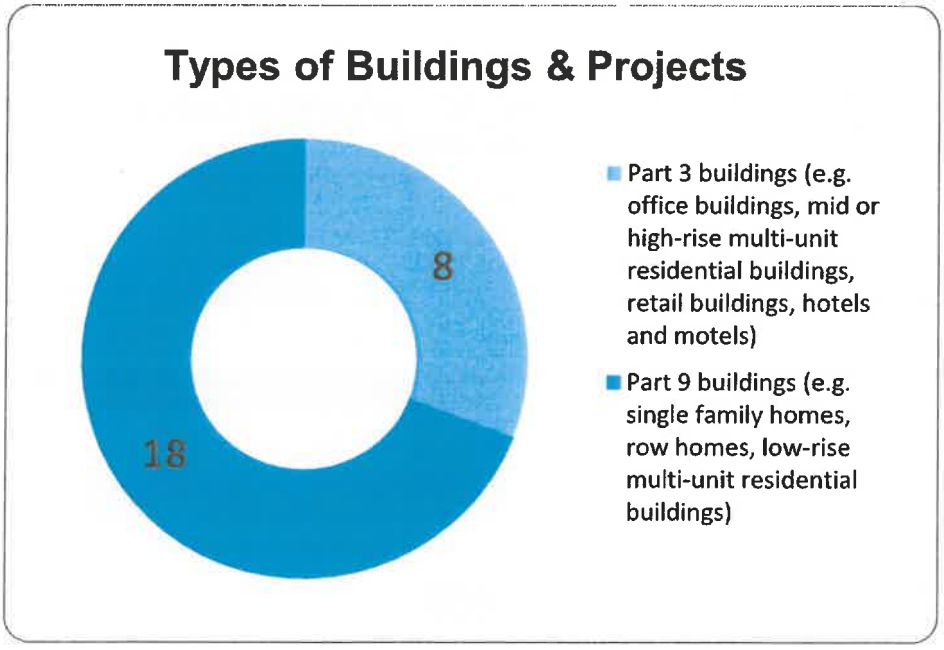
"Other" responses:

- Architect/Designer, 1
- Energy Advisor and Building Designer, 1
- CAD Design Technician, 1
- Utility Sector, 1
- Product supplier/installer, 1

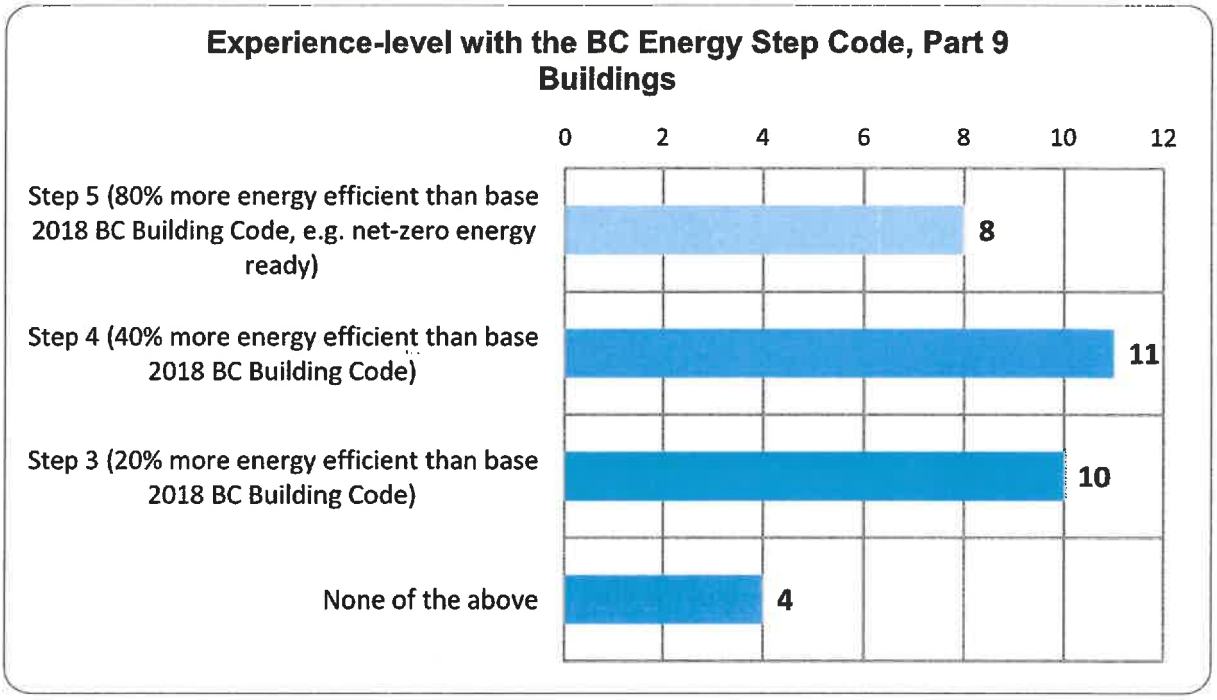
Question 2) Which area or municipality/municipalities in the Regional District of Nanaimo (RDN) do you work in? [check all that apply].



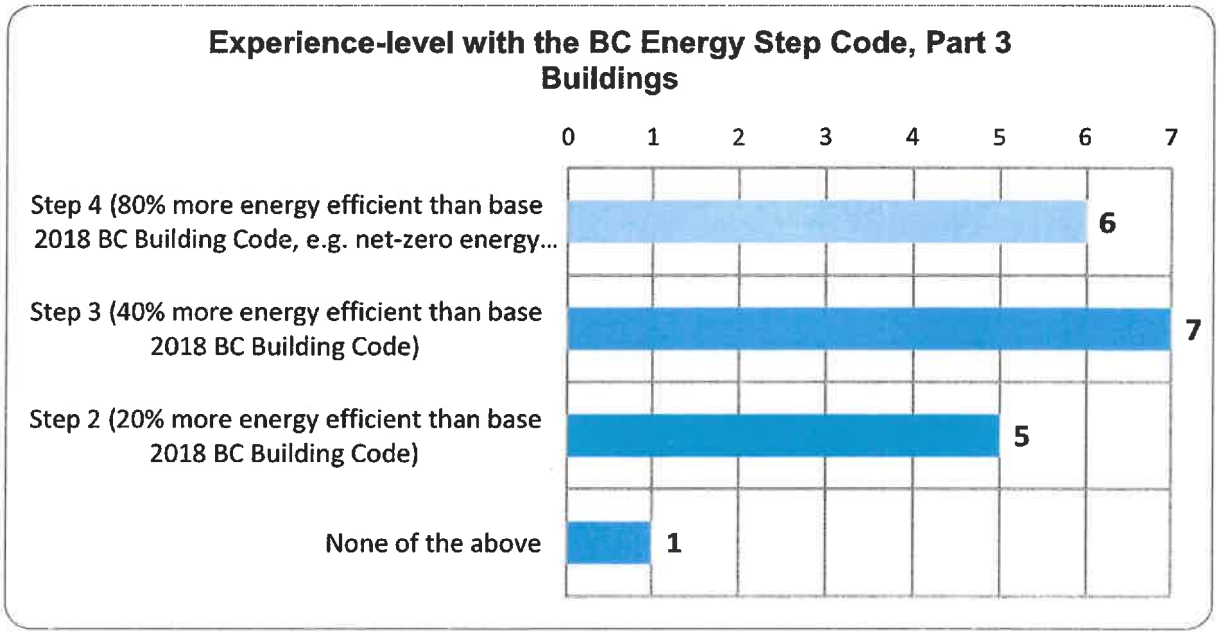
Question 3) What type(s) of building design and construction projects do you primarily work on? [select one]



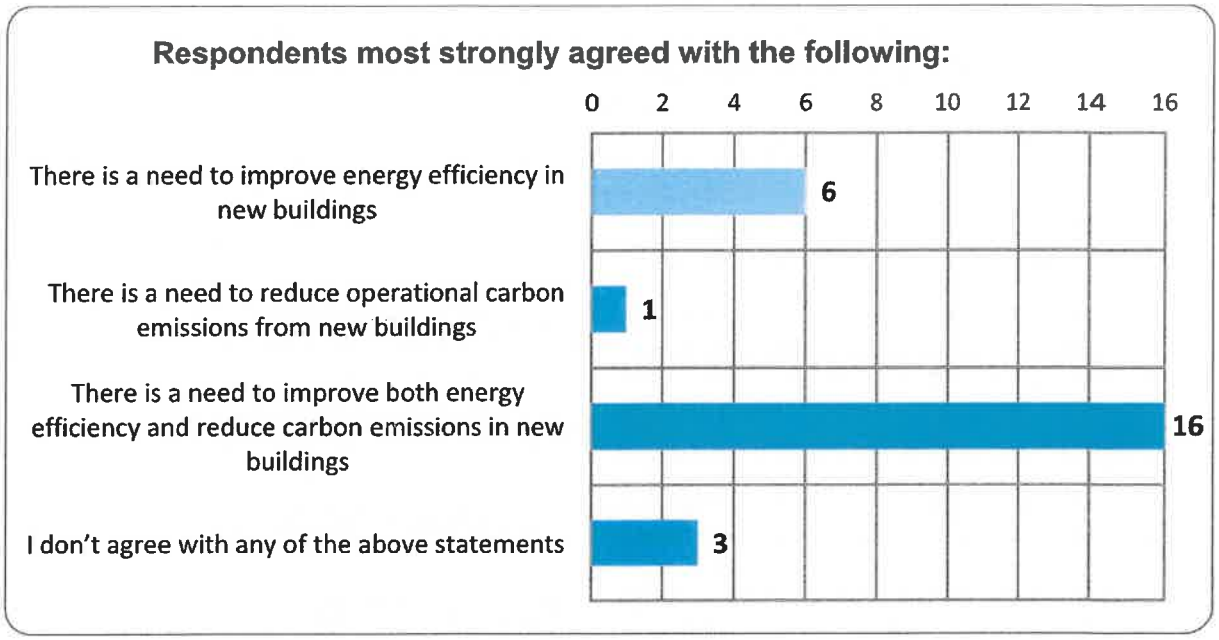
Question 4) Do you have experience designing/building to higher levels of the BC Energy Step Code for Part 9 buildings (e.g. single-family homes, row homes, and small multi-unit residential buildings)? [check all that apply]



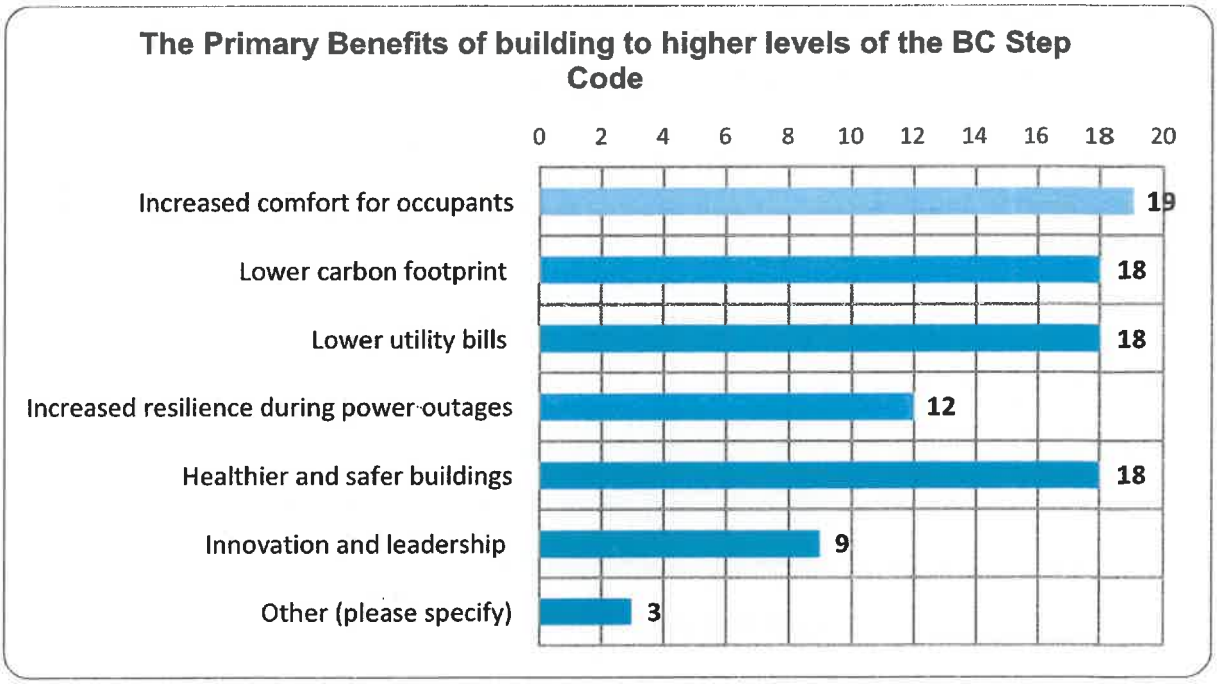
Question 5) Do you have experience designing/building to higher levels of the BC Energy Step Code for Part 3 buildings (e.g. office buildings, large multi-unit residential buildings, retail, and hotels)? [check all that apply]



Question 6) Which of the following statements do you most strongly agree with? [select one]?

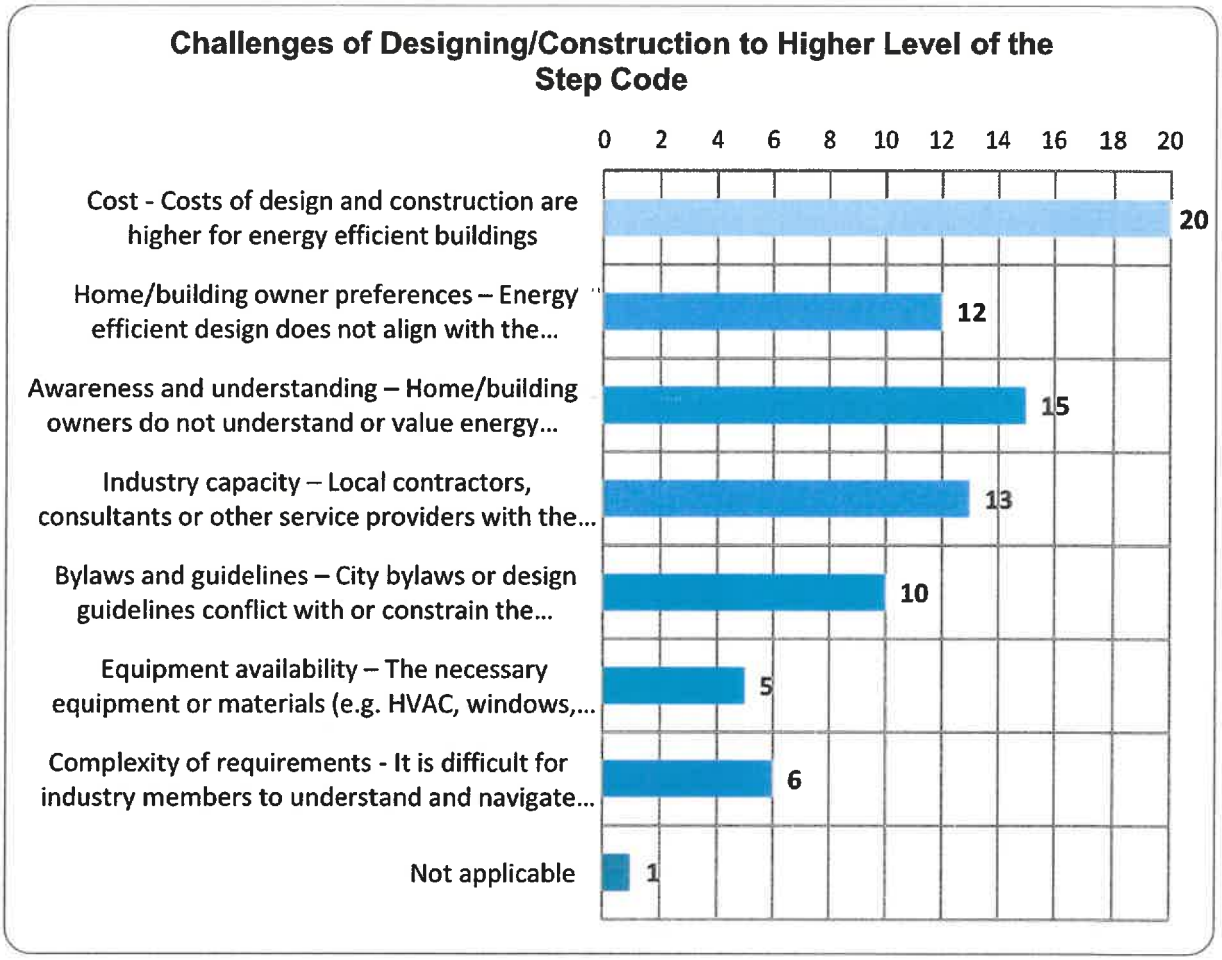


Question 7) What do you see as the primary benefits of building to higher levels of the BC Energy Step Code? [check all that apply]

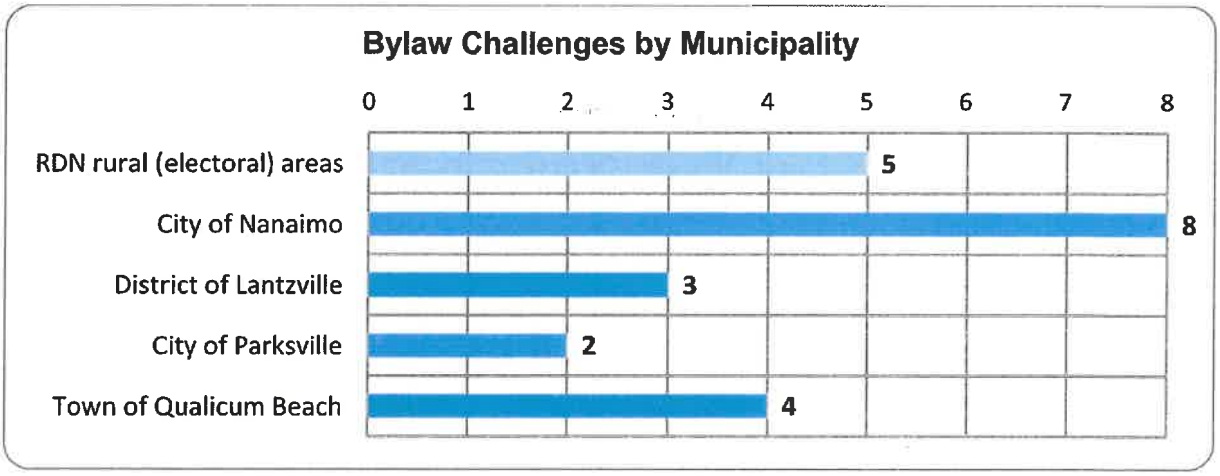


Other: "Worthwhile path to mitigate against accelerating global warming."

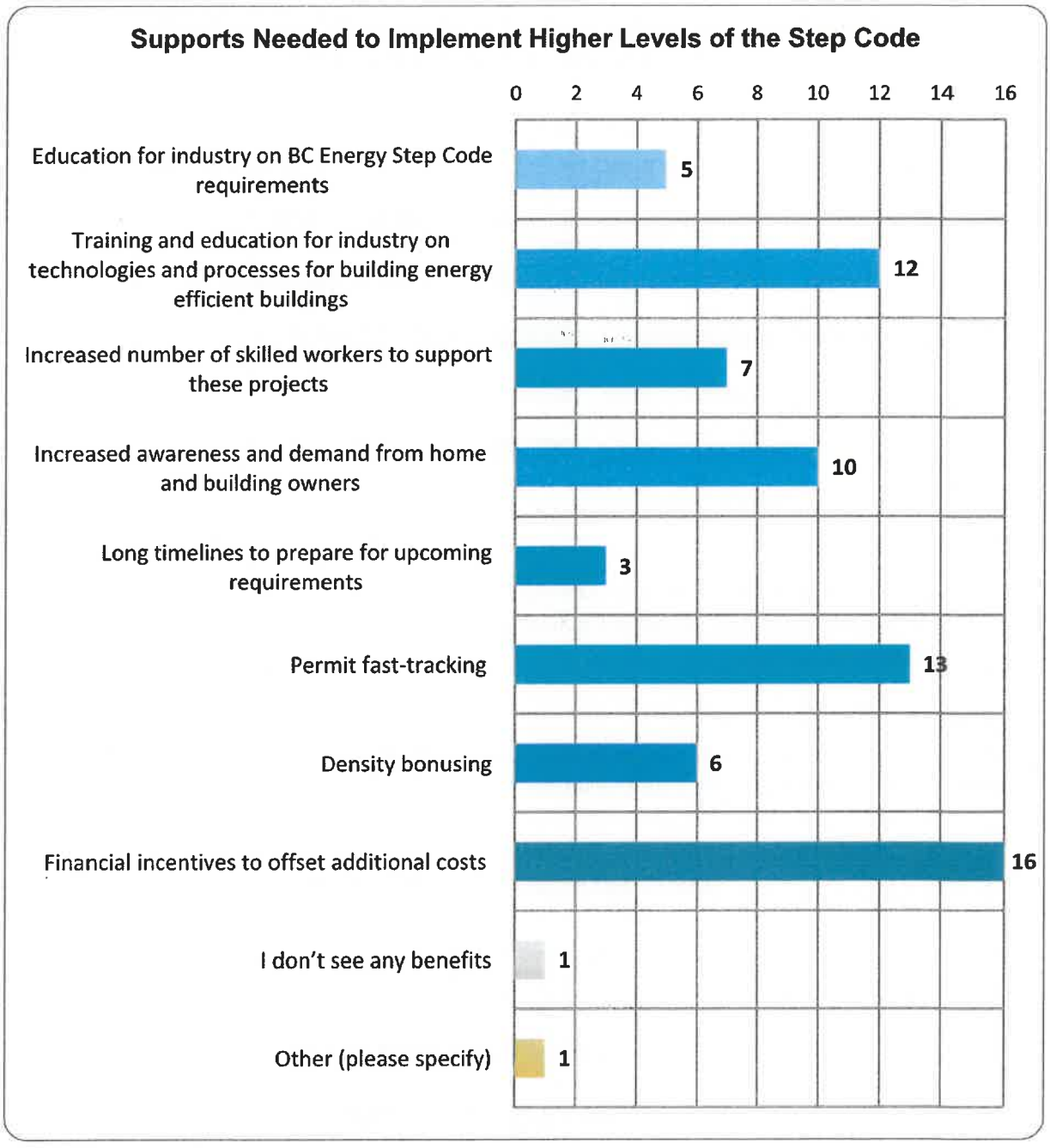
Question 8) What challenges designing/constructing to higher levels of BC Energy Step Code have you experienced (or would you expect to experience)? [check all that apply]



Question 9) If you chose "Bylaws and guidelines" in the question above, which municipality are you referring to?

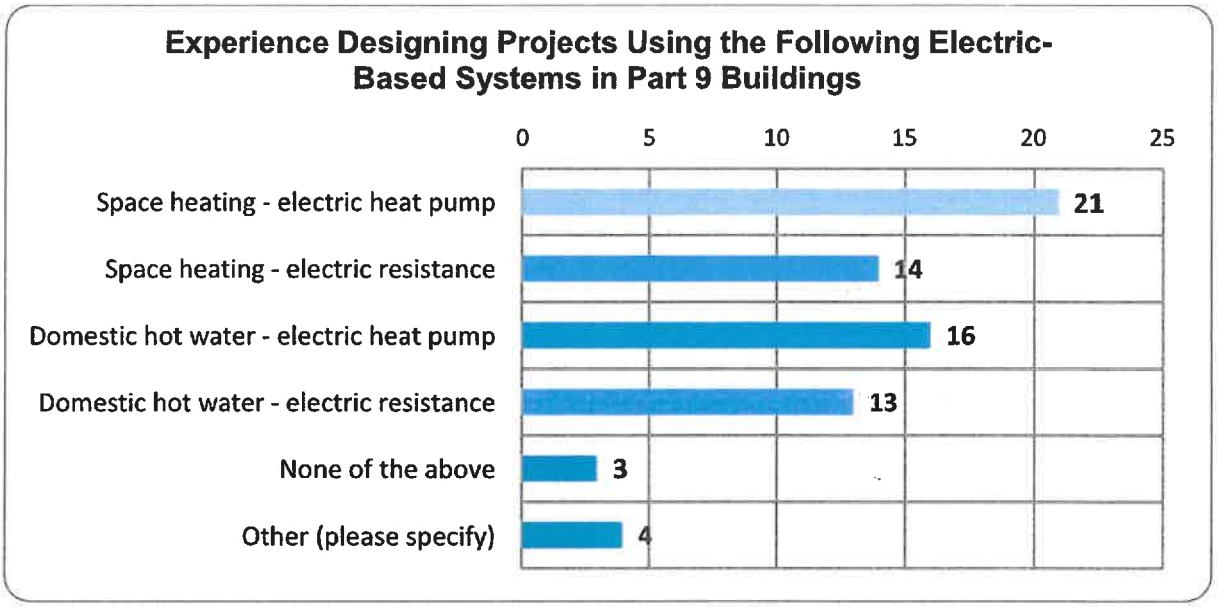


Question 10) What type of support would help you or your peers implement higher levels of the BC Energy Step Code? [select your top three choices]



Other: "Better training for plan checkers and building inspectors."

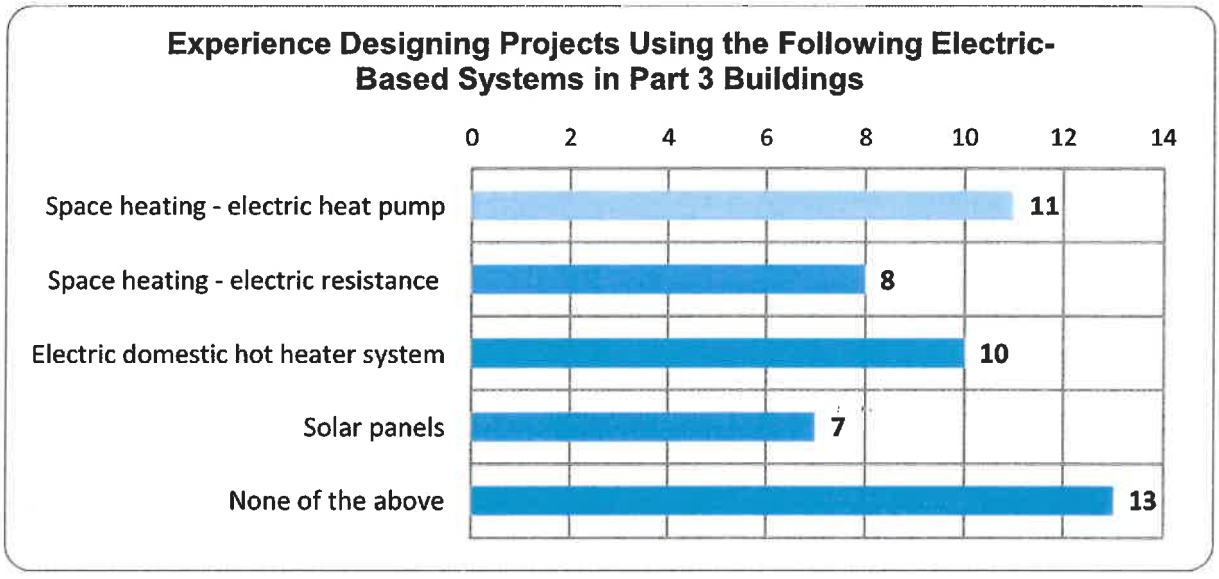
Question 11) Do you have experience designing/building projects that use the following electric-based systems in Part 9 buildings? [check all that apply]



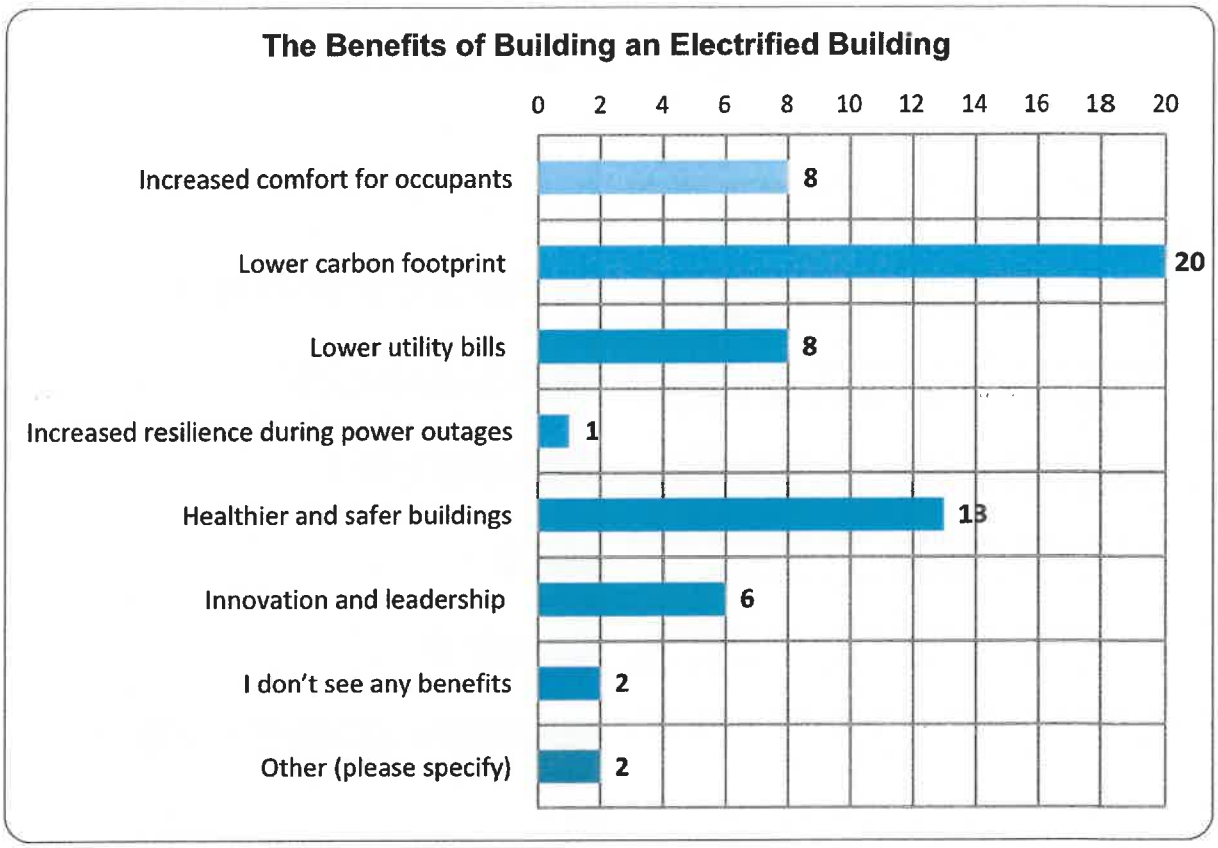
Other:

- Geothermal, grid-tied PV, inverter back-up power
- Air to water heat pump for radiant in-floor heating
- Geothermal and solar

Question 12) Do you have experience designing/building projects that use the following electric-based systems in Part 3 buildings? [check all that apply]



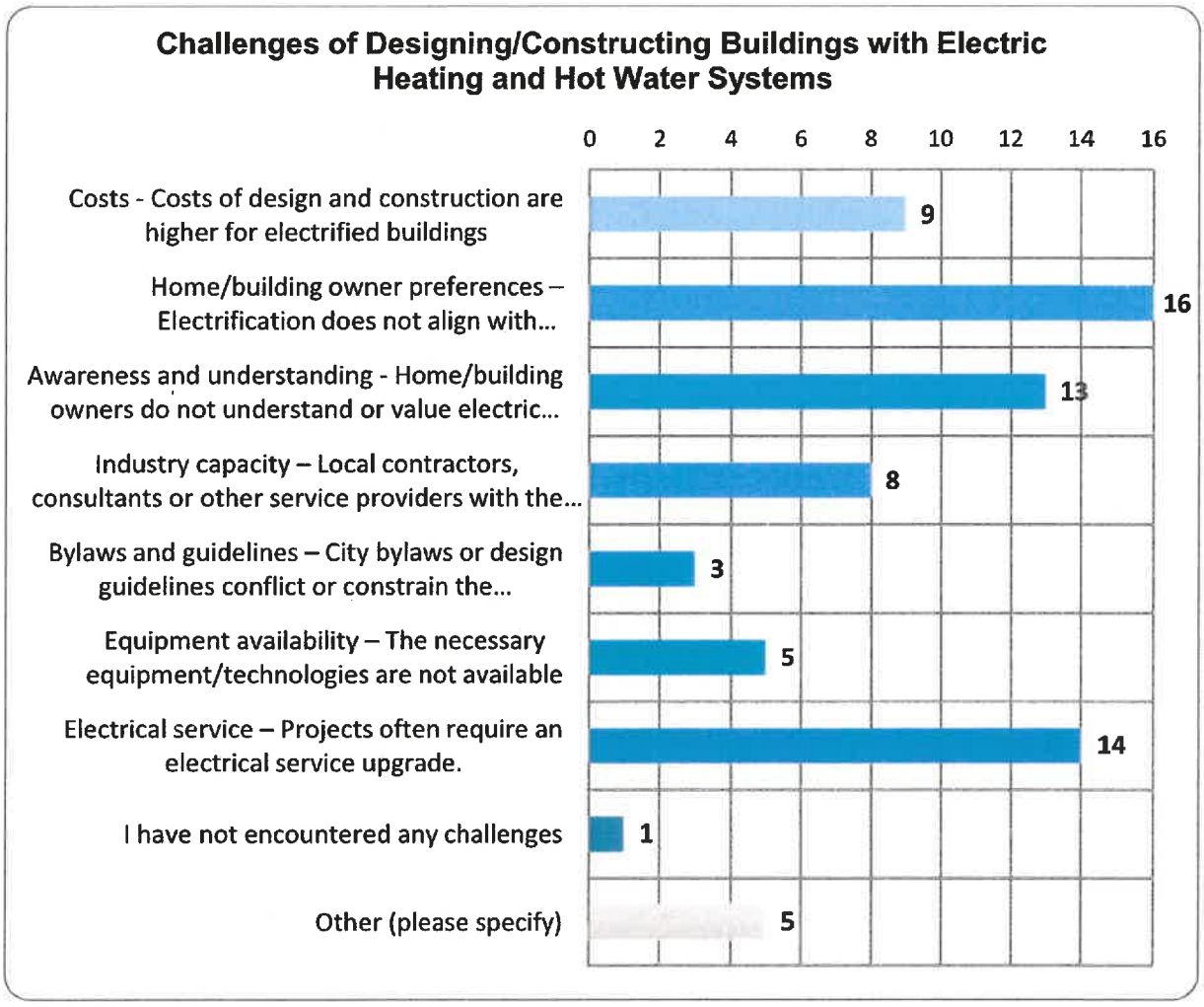
Question 13) What do you see as the primary benefits of building an electrified building (i.e. Zero Carbon Step Code)? [check all that apply]



Other:

- "Most effective single way to reduce operational carbon impacts of buildings"

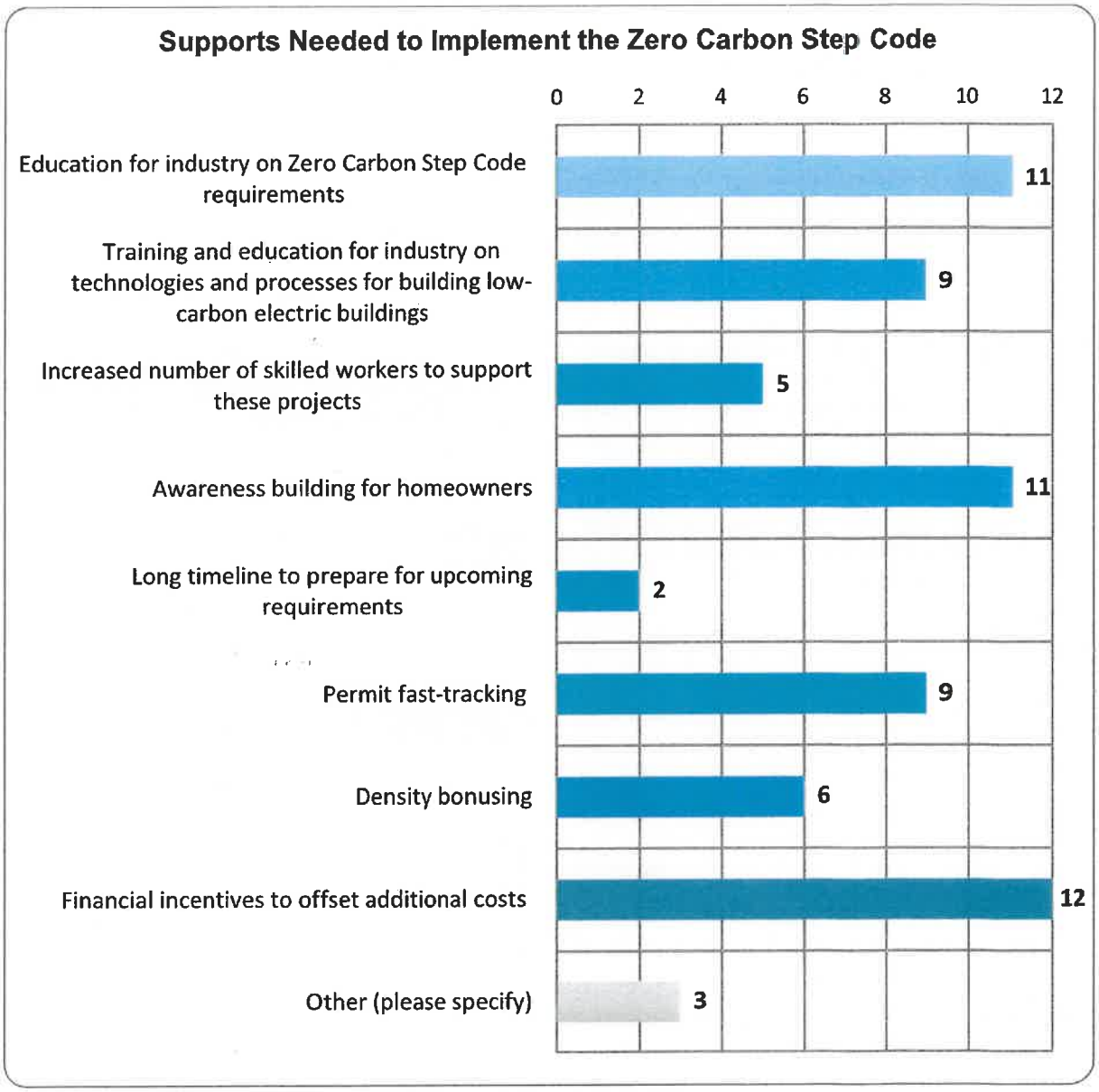
Question 14) What challenges designing/constructing designing/constructing buildings with electric heating and hot water systems have you experienced (or would you expect to experience)?



Other:

- "Increased electrical grid load, susceptibility to power outages and downed power lines, melted sea floor power transmission cables from mainland, higher utilities bills, reduced natural gas usage"
- "BC Hydro is not prepared for this!"
- "Lack of island power generating sources, reliance on power transmission from mainland via sea floor cables"
- "Lack of 'buy-in" (awareness) on the part of much of the development industry and ignorance and lack of buy-in on the part of elected officials, and ignorance (lack of training, education, buy-in) on the part of local government staff"
- "Disinformation caused by Fortis. Their advertising would lead people to believe that NG (methane) is a clean fuel and that they capture all of it from dumps."

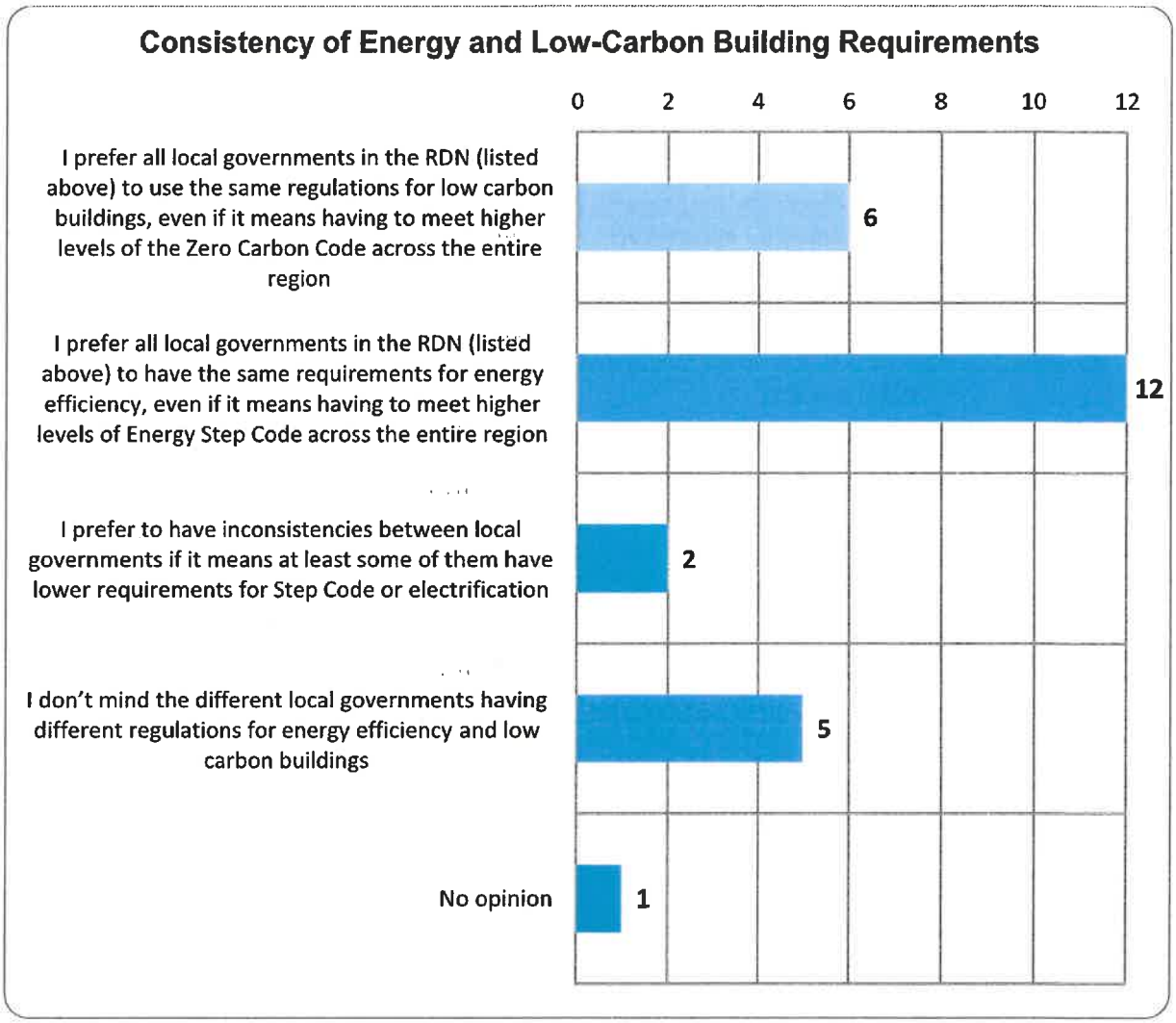
Question 15) What type of support would help you or your peers implement the Zero Carbon Step Code? [select your top three choices]



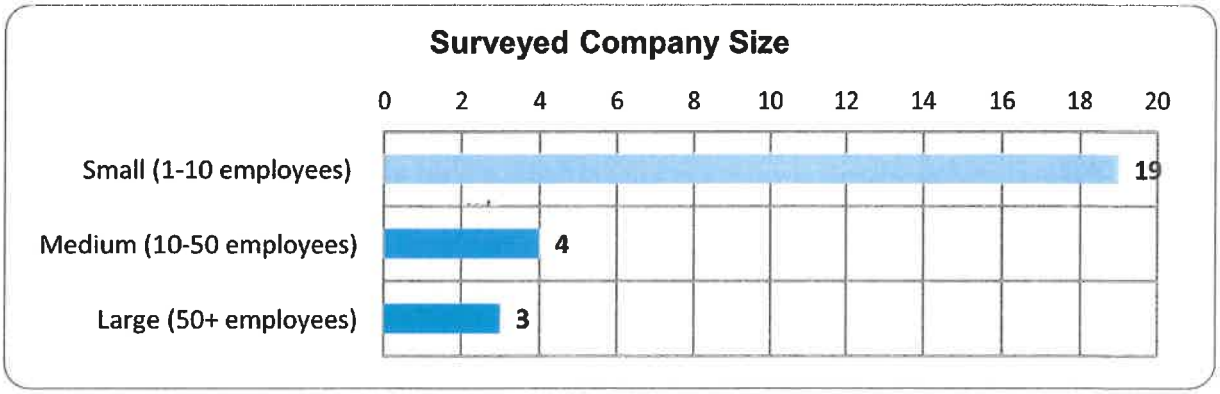
Other:

- "Better training for plan checkers and building inspectors"
- "While installing electric systems and solar panels is a great way ahead, builders and owners really need to understand that conservation of energy is the key. Building better building envelopes that are better insulated and air tight is key. Installing a high performance system in a building that leaks energy makes little sense. Build the envelope as best as possible and even a crappy old heating system will use less energy than a new heating system in an inefficient building."

Question 16) How important is it to you to have consistent requirements for energy efficiency and low carbon buildings across local governments in the Regional District of Nanaimo, including the City of Nanaimo, District of Lantzville, Town of Qualicum Beach and the RDN Electoral Areas?



Question 17) What is the size of the company you work for?



Q 18) Is there any other feedback or comments you would like to provide?

Theme: Guidance and incentives needed

"It is imperative that the Province of BC refines and upgrades the Zero Carbon Step Code to address embodied carbon and to this end BC Housing to publish guidance documents for local governments on "development policies that target embodied carbon in both new construction and building retrofit and renovation."

"Providing incentives is key. The step code was designed in conjunction with industry and the timelines meet what industry can deliver on while meeting our provincial carbon reduction requirements. The key is not to arbitrarily accelerate things because it makes local politicians feel good"

Theme: Consistency of requirements across local governments

"Consistent requirements (including submission requirements) across all municipalities would help reduce incomplete permit applications"

"The entire RDN needs to be at the same level. This simplifies it for the industry so that they don't have to look up different requirements for different neighborhoods. Builders/developers will build in areas with more lenient rules. Don't give them that opportunity. Focus on the building envelope. Conserving energy should be the priority over more efficient systems. Systems can be improved later. The walls wont be opened up for 40 or 50 years."

Theme: Building envelope and lot sizes

"We need to focus on the building envelope. If we build it correctly, then consumed energy becomes less of a talking point because we will be using less of it. Mechanicals can for the most part be easily upgraded or converted at a later date. You don't get many opportunities to upgrade the building envelope so we might as well do it correctly the first time. Increasing awareness and education of homeowners is key. We need them to understand and to ask for buildings to be built better. Energy labeling should be mandatory and be used as a selling feature. Driving demand will steer the industry in the right direction. Airsealing and compartmentalization of buildings has drastic effects on efficiency and comfort. Build tighter (with proper ventilation) should be a priority. Technologies such as aerosolized caulking make sealing very easy."

"Local Government rules need to change to make development of more energy efficient homes: - smaller lots and smaller setbacks and allowable increased lot coverage -> homes can be simpler in design for efficiency and have less rear yard/front yards and exterior side/flanking setbacks to fit same sized home on smaller parcel - Design Panel scope reduced (energy efficiency and cost reduction over aesthetics) - eliminate perimeter wall height requirements (straight wall more efficient over walls with corners and cantilevers and stepbacks) - Passive Shading systems allowable as encroachments into south facing setbacks (except sides) - larger roof overhangs, shade sails, etc. - must start getting uptake on solar panels on houses (Calgary's electrical provider, Enmax, was providing grid tied solar panels to building and home owners to install on their roofs - maybe this could be setup through a regional crown corporation-ish structure) - local government incentives from green roofs and green walls - incentivize builders to include full in-ground basements where grades allow in single family homes, duplexes, multiplexes and townhouses (underground living space is naturally insulated) - need incentives to

offsets rock excavating costs. A review of all local government owned buildings and parcels is needed for feasibility of solar and wind power generation Strongly suggest local government work with first nations and provincial government to look at tidal power generation, wind power and solar power on the island on a large scale."

Theme: Permitting times/requirements

"1.) If the goal posts could be the same each and every time. Different staff within the same building department will request different items. This causes time lost increasing the costs. A streamlined system with heavy penalties for builders Bending/ Breaking the rules is required. 2.)Why are Builders allowed to falsify paperwork and building permits and get a slap on the wrist. This is bad for the industry and should not be allowed within our building departments. Building License and Business License should be suspended. Blaming a staff member does not excuse the fraud. We are professionals we can't improve this industry without accountability."

"Permit times need to be faster and more consistent throughout the year despite staff holidays. We waited for 22 weeks for a permit last year and that is very detrimental to our business for a lot of reasons. It isn't exclusive to the RDN but most regional districts timelines are far too long and virtually no accountability to any timeframe. The company that falsified
building permits and constructed multiple homes without a permit should not be allowed to apply or receive building permits. The claim that one rogue employee did that is laughable to say the least. The owner as part of BC Housing home warranty requirements cannot pass off the "general manager" role and claim they had no idea they were doing that. They are either
completely inept as an owner and in violation of BC Housing rules around people in charge of the company or they are complicit in the actions. Either way them still being able to carry on as usual is a complete slap in the face to the rest of the local industry and further risk to the community for yet another abuse. A quick BC courts record search of said company shows they have had upwards of 20 pending and past legal actions against them. This is not the behavior of a valued community business nor one the industry should support in any way."

"Permit wait times are way too long Builders breaking rules (like falsifying permits, should not be able to build)."

Theme: Electrification and hydro capacity

Promoting an electrification only approach to decarbonization for housing will likely have higher cost implications, and energy reliability challenges for both industry and homeowners. Renewable Natural Gas (RNG) should be considered by all municipalities as a low carbon energy option for new homes as it provides homeowners energy choice, resiliency, affordability, and comfort. RNG has the lowest emission factor of any energy delivered in the Province (0.29 CO2e kg/GJ), including BC Hydro (3.0 CO2e kg/GJ) and Fortis electricity (0.72 CO2e kg/GJ). This is because with Renewable Natural Gas (RNG) production, methane from organic waste that otherwise would have escaped into the atmosphere is captured and used to produce RNG. The Province publishes the emissions factors including the methodology for determining the emission factors of all fuels which you can access at
https://www2.gov.bc.ca/assets/gov/environment/climatechange/cng/methodology/2018-pso-methodology.pdf

"Some of the questions are pretty leading. There also needs to be discussions with BC Hydro regarding capacity if homes are all electric, including vehicles. Many homeowners want gas fireplaces which is not addressed. Most oceanview properties in the RDN are north facing so therefore homeowners want large north facing windows which are not very energy efficient even with triple pane windows. Another form of housing that should be promoted is modular homes. These homes are land efficient and are generally rectangular in nature making it much simpler to to obtain higher energy efficiency. They are also a more affordable form of housing. District energy in higher density areas is another point that needs further discussion."

"I participated in the panel. One concern I have is that in BC there is talk, and this came up in the panel, about having air conditioning as a necessity... In the South of France where I am now just today a mechanical contractor complained to me that in Canada we do not care about the environment as there is 'air conditioning everywhere', In the south of France where it can hit high 30s in the summer new houses are not allowed to be constructed with air conditioning *the whole country. Even though a lot of the electricity is nuclear and renewable they recognize that air condition is on of the larger consumers of electricity. They treat the high temperatures by design and adaptation. Even though we have hydro in BC I think it is an enormous mistake to believe that we all will need AC. It is not that hot and when it is we need to change our habits...i.e. less thermal bridging, not wearing sweaters and jackets on a hot day. We should not push a solution that the world is worried about. If we are able to connect the electrical grid across the nation energy not used on cooling will be able to offset dirty production elsewhere. I really think we need to reject the notion that we have to plan for air conditioning. We should be planning how to continue to avoid it in a warming planet"

Appendix F: Summary of Equity Stakeholder Interviews

Equity Stakeholder Interviews

Participants

In order to address any unforeseen equity consequences of the proposed pathway, Staff identified the following non-profit housing providers:

- Canadian Mental Health Association (CMHA)
- Ballenas Housing Society
- M'akola Housing Society
- Connective (formally the John Howard Society)
- Habitat for Humanity
- BC Housing
- Island Crisis Care Society
- Pacifica Housing

These providers were invited to the Industry Stakeholder Workshop and Staff followed up with many of them for one on one interviews. Interviews were conducted with the following equity housing stakeholders.

- M'akola Housing Society
- Connective (formally the John Howard Society)
- Habitat for Humanity
- BC Housing

Representatives from Island Crisis Care Society attended the Industry Stakeholder workshop, but were not interviewed separately.

Existing Requirements

Equity stakeholders noted they are often already required to build to high energy-efficiency and emission standards due to BC Housing and Canadian Mortgage and Housing Corporation (CMHC) funding requirements.

BC Housing currently requires Step 4 for Part 9 buildings, Step 4 for Part 3 buildings up to 7 stories, and Step 3 for 7 stories and above. Part 3 buildings also have a 3 $kgCO_2e/m2$ greenhouse gas intensity (GHGi) limit, roughly equivalent to the Strong Carbon Performance step in the ZCSC. These regulations have been in place since April 2019.

CMHC requirements vary by funding stream and are generally related to National Energy Code for Buildings (NECB) as opposed to Step Code. Applicants usually need to provide both Step Code evidence (for BC Housing) and NECB modeling/compliance (for CMHC). One equity stakeholder raised a concern regarding with what they perceived as a disparity in these requirements with CMHC being generally more stringent and a lack of appropriate funding to support non-profits in meeting both requirements.

Challenges

Overall, the equity housing providers noted the following challenges related to increased energy efficiency and emissions standards for new buildings:

- Concern related to increased construction costs due to BC Energy Step Code requirements. Equity stakeholders were less concerned about cost increases related to the ZCSC and electricity requirements. Some equity stakeholders, such as M'Akola, are already building all-electric buildings and generally don't have any operational requirements where they'd need gas.
- Potential impacts on building permit approval timelines.
- Lack of expertise on the team. Equity stakeholders noted they would need to hire outside help to meet energy efficiency requirements, this was a particular concern for Habitat for Humanity who often rely on volunteer labour and in-house building expertise; whereas other equity builders already rely on outside building professionals (Connective, M'Akola) or have the capacity to train staff in-house (BC Housing).
- Energy efficiency focused design requirements impacting residents quality of life (e.g.: over heating, lack of balconies and window openings)
- Electrical capacity - BC Housing have encountered issues with electrical capacity at some sites too late in the game for the project to proceed with all-electric and had to switch to gas solutions. In response, they have changed their approach so that BC Hydro is engaged very early in the process to allow lead time for site upgrades.
- Utility costs/operational costs - equity stakeholders noted, with respect to monthly billing, natural gas is currently a more affordable energy source than electricity; however, BC Housing noted they expect the costs to even out within the next four to five years as natural gas costs increase. BC Housing also noted they are required to pay offset costs to maintain carbon neutrality which increases the cost of natural gas for them. Connective noted utility costs are marginal with respect to their overall operating costs.
- Commercial kitchen - BC Housing noted many of their buildings require a commercial kitchen. While they are starting to build electrical kitchens, clients often still prefer natural gas.
- Generally, equity stakeholders would prefer to put money into more units than into energy efficiency/carbon reduction if there's a choice –they don't anticipate that a change to code requirements would reduce the number of units they build as BC Housing provides the funding to meet whatever the local government code requirements are for the development

With respect to the construction cost implications, BC Housing noted they have been documenting their costs across different projects, including those built to different levels of Step Code and energy emission (GHGi) standards. They have observed that for Part 3 buildings Passive projects[1] have lowest build costs, followed by Step 4, and Step 3 builds are all over the map. BC Housing speculates the increased Part 3 building costs may be due to builders trying different things on the ground instead of taking a more careful design approach.

[1] Passive House is an international energy efficiency standard not included in the BC Energy Step Code but considered equivalent to slightly more stringent to the top steps of the Step Code.

Potential Supports

In order to help address the above noted challenges, equity stakeholders suggested the following supports be considered:

- Provide more subsidy for increased utility rates or see if BC Hydro can provide electricity at a lower rate for affordable housing.
- Grants and funding to match increased construction costs (suggest funding be targeted specifically to encourage integrated design and or specialist advice in design and construction stages).
- Education and information on overall cost impact of proposed changes to help non-profits with budgeting and applying for grants.
- Access to training opportunities and expert advice.
- Reduced or status-quo permitting timelines.

Benefits

In addition to the challenges listed above, the equity stakeholders noted some benefits with the proposed energy efficiency and emission requirements.

- Less maintenance concerns with electric baseboards and easier systems for residents to understand and control. Connective noted "if systems are simple, that suits our clients".
- Improved tenant comfort.
- Lower utility costs due to higher energy efficiency design in buildings.
- City regulations more aligned with BC Housing and CMHC requirements, by requiring all local buildings to meet these standards equity builders will no longer have to build to a higher standard then for profit developers.
- Improved indoor air quality by switching from gas to electric cooking.

Appendix G: Industry Workshop Presentation

Appendix G: Industry Workshop Presentation

Net Zero Buildings in the Regional District of Nanaimo

Stakeholder Workshop

May 9, 2023



Introba

Why are we here?

Meeting our climate goals

- Regional District of Nanaimo (RDN) and municipalities have set ambitious GHG reduction targets:
  - **RDN:** 80% by 2050
  - **Qualicum Beach:** 80% by 2050
  - **Lantzville:** 85% by 2050
  - **City of Nanaimo:** 50-58% by 2030 and 94-107% by 2050



Current Requirements for New Construction

BC Energy Step Code Implementation

ENERGY STEPCODE
BUILDING BEYOND THE STANDARD

- With the recent building code update, **all municipalities in the RDN require the base BC Building Code.**
- The City of Nanaimo has previously implemented BC Energy Step Code in advance of the Provincial backstop

Other Policies and Programs

City of Nanaimo

- **Rezoning Bylaw** requires applicants to either achieve one step higher or achieve current step with a low-carbon system
- **Density amenity bonusing** for buildings achieving Step 3 and above

Regional District of Nanaimo Incentives

- Renewable Energy Systems Rebate
- Sustainable Development Checklist Incentive
- EnerGuide Assessment Rebates

Introba

RDN Net Zero Buildings

Strategy for Net Zero Buildings & Localized Energy Generation

- How do we further reduce the carbon and energy impact of our buildings
- Considering industry feasibility, environmental, financial and social implications
- Collaboration between local governments within the RDN
- Consulting together, but each participating local government may choose different options following consultation and policy analyses



Accelerating Step Code in the City of Nanaimo

City Plan Direction

- **Accelerate zero carbon and energy efficient building design** and practices for all new construction before 2030, and require this for all new construction after 2030
- **Support, prioritize, and advocate for low carbon energy systems** in all new construction.

Integrated Action Plan

- Confirm final steps with respect to Nanaimo's Energy Step Code implementation strategy, to **ensure higher Step Code compliance requirements come into effect before the Provincial mandated implementation timelines**



Introba

Why are we here?

To hear your insights and experiences to help the RDN and its member municipalities shape regulatory pathways for new construction

- ❑ Provide an overview of local government decarbonization goals and the role and benefits of net-zero energy-ready (NZER) and zero carbon (ZC) buildings
- ❑ Present case studies/examples of successful NZER or ZC buildings in the region
- ❑ Workshop a shortlist of new construction policy options for stakeholder discussion and feedback

Introba

Today's Agenda

8:10 Getting to zero in the new building sector

8:20 How do we get there?
Guest speakers

8:50 Group discussions

9:45 Reflections on pathways to zero

9:55 Closing remarks & next steps



Introba

BACKGROUNDER

Getting to Zero in the New Building Sector

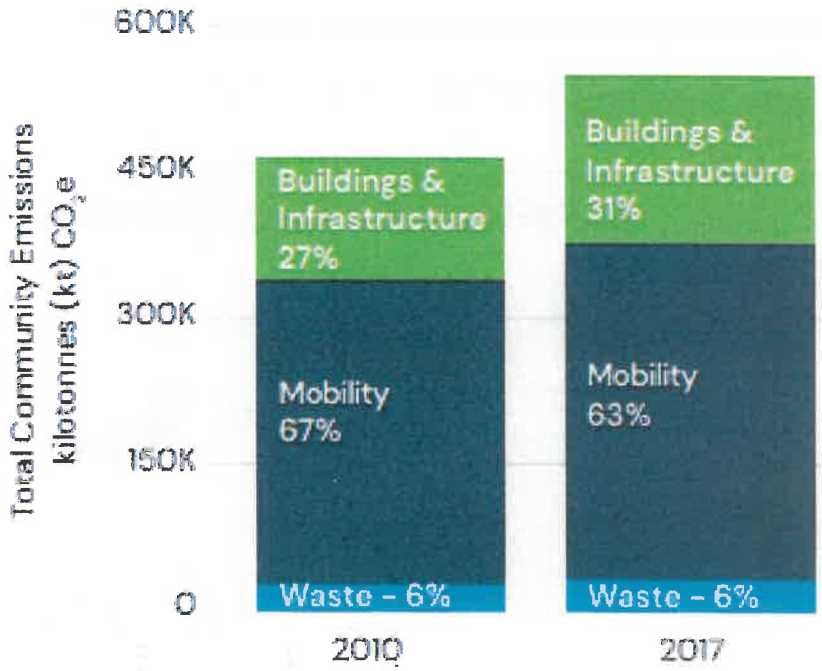


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The Role of the Building Sector in Community Emissions

- The building sector accounts for **12% of province-wide GHG emissions**
- At a municipal level, buildings can account for **25%-55% of emissions**

Figure 7: Sources of Emissions in Nanaimo



2023 Provincial Building Code Updates

On May 1, 2023, the Province updated the BC Building Code

ENERGY STEPCODE
BUILDING BEYOND THE STANDARD

Increased Energy Efficiency

A 20% increase in energy efficiency above the 2018 Building Code

ZERO CARBON STEPCODE

Reducing Carbon Emissions

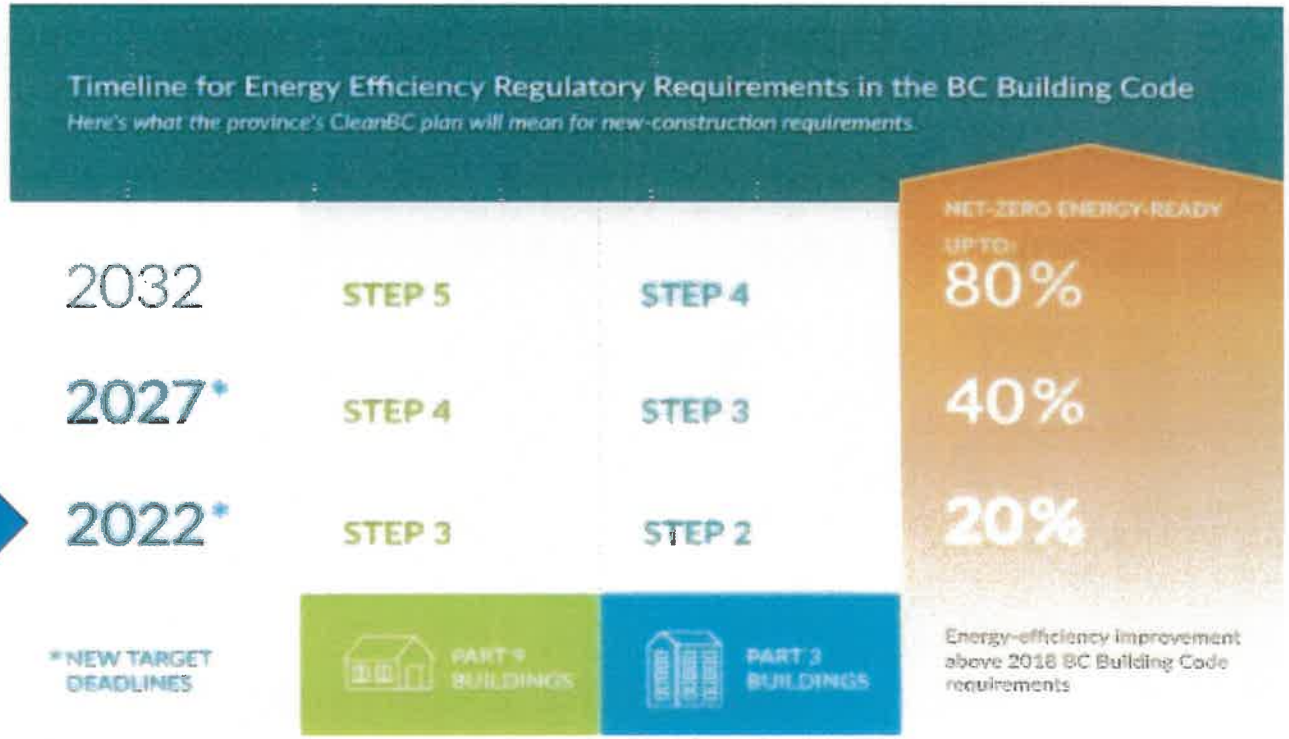
Voluntary carbon limits for Part 3 and Part 9 construction

The BC Energy Step Code

The BC Energy Step Code has been in effect since 2017

Steps are increased every ~5 years

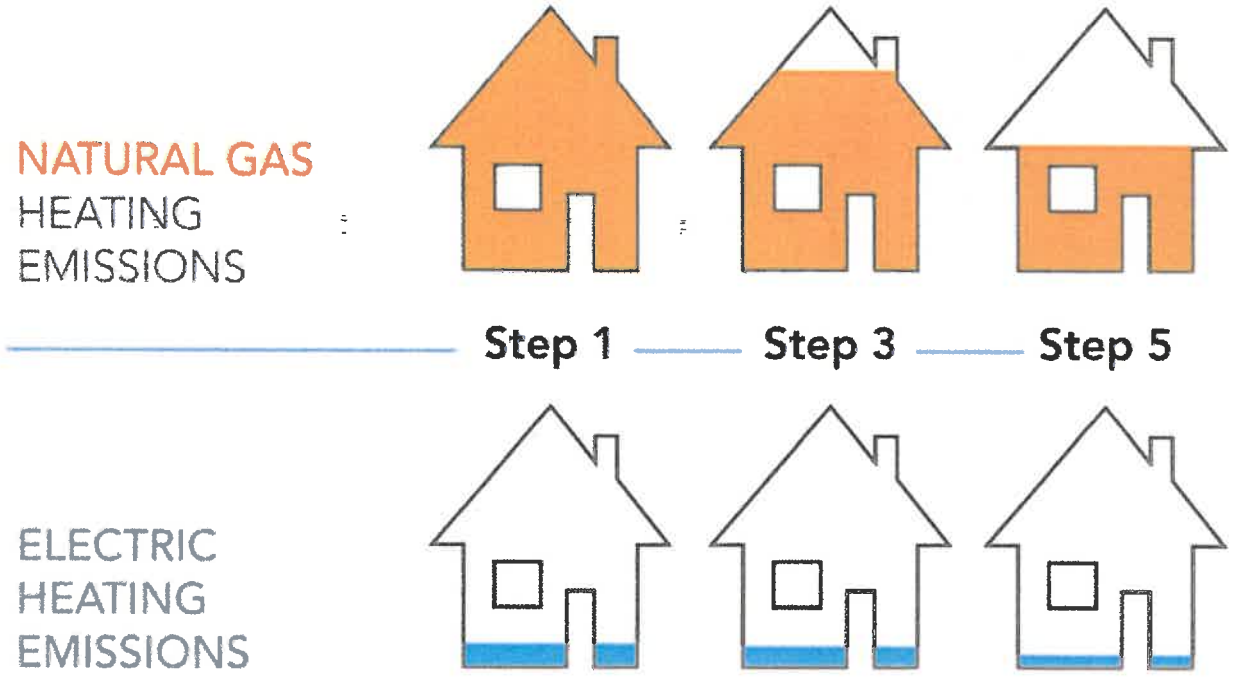
We are here



So why do we need another code?

FROM ENERGY EFFICIENCY TO CARBON EMISSION REDUCTIONS

Focusing on energy efficiency alone can still result in significant emissions from the new building sector – even at higher steps of the BC Energy Step Code



Greenhouse gas emissions by heating type and energy step (source: Metro Vancouver Climate 2050 Buildings Discussion Paper)

The Zero Carbon Step Code

- Local governments now have an option to add carbon requirements alongside energy efficiency targets
- CleanBC Roadmap to 2030 commits the Province to requiring all new construction to be zero carbon by 2030

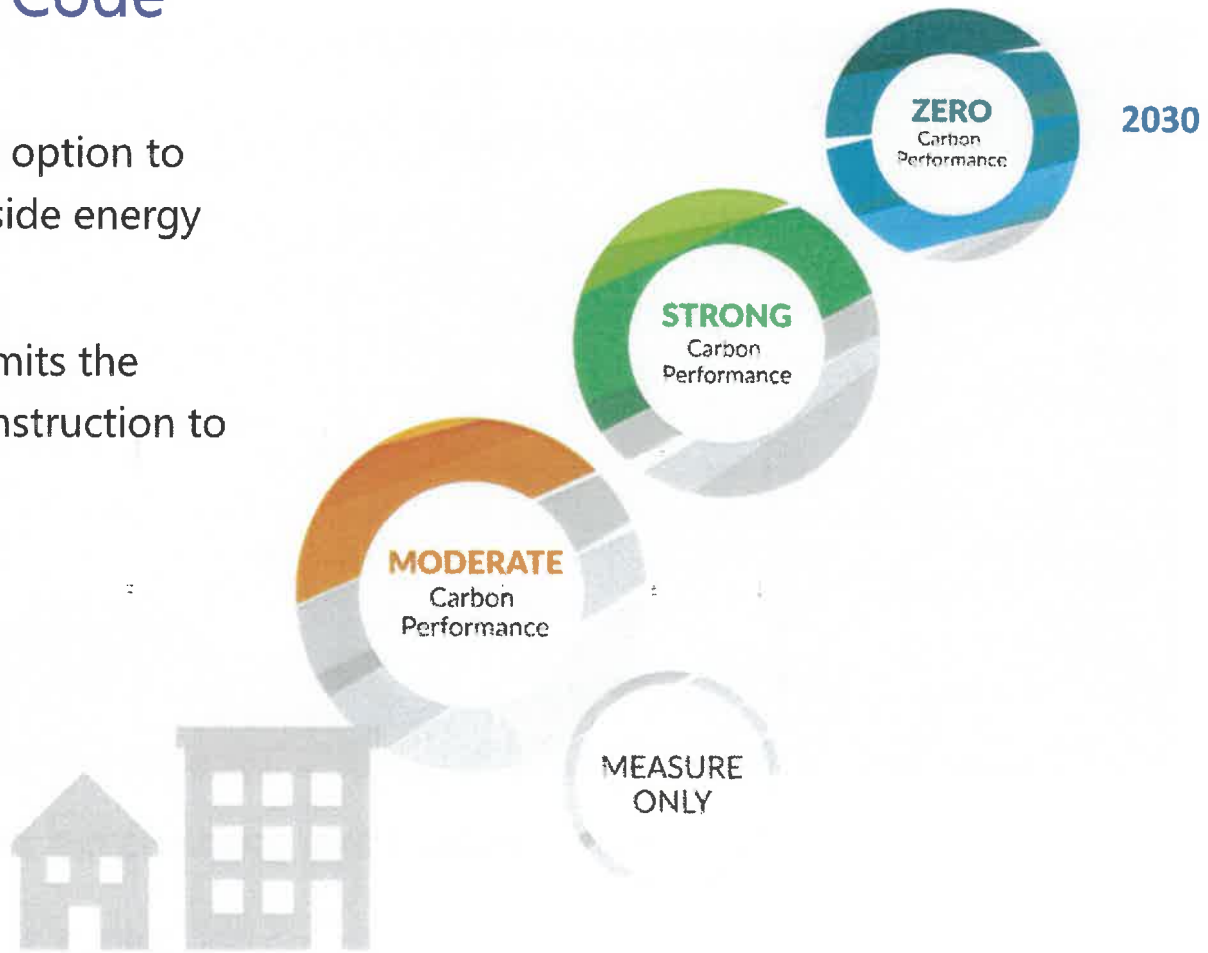


Image Source: Building Safety and Standards Branch

The Zero Carbon Step Code

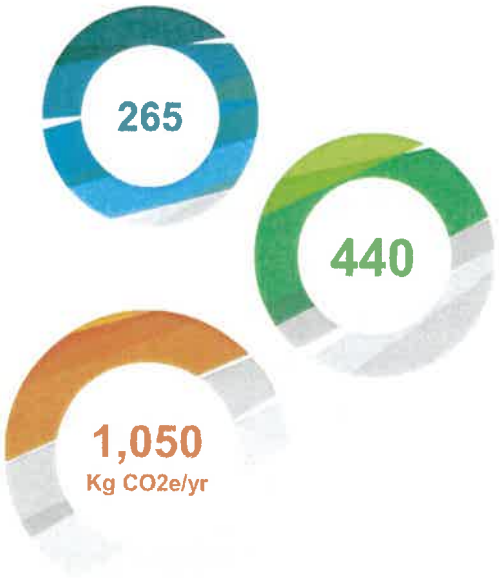
PART 3 BUILDING REQUIREMENTS FOR GREENHOUSE GAS INTENSITY (GHGI)

Building Type	Moderate $kgCO_2e/m^2/year$	Strong $kgCO_2e/m^2/year$	Zero Carbon $kgCO_2e/m^2/year$
MURB	7	3	1.8
Office	5	3	1.5
Retail	6	3	2
Hotel	9	4	2
Implications	Zero carbon **space heating**	Zero carbon **space and water heating**	Zero carbon **energy**

The BC Zero Carbon Step Code

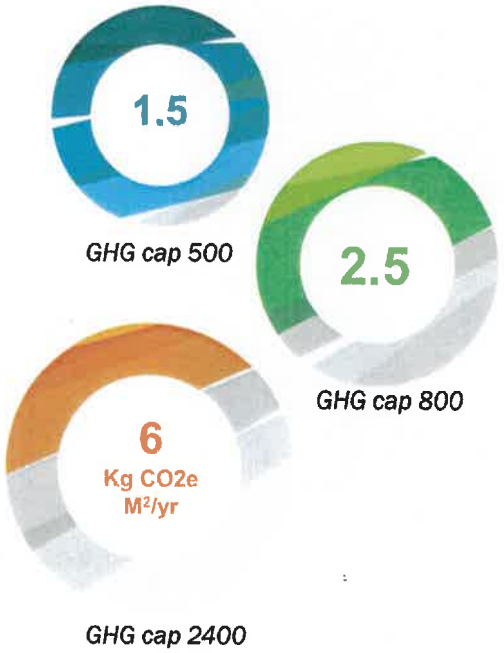
PART 9 BUILDING REQUIREMENTS

Compliance Path #1
Quantity of carbon pollution



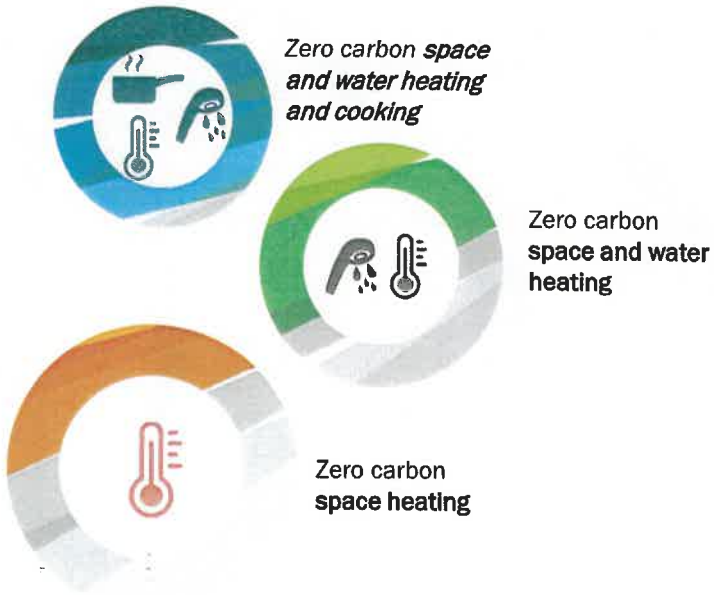
Maximum GHG emissions per home per year

Compliance Path #2
Intensity of carbon pollution



Maximum GHG intensity per home per year

Compliance Path #3
Prescriptive approach

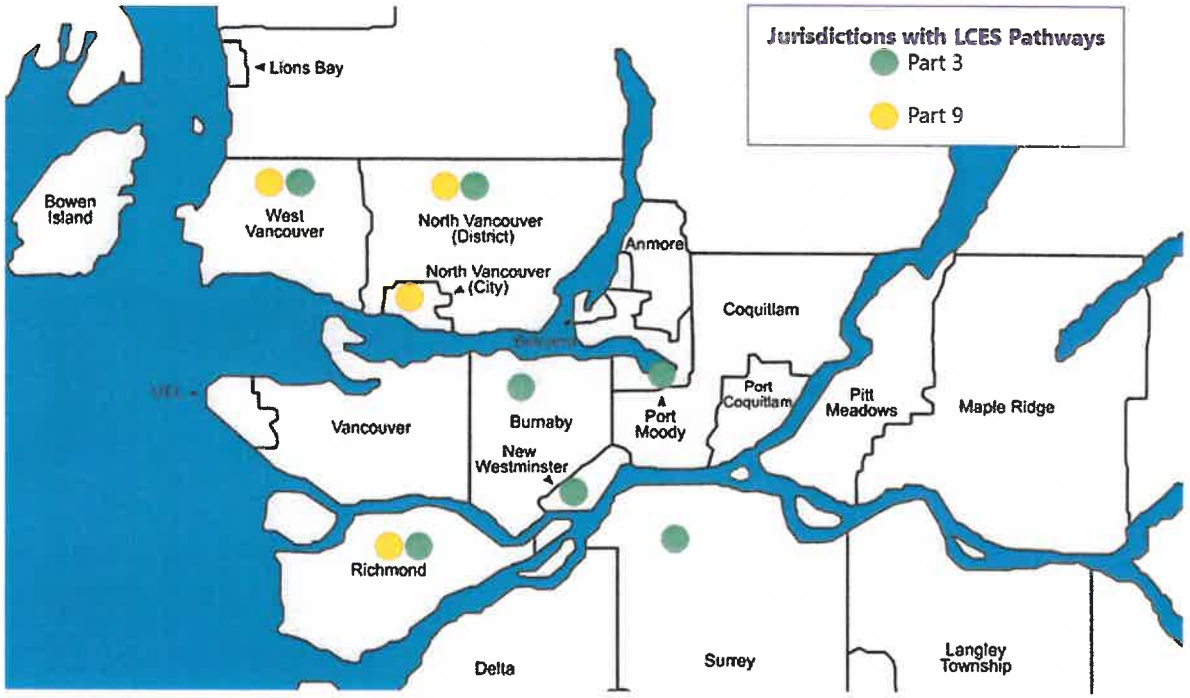


Maximum emissions by energy source

State of Step Code Implementation by other Local Governments

LOW-CARBON ENERGY SYSTEM PATHWAYS

- Before the Zero Carbon Step Code was implemented, many local governments introduced Low Carbon Energy System (LCES) Pathways alongside BC Energy Step Code to encourage decarbonization



State of Zero Carbon Step Code Implementation by Local Governments



City of Victoria

Nov 2023 Zero Carbon

Jul 2024 Zero Carbon
(MURBs <6 storeys)

Nov 2024 Zero Carbon
(MURBs >7+ storeys, commercial)

Provincial backstop for ***BC Energy Step Code***



Saanich

Nov 2023 Zero Carbon

Jul 2024 Zero Carbon
(MURBs <6 storeys)

Nov 2024 Zero Carbon
(MURBs >7+ storeys, commercial)

Provincial backstop for ***BC Energy Step Code***



City of Richmond*

Oct 2023 Moderate Carbon + Step 5
Jan 2025 Strong Carbon + Step 5
Jan 2027 Zero Carbon + Step 5

Oct 2023 TBD Carbon + Step 3
Jan 2025 TBD Carbon + Step 4
Jan 2027 TBD Carbon + Step 4



Whistler

Jan 2024 Strong Carbon + Step 4
TBD 2026 Zero Carbon + Step 4

Jan 2024 Strong Carbon + Step 3
TBD 2026 Zero Carbon + Step 3

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**Note Richmond has a LCES structure – information summarizes the minimum level of carbon performance*

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Other Ways of Encouraging Higher Performance



Financial Incentives

- Local government financial incentives include:
  - **Building permit fee rebates** for homes meeting the upper steps of the BC Energy Step Code (e.g. Comox Valley Regional District, Township of Langley, City of Kimberley)
  - **Home energy evaluations or airtightness testing rebates** (e.g. City of North Vancouver, Township of Langley, New Westminster)



Permit Fast Tracking

- "Front of the line" status for all-electric/highest step projects (e.g. Port Coquitlam)



Density Bonusing

- Additional density granted to higher performing designs (e.g. City of Duncan)

Introba

GETTING TO ZERO

What does this mean for design & construction?



What does this mean?

BENEFITS & RISKS OF ENERGY EFFICIENT & ALL-ELECTRIC BUILDINGS

BENEFITS

- Significantly reduced carbon emissions
- Potential to lower energy bills for residents and tenants
- Quieter and more comfortable homes
- Healthier indoor and outdoor air quality
- Increased safety and resilience
- More durable envelopes with lower replacement needs
- Avoid cost of future retrofits

RISKS

- Limited electrical capacity/potential need for electrical upgrades
- Potential to increase energy bills with lower efficiency HVAC systems
- Need to ensure careful design to avoid overheating
- Need for additional training for municipal staff and industry members
- Potential for increased costs in an already squeezed market

Diving into Cost Implications – BC Energy Step Code

Building Type	Energy Step Code	Incremental cost increase range (%)*
Single family homes	4	0% -5%
	5	1% - 7%
High Rise MURB	3	1% - 4%
	4	1%- 6%
Low Rise MURB	3	1% - 2%
	4	3%
Row Homes	4	0-2%
	5	2%
Quadplex	4	2%
	5	4%
Office	3	-2%-0%

Introba

*Based on *BC Energy Step Code Metrics Report Update* (2022); City of Surrey *Step Code Costing Study*; City of Vancouver *Zero Emissions Building Plan: Rezoning Cost Comparison*; *Getting to Zero: A High Performance Energy Policy for New Buildings in the City of Richmond.*
***Baseline generally assumes NECB 2017, not recently updated BCBC.**

Diving into Cost Implications – Zero Carbon Step Code

Building Type	Energy Step Code (Baseline)	Zero Carbon Step Code	Incremental cost increase range (%)
Single family homes	4	Zero Carbon	0% – 1%
	5	Zero Carbon	0% – 2%
High Rise MURB	3	Zero Carbon	0% – 2%
	4	Zero Carbon	0% – 1%
Low Rise MURB	3	Zero Carbon	0% – 2%
	4	Zero Carbon	0% – 1%
Row Homes	4	Zero Carbon	-
	5	Zero Carbon	-
Quadplex	4	Zero Carbon	1% – 2%
	5	Zero Carbon	1% – 2%
Office	3	Zero Carbon	3%

Introba

*Based on Carbon Pollution Standards for Part 9 and Part 3 Buildings Report (2022).

Diving into Cost Implications – Utility Cost Impacts

Building Type	Energy Step Code	Zero Carbon Step Code	Utility Cost
Single family homes	4	Zero Carbon	+7% – -4%
	5	Zero Carbon	+5% – -12%
High Rise MURB	3	Zero Carbon	-9% – -11%
	4	Zero Carbon	-11% – -24%
Low Rise MURB	3	Zero Carbon	-9% – -11%
	4	Zero Carbon	-11% – -24%
Row Homes	4	Zero Carbon	-21%
	5	Zero Carbon	-25%
Quadplex	4	Zero Carbon	–
	5	Zero Carbon	–
Office	3	Zero Carbon	-18%

Introba

*Based on Carbon Pollution Standards for Part 9 and Part 3 Buildings Report (2022).

Driving Down Costs



Base BC Building Code changes. The additional capital cost of achieving higher levels of performance is decreasing as the base building code becomes more energy efficient.



Industry experience. As the industry becomes more experienced with high-performance and low-carbon construction, cost overruns are decreasing and efficiencies are increasing – especially where IDP – are used.



Cooling demand. As the demand for cooling increases, heat pumps are becoming an increasingly cost-effective option.

Supporting the Market

- **BC Hydro Integrated Resource Plan** is preparing for an electrified future
- **BC Hydro review and update of Distribution Extension Policy** to address cost and timelines associated with interconnection and electrical service upgrades
- **Training opportunities are available** to attract new workers and support upskilling (e.g. Home Performance Stakeholder Council, BCIT, ZEBx, EGBC, TECA)
- **Resources are available** to support industry in understanding how to build to new levels of performance (e.g. BC Housing Builder Insights, Design Guide)
- **Pilots and demonstration projects** are supporting the adoption of new technologies and processes.

Introba

GETTING TO ZERO

Guest Speaker
Mark Bernhardt, Bernhardt Contracting Ltd.

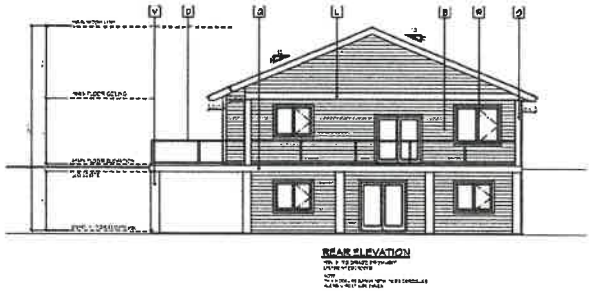


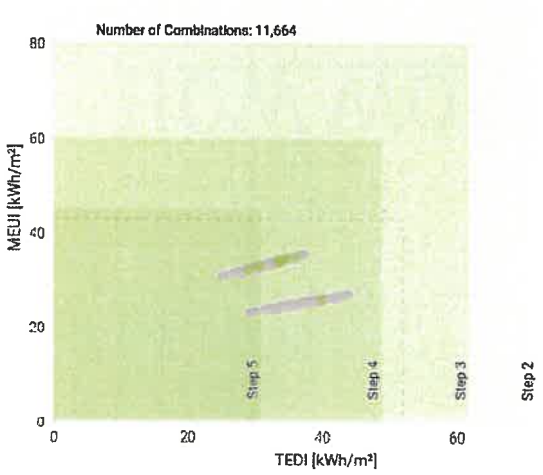
HOW WORRIED SHOULD INDUSTRY BE?

Spring 2023

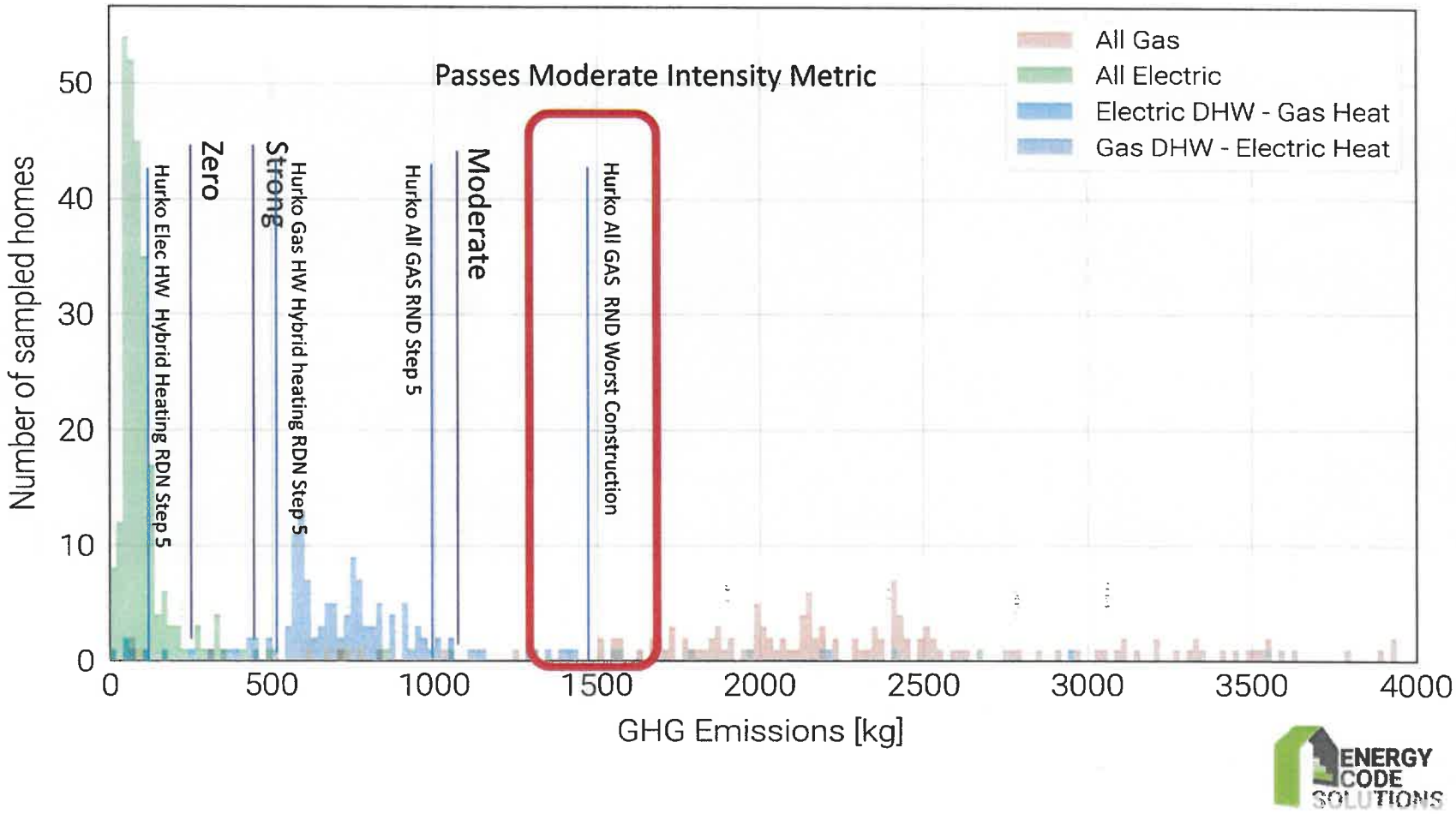
Hurko Residence Carbon/ Energy Step Code Example










Passes Moderate Intensity Metric
All Gas
All Electric
Electric DHW - Gas Heat
Gas DHW - Electric Heat
Number of sampled homes
0
10
20
30
40
50
0
500
1000
1500
2000
2500
3000
3500
4000
GHG Emissions [kg]
Hurko Elec HW Hybrid Heating RDN Step 5
Zero
Strong
Hurko Gas HW Hybrid heating RDN Step 5
Hurko All GAS RND Step 5
Moderate
Hurko All GAS RND Worst Construction
ENERGY CODE SOLUTIONS

Zero Carbon Sells
Step 5 Zero Carbon Island Examples



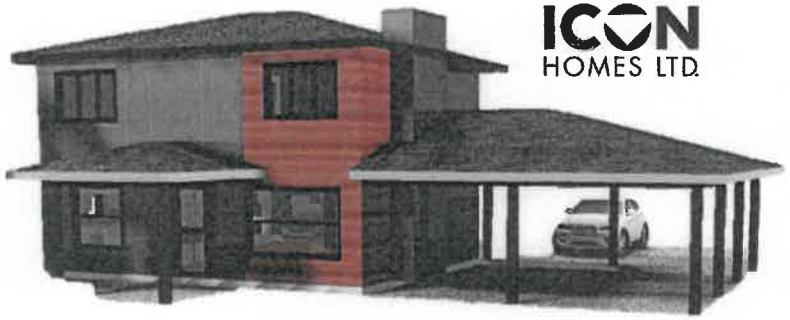


If it can be done here, what is our excuse?

Part 9 Step 5
Zero Carbon
Northern BC

Total Build Cost under
$400,000







WAYMARK
ARCHITECTURE



Part 3 Step 4
Zero Carbon
Affordable Rental
Northern Nova Scotia

Total Estimated Build Cost $7.5
Million


"Do or do not. There is no Try"
- Yoda

Introba

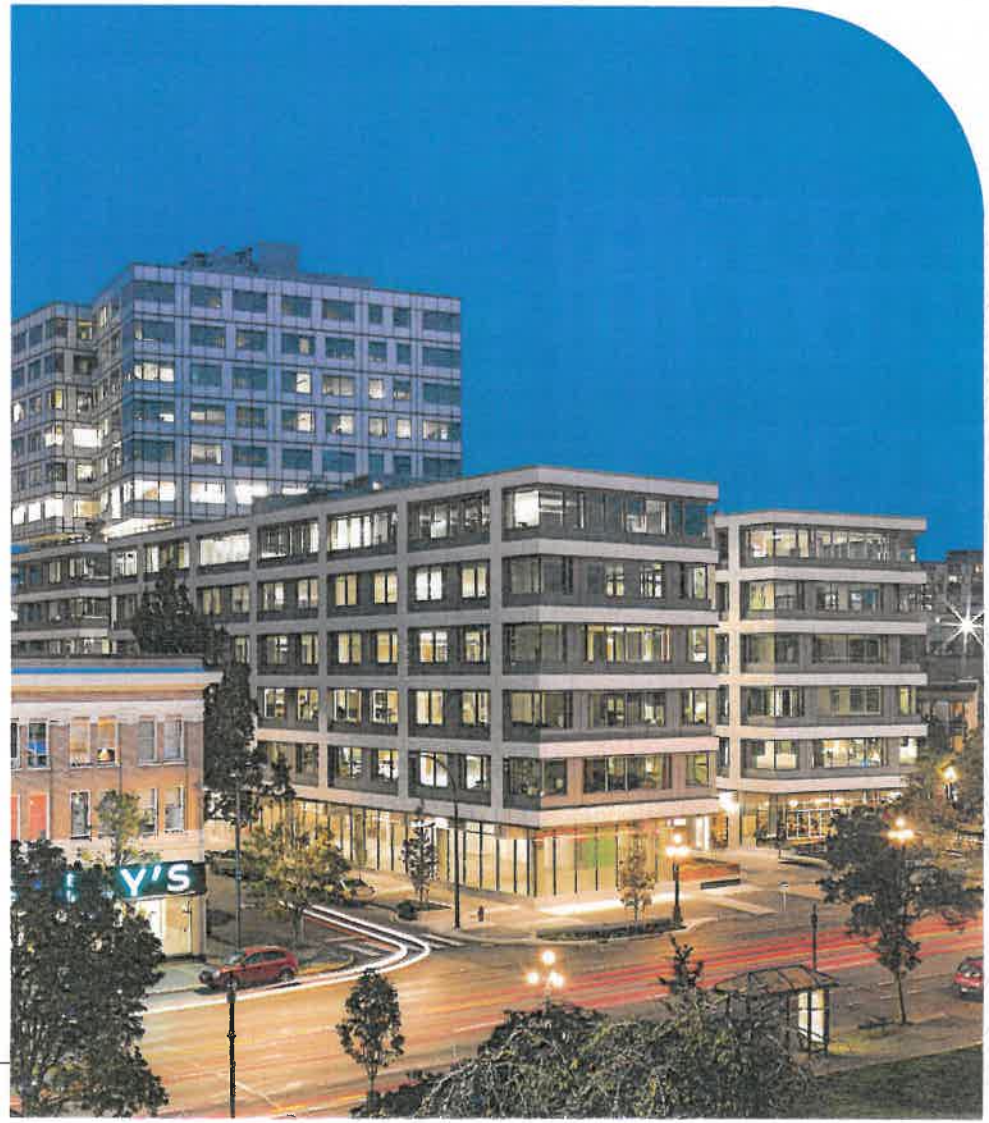
GETTING TO ZERO

Guest Speaker
Andy Chong, Introba



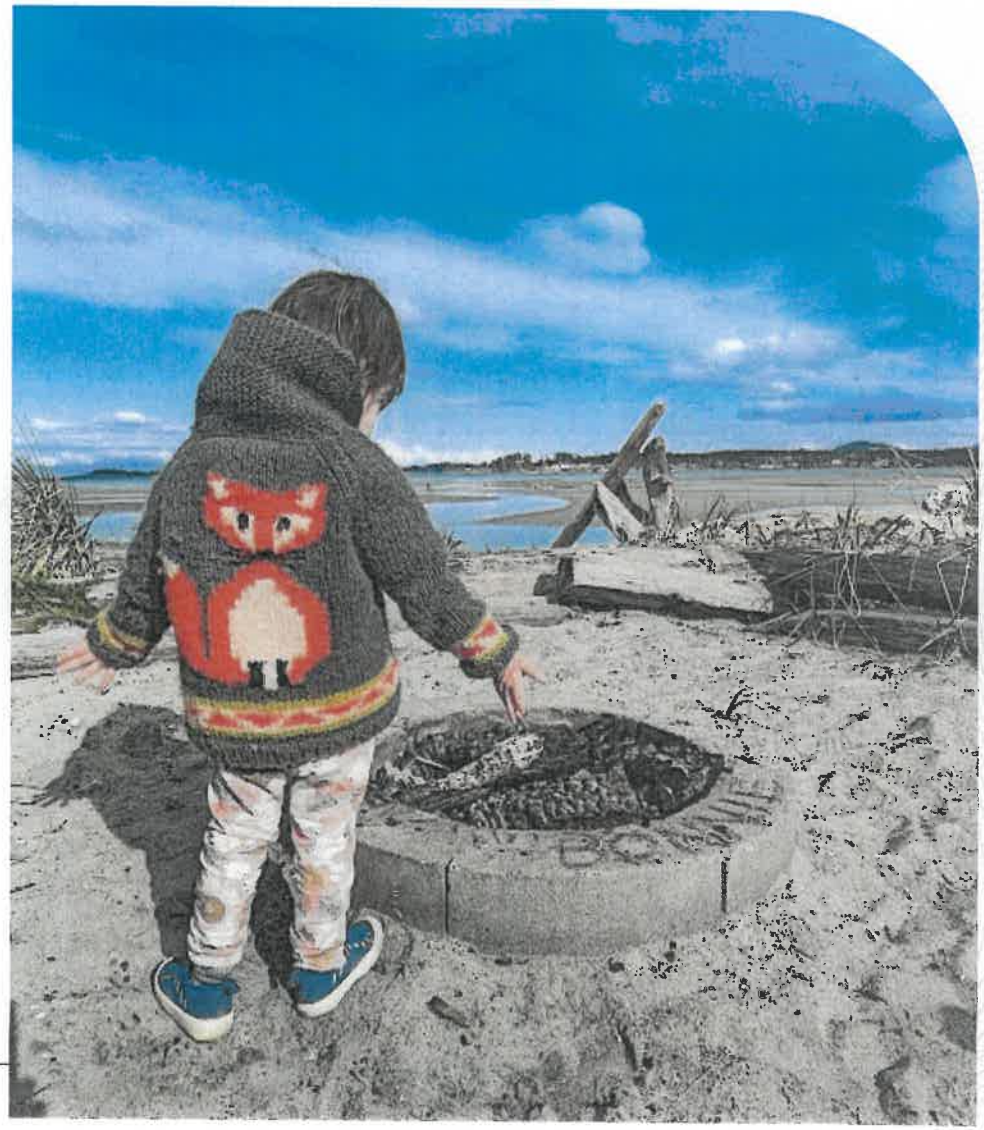
Quick Intro

- 15+ Years, Mainland to Island
- Introba Victoria Office est. 2014
- Focus on High-Performance Commercial + Affordable Housing
- CRD Step Code Adoption 2018
- CRD Step Code Advancement 2022
- Victoria Resident, Nanaimo Visitor



Quick Intro

- 15+ Years, Mainland to Island
- Introba Victoria Office est. 2014
- Focus on High-Performance Commercial + Affordable Housing
- CRD Step Code Adoption 2018
- CRD Step Code Advancement 2022
- Victoria Resident, Nanaimo Visitor
- Dad



Local Impact: Vancouver Island Case Studies



TELUS Ocean

Part 3 Office

Step 3, Zero Carbon



Discover Montessori School

Part 3 Commercial

Net Zero Energy



Nigel House Residential Care

Part 3 Residential

Step 2, Fully Electric



Saanich Fire Stn #2 Replacement

Part 3 Commercial

Step 3, Net Zero Energy& Carbon

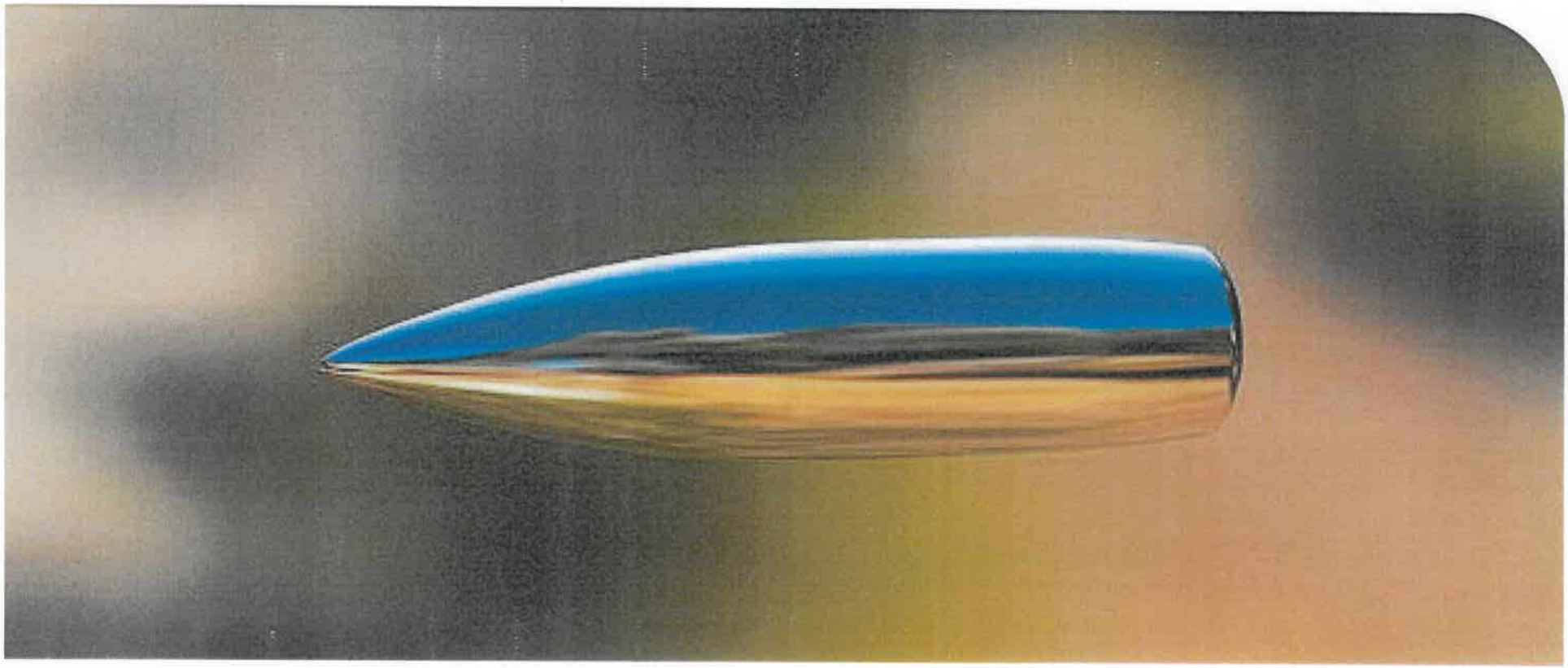


North Cowichan Seniors Housing

Part 3 Residential

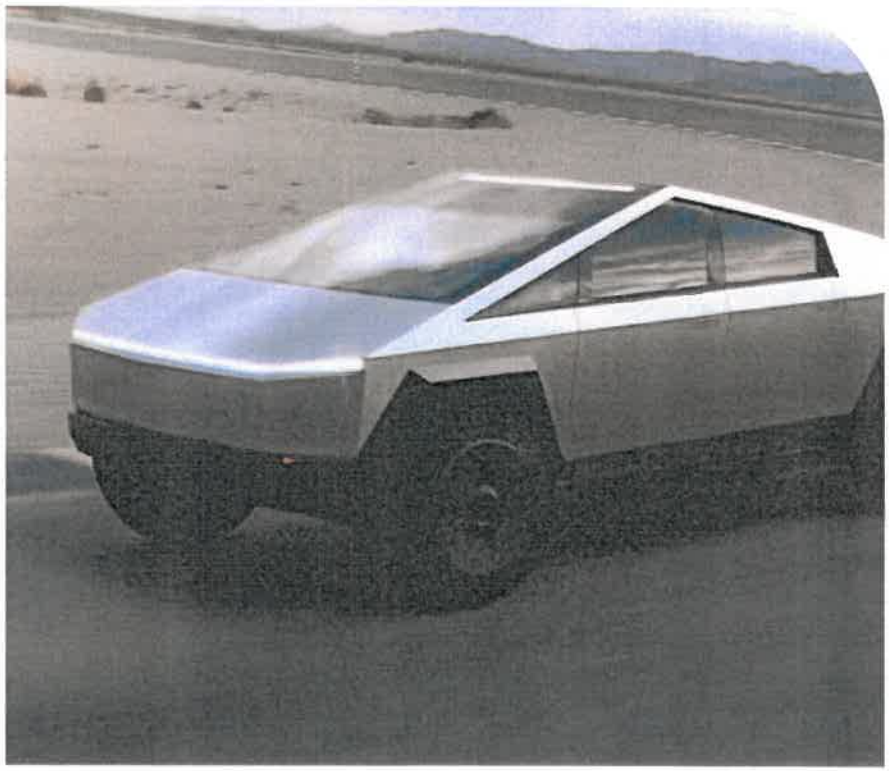
Step 3, Fully Electric

The costs and implications of getting to zero carbon?



... depends on what you are starting with.





Stuck on Brute Force Systems Approach





P199

Large Building Mechanical Approaches at a Glance...



Economy of Scale

1515 Douglas St

Victoria BC

Hybrid Air/Ground Source Heat Recovery Heat Pump



High Performance Commercial HVAC Equipment

Charter Telecom HQ

Langford BC

Central High-Performance HRV



Heat Recovery

Uptown Shopping Centre Whole Foods

Saanich BC

Refrigeration Heat Recovery



Greater Flexibility in System Types

750 Pandora BC Investment HQ

Victoria BC

Radiant Ceiling



Innovative Ventilation Strategies

Reliable Controls HQ

View Royal BC

Natural Ventilation