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**TO:** CHAIR AND MEMBERS  
SUSTAINABLE CITY ADVISORY  
COMMITTEE

**DATE:** 2018 January 24

**FROM:** DIRECTOR PLANNING AND BUILDING

**FILE:** 76500 20  
*Reference: Environmental Planning*

**SUBJECT: DEVELOPMENT OF GREEN BUILDING POLICY FOR BURNABY**

**PURPOSE:** To outline a process for development of Green Building Policy in support of the approved Environmental Sustainability Strategy (ESS) and Community Energy and Emissions Plan (CEEP).

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## RECOMMENDATION:

1. **THAT** Council approve the process for development of Green Building Policy in support of Burnaby's approved ESS and CEEP, as outlined in this report.

## REPORT

### 1.0 INTRODUCTION

Well designed, energy and resource-efficient buildings have many important benefits, including improved health, comfort, soundproofing, durability, lower energy costs, and smaller environmental footprint. Development of new buildings in Burnaby is growing in all sectors including residential, commercial, industrial, and institutional uses, with most new residential and commercial development occurring within Town Centres and Urban Villages. Nearly half of Burnaby's community greenhouse gas (GHG) emissions come from heating and cooling buildings (see *Figure 1*, next page). Since buildings can last between 50 and 100 years, standards are important to ensure they are built to deliver long-lasting quality and benefits, including reducing energy costs and GHG emissions.

For the purposes of this report, "green" buildings refer to those buildings that efficiently use energy, water and other resources and support healthy ecosystems throughout a building's lifecycle, and provide a healthy and comfortable indoor environment for occupants.

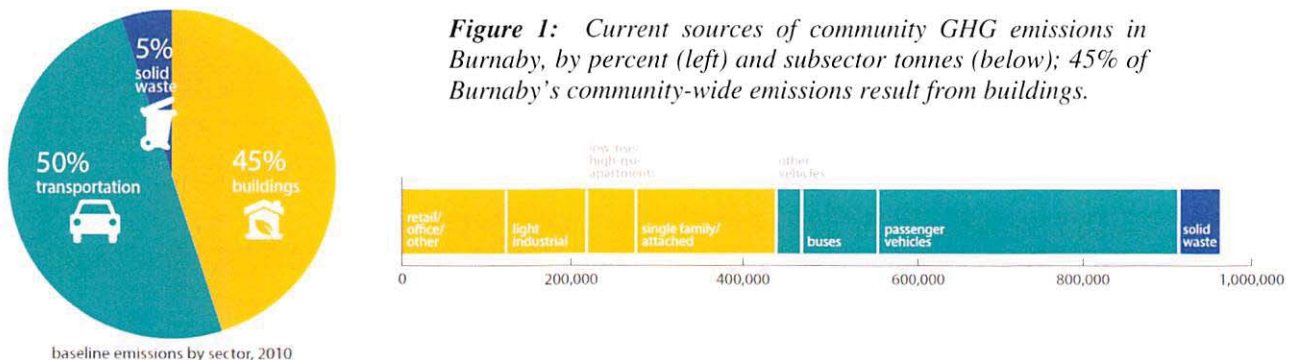
### 1.1 Burnaby Policy Basis for Green Buildings

Policy that encourages and/or requires standards for green buildings, both private and public, is aligned with the City of Burnaby's Corporate Strategic Plan (see [www.burnaby.ca/CSP](http://www.burnaby.ca/CSP)) by supporting the goals (and sub-goals) of: **A Healthy Community** (1. Healthy Life; 2. Healthy Environment); and **A Dynamic Community** (1. Economic Opportunity; 2. Community Development; 3. City Facilities and Infrastructure). See also *Appendix A* for additional details.

Green building policy also supports the City’s Social Sustainability Strategy (SSS) ([www.burnaby.ca/ssss](http://www.burnaby.ca/ssss)), for example buildings that cost less to heat and cool are more affordable for residents and have improved health benefits, and the Economic Development Strategy (EDS) (<http://www.burnaby.ca/eds2020>), for example by supporting the green economic sector. The relationship of these policies to green buildings is further described in *Appendix A*.

Burnaby’s Environmental Sustainability Strategy (ESS) and supporting Community Energy and Emissions Plan (CEEP) ([www.burnaby.ca/ess](http://www.burnaby.ca/ess)) were approved by Council in 2016. The ESS and CEEP, combined with the SSS and EDS, are intended to build on Burnaby’s successes and set a course toward world-leading sustainability. Green building policy supports many of the ESS and CEEP goals, as described in *Appendix A*. Specifically, improving compliance with existing building code for energy, and encouraging development of buildings that exceed minimum code compliance, are two Big Move (priority) strategies under the “Build” goal in both these plans. These strategies and supporting suggested actions are cited in *Appendix A*.

The CEEP also includes targets for reducing community greenhouse gases (GHGs): a City-Only target of **5% below 2010 levels by 2041**, and a City-Plus-Others target<sup>1</sup> of **30% below 2010 levels by 2041**. Today, 45% of Burnaby’s community-wide emissions result from buildings (*Figure 1*).



## 1.2 ESS and CEEP Phase 1 Priorities

As outlined in the Sustainable City Advisory Committee Report dated 2017 September 6, the following three priority policy areas have been identified for Phase 1 ESS and CEEP implementation:

- Green Building Policy
- Electric Vehicles
- Corporate Sustainability

<sup>1</sup> These dual targets recognize the limits of jurisdiction, and commit the City to the **City-Only** target (5% below 2010 levels) in areas over which it has direct control or significant influence, while also illustrating the potential reduction in GHGs that could be achieved with the support of others (**City Plus Others** target). It should be noted that the **City Only** target entails a substantial (~20%) reduction in GHGs in year 2041 compared to a scenario where no specific action is taken.



Green Building Policy and EV Policy are being developed separately and concurrently, as they are related but have different technical considerations. Once established, the standards for EV charging in new development will likely be expressed as a component of Green Building Policy. Both EV Policy and Green Building Policy will include direction for City facilities and fleets. These and other opportunities would form part of a Corporate Sustainability Policy, to be initiated at a future date.

This report outlines additional background and details for development of Green Building Policy. Electric Vehicle Policy is addressed in a separate report received by the Committee on 2017 November 1, while a process to initiate Corporate Sustainability Policy development will be initiated in future.

## 2.0 BACKGROUND

### 2.1 Burnaby Successes to Build On

The City has many examples of successful approaches in leading green building design, both as individual buildings and at the neighbourhood scale. For example:

- **City facilities** have incorporated many green building features and technologies, such as a geothermal heating system at **Tommy Douglas Library**, a solar hot water heating system for the pool at **Bonsor Recreation Centre**, and use of recycled materials and a high rate of construction waste diversion in construction of **Edmonds Community Centre**.
- **Electronic Arts** Motion Capture Studio building achieved a LEED Silver rating in 2009, and included 40% water use reduction and 43% energy savings, and included an 18,000 square foot extensive green roof.
- **Discovery Green**, a large commercial building in Discovery Place Business Park, utilizes an innovative (heat recovery variable refrigerant flow) system for heating and cooling, reducing energy use by 40%, harvests and re-uses rainwater saving 45% in water use, and achieved a LEED Platinum Core and Shell rating in 2010.
- **Appia's Solo District** in Brentwood Town Centre, a 150,000m<sup>2</sup> mixed-use development, has installed a low-carbon geo-exchange heating and cooling system that will reduce the development's GHG emissions by approximately 50% compared to a standard system. Phase 1 of the development is complete and remaining phases are still in progress.
- **UniverCity Childcare Centre** on Burnaby Mountain, completed in 2013, was built to meet the very high standards of the Living Building Challenge, including treating and recycling all wastewater on-site, net positive energy, using local and nontoxic building materials, and cost less to build than a standard equivalent building.

- **UniverCity** neighbourhood development, administered by the SFU Community Trust, has implemented standards for green buildings exceeding the BC Building Code for over ten years, and continues to successfully achieve leading-edge design and a successful business model.

Green building design practices have evolved greatly over the years, and today approaches that emphasize highly efficient *building envelopes* are gaining prominence and priority. Significant energy efficiency improvements can be achieved through the use of relatively simple and cost-effective practices and materials, to meet the lower “steps” of the Energy Step Code described in **Section 3.2**. At the highest levels of efficiency, meeting the Passive House<sup>TM</sup> standard can reduce energy use by up to 90%, and is being targeted in several projects in design or construction in the Lower Mainland including Burnaby<sup>2</sup>. Efficient systems using renewable sources for heating and cooling, such as air source heat pumps, re-using waste heat, solar and geexchange, also have a role to play. By prioritizing efficient building envelopes, such systems can be smaller and simpler, and more easily adapted as technology changes.

Some examples of leading Burnaby developments are further illustrated in **Appendix B**, alongside their equivalent provincial Energy Step Code performance levels, if known.

### **3.0 POLICY BACKGROUND**

#### **3.1 Federal Policy and Programs**

Provinces and territories directly regulate the design and construction of new houses and buildings. The National Building Code of Canada is a model code, with provinces having the choice to adopt or modify this code, or to enact their own. It is intended to provide overall direction to encourage consistency across the country. There is also a National Energy Code for Buildings, first created in 1997 and updated in 2011 and 2015. In 1985 BC enacted its own provincial Building Code, which is largely aligned with the National Building Code.

The Pan-Canadian Framework on Clean Growth and Climate Change<sup>3</sup> includes a commitment by federal, provincial and territorial governments to adopt increasingly stringent model building codes, starting in 2020, with the goal that provinces and territories adopt a “net-zero energy ready” model building code by 2030. The Framework also calls for continued federal investment in research, development, demonstration and cooperation with industry.

Natural Resources Canada runs several programs related to energy efficiency, which can be voluntarily used by builders, or as a policy tool:

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<sup>2</sup> These include a 5 to 6-storey multi-family rental building at SFU (Rezoning #17-08), many single family homes in various municipalities, mid-rise and high-rise developments in the City of Vancouver, and a community centre in the City of Surrey.

<sup>3</sup> <https://www.canada.ca/en/services/environment/weather/climatechange/pan-canadian-framework/climate-change-plan.html>



### Rating systems for homes (single and two-family)<sup>4</sup>:

- **EnerGuide** for new homes is a program to support design, evaluation and labeling of homes for energy efficiency. By engaging the services of a certified Energy Advisor, homeowners can have an EnerGuide assessment performed to identify opportunities to improve energy efficiency. EnerGuide testing and rating for new homes can be used as a voluntary system or to meet local government targets for energy efficiency. An EnerGuide label can also assist home buyers to make informed choices about the performance and energy costs of the home.
- **Energy Star** for New Homes is a rating system for homes that indicates it has met certain standards, typically about 20% better energy efficiency compared to the Building Code.
- **R-2000 Homes** is a building certification program that goes beyond Energy Star levels of energy efficiency for homes, and also includes air quality and water conservation.

### Other programs offered by NRCAN:

- Energy benchmarking<sup>5</sup> with Energy Star Portfolio Manager is a program for commercial and institutional buildings that allows for ongoing tracking of energy use, and comparison against other similar buildings, enabling energy efficiency improvements.
- Energy modeling software and training programs include HOT2000 for low-rise residential buildings, and CAN-QUEST for commercial and institutional buildings.
- Training and education programs are also available<sup>6</sup>.

## 3.2 Provincial Regulation and Introduction of Energy Step Code

The BC Building Code (BCBC) sets minimum standards for building construction, primarily to meet health and safety requirements, and applies to all communities in BC except the City of Vancouver which has its own building code. The first time that energy efficiency standards were included in the BCBC was in 2008. The current (2014) Building Code also introduced new requirements for energy efficiency, for Part 3 (larger buildings) and Part 9 (small buildings).

The 2016 provincial Climate Leadership Plan included commitments related to buildings for:

- improved energy efficiency requirements for gas fireplaces and air source heat pumps;
- high-efficiency technology requirements for natural gas space and water heating equipment;
- accelerating increased energy requirements to the BCBC by taking incremental steps to make buildings ready to be net zero by 2032;

<sup>4</sup> <http://www.nrcan.gc.ca/energy/efficiency/housing/new-homes/18767>

<sup>5</sup> <http://www.nrcan.gc.ca/energy/efficiency/buildings/energy-benchmarking/3691>

<sup>6</sup> <http://www.nrcan.gc.ca/energy/efficiency/buildings/capacity-building-resources/3709>

- developing energy efficiency requirements for new buildings that go beyond those in the BCBC, called Stretch or Step Codes, that interested local governments could implement in their communities; and
- creating innovation opportunities and financial incentives for advanced, energy-efficient buildings, including an increase in funding for design and innovation.

In 2015, the Province passed the *Building Act*, with a key objective to establish the Province as the sole authority to set technical building requirements, thus addressing concerns from the development industry about inconsistent local government requirements. Meanwhile, the Province also convened a multi-stakeholder working group to develop a Step Code, responding to recommendations from local governments together with other stakeholders who had previously worked to outline a proposed structure for such a code<sup>7</sup>.

In May 2017, the Province enacted the Energy Step Code (ESC), a framework that local governments can adopt to support building requirements exceeding minimum BCBC requirements<sup>8</sup>. The ESC sets performance standards for energy efficiency for Part 3 and Part 9 buildings, from basic (lower steps) to advanced (higher steps). The ESC prioritizes energy efficient building envelopes over complex systems, and consists of performance standards rather than a prescriptive approach. This framework was established in collaboration with local governments, development industry, utilities and the Province, and is well supported by these stakeholders.

Implementation of the ESC is being supported by the Province, BC Hydro, BC Housing and other partners, including by coordinating a multi-stakeholder Energy Step Code Council, undertaking research, and providing resources and industry training.

### **3.2.1 How the Energy Step Code Works**

When it is adopted, the ESC establishes a series of measurable energy-efficiency requirements that builders must meet. To comply with the ESC, builders must use energy modelling software and on-site testing by professionals to demonstrate that both their design and the constructed building meet the performance targets of the standard. The ESC groups these targets into a series of “steps” of increasing energy efficiency. Step 1 is referred to as the “enhanced compliance” step, as it simply requires confirmation that new buildings meet the energy-efficiency requirements of the existing BC Building Code. The highest step represents the most energy-efficient building that can be built today. An example is provided in **Figure 2**.

There are five steps for smaller (Part 9) residential buildings, four steps for larger and more complex (Part 3) residential buildings have four steps, and three steps for Part 3 commercial buildings. For Part 3 buildings energy performance is measured in total or thermal energy

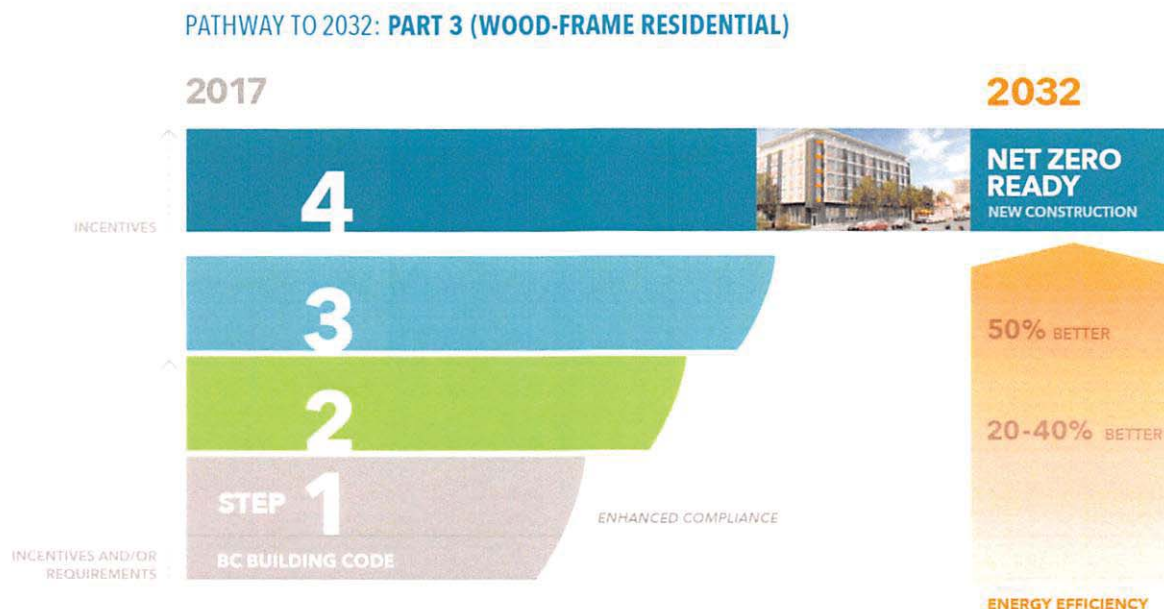
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<sup>7</sup> The recommendations of this group are summarized in the 2015 report “Advanced Energy Efficiency Requirements for Buildings in BC” by Integral Group. Advisory group members included several Metro Vancouver local governments (including Burnaby), BC Hydro, the Urban Development Institute, Pembina Institute, BC ministries (Building Safety Standards Branch and Ministry of Environment) and BC Housing.

<sup>8</sup> An overview of the Energy Step Code and resources supporting implementation can be found at:  
[www.energystepcode.ca](http://www.energystepcode.ca)



demand using energy modeling software. The technical energy performance requirements of each step are listed in **Appendix C**.



**Figure 2:** Steps for Part 3 wood-frame residential buildings

### 3.3 Costs and Benefits of Energy Step Code

In order to investigate feasibility of the Energy Step Code (ESC), a comprehensive study<sup>9</sup> examined possible approaches to meet various Steps in a variety of building archetypes, to better understand opportunities for the biggest gains in energy efficiency, greenhouse gas emission reduction, and financial implications (both first costs and costs of operations). This study found that up to Step 3 of the ESC may incur small incremental costs of less than 1 or 2% for most building types. Incremental costs for larger (Part 3) buildings are shown in **Table 1**.

At the same time, the ESC offers significant opportunity for energy savings and greenhouse gas (GHG) reduction. **Table 2**, below, compares the capital costs, energy savings and GHG reduction potential of Steps 2 to 4 for larger (Part 3) multi-family residential buildings. The estimated cost of moving from Step 2 to Step 3 is small (0.4%) but notably at Step 3 there is significant energy savings potential of 22% overall and 10% compared to Step 2. GHG reductions are significant, yet similar, across these steps.

Similarly, costs for Part 9 buildings are also modest up to Step 3 or Step 4 (out of 5); this data is not reported here, but is available in the report mentioned above, and will be further explored in future policy work.

<sup>9</sup> BC Energy Step Code Metrics Research Report (full report and executive summary) can be found at: [www.energystepcode.ca/resources](http://www.energystepcode.ca/resources)

**Table 1:** Incremental capital costs of ESC compared to existing BC Building Code for Part 3 multi-family residential and commercial buildings (Climate Zone 4)

	Part 3 - Residential		Part 3 - Commercial	
	Low rise MURB	High rise MURB	Office	Retail
Step 1	0 %	0 %	0 %	0 %
Step 2	0.5 %	0.4 %	-0.2 %	0.8 %
Step 3	0.6 %	0.8 %	0 %	2.0 %
Step 4	2.6 %	2.4 %	N/A	N/A

**Table 2:** Comparison of GHG reduction, capital costs, and energy costs among Steps 2-4 for Part 3 multi-family residential buildings, compared to existing BC Building Code

	Step 2	→ Change from Step 2 to 3	Step 3	→ Change from Step 3 to 4	Step 4
<b>Cost of Going Another Step vs. BCBC, capital cost</b>	+0.4%	↑0.4%	+0.8%	↑1.6%	+2.4%
<b>Change in Energy Costs vs. BCBC, 2018 prices</b>	-12%	↓10%	-22%	↓13%	-35%
<b>GHG Reductions vs. BCBC</b>	-29%	↓1%	-30%	↓3%	-33%

### 3.4 Local Government Policy and Responses to Energy Step Code

Local governments in BC have previously used various tools to encourage, incentivize or require higher levels of energy efficiency beyond the BCBC, including: bylaw requirements for certain standards; Council policies; Development Permit Areas; density bonus or other types of incentives; and locally administered sustainability checklists. Referenced standards have included third party systems such as LEED, EnerGuide for Homes, and BuiltGreen. Although many of these were locally successful, the variety of approaches created challenges for the development industry, and resulted in a “patchwork” of varying standards for buildings that was part of the impetus for the Energy Step Code. With the enactment of the provincial Building Act and ESC, as of December 2017 most of these requirements no longer have effect and any building energy efficiency standards must instead reference the ESC.

As outlined in **Appendix D**, many local governments in BC and Metro Vancouver are currently addressing the ESC in some way, in the development of new policy or bylaws. At this time, the City of Vancouver, City of North Vancouver and District of North Vancouver have adopted bylaws/policies that address or align (in the case of Vancouver) with the ESC; the City of Richmond, District of West Vancouver, City of Victoria and District of Saanich, are in process of consulting on a specific approach, and a number of others are undertaking consultation for future policy.



### 3.5 Existing City of Burnaby Policy

To date, the City has implemented a flexible and site-by-site approach to encouraging sustainable buildings through the development review and rezoning process. A standard meeting the equivalent of LEED<sup>TM</sup> Silver has been applied to some projects. This practice provided a flexible approach that helped to address uncertainty and feasibility of new technologies and approaches, as the green building industry has matured.

At UniverCity, requirements for green building standards that go beyond Building Code have been in place since 2010, and are administered through the SFU Community Trust. Most recently these have included simple prescriptive requirements to achieve more energy efficient buildings at lowest cost, such as reducing thermal bridging<sup>10</sup> and increasing insulation value of walls, approaches that are consistent with the Energy Step Code. Analysis suggests that all buildings constructed at UniverCity since 2012 have achieved an average performance equivalent to Step 3 of the Energy Step Code, including both mid-rise wood frame and concrete buildings. Some examples are included in *Appendix B*. UniverCity has generally had positive feedback from developers and a strong market demand for their product.

## 4.0 PROPOSED POLICY SCOPE AND DIRECTION

Based on the successes demonstrated at UniverCity and in other local developments, and research on ESC as discussed above, it is apparent that many practices for achieving higher levels of energy efficiency are now well established, achievable and cost-effective. In consideration of these factors, the following approach is proposed as a preliminary basis for consultation with stakeholders.

The Green Building Policy is proposed to initially focus on standards for new buildings. While the ESS and CEEP also include strategies for creating new policies and programs to improve the environmental performance of existing buildings, different approaches and considerations are involved, thus these would be further explored and developed in a future phase of ESS/CEEP implementation.

Energy, including alignment with the ESC and opportunities to reduce GHG emissions, along with policy for electric vehicle charging, as described in *Section 1.2*, will be the primary focus of the policy. The Environmental Sustainability Strategy also supports additional environmental objectives for new development (e.g. water conservation, ecosystem enhancement, waste reduction, as outlined in *Appendix A*) which would be considered secondary objectives, and approaches for including these objectives will be further explored in development of the policy.

### 4.1 New Private Development

The Green Building Policy is proposed to primarily address the Big Move strategies listed in *Tables A5 and A6* in *Appendix A*. This will include standards for new development that improve

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<sup>10</sup> A thermal bridge is an area or component of a building that transfers heat more easily than the surrounding material resulting in heat loss, such as wall studs or projections; this problem can be mitigated with various building technologies.

compliance with existing minimum BCBC, and achieve higher environmental performance. In consultation with stakeholders, appropriate levels/Steps will be examined for various building types. The first phase of work would focus on larger/complex buildings such as mixed use, commercial and high-rise multi-family residential buildings (Part 3 in the BC Building Code), while single, two-family and small multi-family residences (Part 9 in the BC Building Code) would be the focus of a future phase.

#### ***4.1.1 ESC for Larger Buildings (Part 3 BCBC) – Multi-family Residential and Commercial / Office***

The Urban Development Institute (UDI), representing developers, designers and builders of larger (Part 3) multi-family residential buildings (MURBs), has been engaged extensively in development of the Energy Step Code and has indicated general support. UDI has also been directly engaged in preliminary discussion on implementing ESC in Burnaby.

As discussed in **Section 3.3**, preliminary analysis suggests a variety of steps for Part 3 buildings can be achieved with modest costs and significant benefits including energy savings, and appear to be achievable using conventional building and design practices and technology. Part 3 developments typically already include energy modeling and multi-disciplinary teams with capacity to address technical requirements. On this basis, the viability and design and building function implications of adopting Step 2 and/or Step 3 for Part 3 buildings will be further explored through stakeholder consultation to confirm applicability for Burnaby's context and market.

Upon establishing general support for implementation of an initial Step as a baseline, Burnaby's approach would look to regular monitoring and reviews to update the standard to higher Steps as the building industry becomes familiar with the practices to meet the standard, and as the base Building Code references higher levels of energy efficiency. Achieving higher Steps than the baseline, which may require more innovative and creative approaches, would also be encouraged.

#### ***4.1.2 ESC for Smaller Residential Buildings (Part 9 BCBC) – Single and Two-family, Townhouse and Low-rise Apartment***

Representatives of home builders' associations were also extensively engaged in development of the ESC, and costs for Part 9 buildings are also modest (less than 2% up to Step 4 for single family homes). However, many local builders of single and two-family homes are not affiliated with these groups and are not generally accustomed to the technical requirements of air tightness practices and energy modeling (through engagement of an Energy Advisor) that are associated with all Steps. For these reasons, a lower starting point (Step) is likely appropriate, along with longer period of time to allow for engagement, awareness and training on the part of home builders. As outlined in Section 5, preliminary engagement of these builders, to raise awareness, is proposed to form part of the process for 2018, while a more fulsome program of engagement and anticipated level and schedule for Steps would be outlined in a future report to Council. Measures to encourage early adoption of ESC among Part 9 builders may also be investigated.



## **4.2 City Facilities**

Development of the City's own facilities represents a valuable opportunity for learning about innovative and progressive approaches, supporting development of the local green building industry, and demonstrating the City's commitment to sustainability, as articulated in the ESS ("Manage" section) and Corporate Strategic Plan (see *Appendix A*). The Green Building Policy would include direction for a standard that seeks to align with the direction of the ESC, and may include a review of specific opportunities within the City's capital plan.

## **5.0 PROCESS FOR DEVELOPING GREEN BUILDING POLICY**

As outlined in the Sustainable City Advisory Committee report dated 2017 September 6, Green Building Policy is one of three priority areas of policy work approved by Council identified for Phase 1 ESS/CEEP implementation, arising from prioritization of Big Move strategies. This policy would ensure grounding in our local context, and take advantage of the new policy landscape being developed across BC and Metro Vancouver in response to the Energy Step Code, through collaboration with other jurisdictions and stakeholders, to implement an approach that will be consistent and familiar to the local industry.

### **5.1 Process and Timeline for Policy Development**

As outlined in the report to this Committee dated 2017 November 1 and approved by Council on 2017 November 6, the process for Green Building Policy is to be run concurrently with development of EV Policy. As such, preliminary work of Steps 1 and 2 as outlined below has already begun, and it is anticipated that the following program would be undertaken between the present and June 2018.

#### ***1. Review of existing policy approaches, best practices (ongoing since Nov 2017)***

This includes detailed review of the Energy Step Code and approaches being implemented or considered in other jurisdictions, as well as leading practices in energy efficiency being undertaken in Burnaby and nearby municipalities. Available studies, data and information about the benefits and costs of higher performing buildings are under review. Existing information is being sourced where possible, and if necessary may be supplemented with further study/analysis. During this phase Burnaby City staff have also been engaged to raise awareness and understanding of the ESC and identify issues specific to Burnaby.

#### ***2. Consultation with key stakeholders and development of policy options (Feb-Mar 2018)***

This will entail the review of proposed policy options for specific standards of energy and environmental performance, and consultation with key stakeholders, including:

- Urban Development Institute for Part 3 residential buildings;
- Building Owners and Managers Association for BC on Part 3 commercial buildings; and

- Other industry professionals, associations and utilities as appropriate.

Consultation is proposed to take the form of meetings, facilitated workshops and/or online. In addition to feedback on appropriate Steps in the ESC, stakeholder engagement would also include discussion about factors such as timing, treatment of applications “in-stream”, appropriate incentive approaches, compliance and enforcement, available training for professionals, and other implementation details.

Feedback received from stakeholders would be used to help inform and refine a draft policy/regulatory framework, and identify any specific concerns and implications. These conclusions would be provided in another report for Council’s consideration in April 2018.

### ***3. Stakeholder Follow-up and Implementation Planning (Apr-May 2018)***

At this stage the draft policy would be shared publicly online, and additional stakeholders would be engaged or follow-up with previously engaged stakeholders undertaken, if required.

Internal processes for application review and approval, and processes for compliance and enforcement, would also be confirmed.

### ***4. Council Approval of Policy (June or Sept 2018)***

The proposed policy framework for Part 3 buildings would then be presented for Council’s consideration, in June 2018, or September 2018 if additional time is required.

Following Council’s approval, final implementation details would be confirmed, and any required regulatory amendments drafted.

Regulatory changes would then be presented to Council in a subsequent report.

Upon approval of the policy for Part 3 buildings, preliminary work would begin to raise awareness among builders of single and two-family (and smaller multi-family) residential (Part 9) buildings, and to outline an approach for this segment of the industry, for Council’s consideration in late 2018 or early 2019.

## **5.2 Resources and Budget**

The approach outlined in this section acknowledges that the Energy Step Code has already involved a significant amount of stakeholder input, research and analysis and collaboration among municipalities and other levels of government. As such, the process entails reviewing and adapting an approach appropriate for Burnaby’s context, and ensuring local stakeholders are consulted, and including other elements of environmental performance to address Burnaby’s ESS. Existing City staff will lead and support this work, supplemented with input from consultants with appropriate expertise. Budget to engage these external resources has been



To: Sustainable City Advisory Committee  
From: Director Planning and Building  
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allocated from existing operational budgets. As the work progresses, should a need arise to seek additional resources to address particular needs or data gaps, a request to that effect will be advanced for Council's consideration.

## 6.0 CONCLUSION

Policy to encourage higher levels of environmental performance in new buildings is a key priority area identified for Phase 1 implementation of the ESS and CEEP and can improve health, comfort, and reduce costs of energy for occupants and home/building owners, among other co-benefits for environmental, social and economic sustainability. With lifespans exceeding 50 years, the quality and durability of buildings, including energy performance, is an important consideration in planning for a low-carbon and sustainable future. This report outlines a process to develop Green Building Policy that will engage stakeholders and establish standards appropriate for Burnaby's context.

Staff are therefore recommending that Council approve the process as outlined in this report to develop Green Building Policy in support of Burnaby's approved ESS and CEEP.



Lou Pelletier, Director  
PLANNING AND BUILDING

LT:sla

### **Attachments**

cc: City Manager  
Director Corporate Services  
Director Engineering  
Director Finance  
Director Parks, Recreation and Cultural Services  
Director Public Safety and Community Services  
Chief Building Inspector  
City Clerk

## GREEN BUILDING POLICY - RELATIONSHIP TO CITY STRATEGIC PLANS

### CORPORATE STRATEGIC PLAN

The following goals and sub-goals of the City's Corporate Strategic Plan are supported by green building policy, as noted in the following examples.

*Table A1. Relationship of Corporate Strategic Plan (CSP) to green building policy*

CSP Goal	CSP sub-goal	Examples of green building policy relationship
A Healthy Community	1. Healthy Life: encourage opportunities for healthy living and well-being	Green buildings can support improved indoor air quality and health/comfort.
	2. Healthy Environment: enhance our environmental health, resilience and sustainability.	Green building policy can encourage the use of sustainable materials, and protection and enhancement of ecosystems.
A Dynamic Community	1. Economic Opportunity: foster an environment that attracts new and supports existing jobs, businesses and industries.	Green building policy supports industries such as energy management services, consulting, trades and technology.
	2. Community Development: manage change by balancing economic development with environmental protection and maintaining a sense of belonging.	Green buildings are an opportunity for economic growth that supports a healthy environment and social place-making.

### SOCIAL SUSTAINABILITY STRATEGY

The following Strategic Priorities and themes of the Social Sustainability Strategy are supported by green building policy, as noted in the following examples.

*Table A2. Relationship of Social Sustainability Strategy (SSS) to green building policy*

SSS Strategic Priority	SSS sub-theme	Examples of green building policy relationship
1. Meeting Basic Needs	Affordable and Suitable Housing	Green buildings can be economical to build and save on operational costs, supporting affordable housing and long-term durability.
	Healthy Living	Green buildings can help maintain more comfortable indoor temperatures, air quality, and sound-proofing, contributing to enhanced quality of life.
5. Enhancing Neighbourhoods	Complete Communities	Green buildings complement sustainability goals for new development focused in town centres and urban villages.
	Community Amenities	Green building standards for city facilities can demonstrate leadership.



## ECONOMIC DEVELOPMENT STRATEGY

The following strategies of the Economic Development Strategy are supported by green building policy, as noted in the following examples.

**Table A3. Relationship of Economic Development Strategy (EDS) to green building policy**

EDS Strategy (G=General; S=Sectoral)	Examples of green building policy relationship
G1 – Building a Strong, Livable, Healthy Community	Green buildings support affordable housing and walkable, transit-oriented and high-density development in town centres and urban villages.
G2 – Making Efficient Use of Land	Green building standards can support the development and re-development of industrial lands and infill development.
G3 – Creating Urban Character	Green buildings can include the enhancement of sites with greenspace for nature and public spaces.
G4 – Striving for a Greener Community	<p><b>Action (g) – Green building technology:</b> “Examine working with the development industry (via existing organizations, such as Urban Development Institute (UDI)) to develop green building technology objectives or standards for new buildings that are workable and that will make a meaningful contribution to reduced energy consumption, reduced waste, lower resource use, and healthier environments. Highlight innovations and success stories, such as UniverCity at SFU.”</p> <p><b>Action (h) - Green Civic Building Standards:</b> “Assess adopting LEED standards and/or principles for civic building construction.” (EDS2020, p.51).</p>
G10 – Cooperating Regionally	Green building standards support regional plans for growth and sustainability including <i>Metro 2040</i> , and the <i>Integrated Air Quality and GHG Management Plan</i> .
S4 – Education	Green building policy and technology complements sustainability goals of the School District and post-secondary institutions, and trades and academic programs, such as building technology and climate change, at BCIT and SFU, respectively.
S5 – Environmental Technology	Green building policy and standards supports innovation and development of the environmental technology industry, including energy management services, design, consulting, mechanical systems, materials and other technology.

## ENVIRONMENTAL SUSTAINABILITY STRATEGY (ESS) AND COMMUNITY ENERGY AND EMISSIONS PLAN (CEEP)

The following ESS and CEEP Goals and Strategies are supported by green building policy, as described in the examples below. Strategies 6.1 (ESS) / C3.1 (CEEP) and 6.2 (ESS) / C3.2 (CEEP) are cited along with suggested actions on the following page.

**Table A4. Relationship of ESS and CEEP goals to green building policy**

<b>ESS / CEEP* Goal</b>	<b>Examples of green building policy relationship</b>
Green – Healthy and resilient ecosystems	Green building policy can include provisions for ecosystem protection and enhancement, on- and off-site.
Flow – Healthy and resilient watersheds	Green buildings can include provisions for water conservation and management of rainwater to mimic natural flows and quality.
Breathe – A community resilient to climate change, with clean air and low carbon emissions	Green buildings can contribute to lower greenhouse gas emissions, and maintain more comfortable indoor air temperature in the case of extreme weather.
Live* – A network of compact and complete communities, within a fabric of healthy ecosystems	Green buildings complement sustainability goals for new development focused in town centres and urban villages, and can include provisions for enhancing ecosystem and greenspace.
Move* – A walkable, bikeable and transit-supported city that supports a healthy environment.	Green building policy can support or include provisions for encouraging active transportation and electric vehicle charging.
Build* – Buildings and infrastructure that have a positive impact on the environment.	Green building policy directly supports this goal; see also specific strategies listed in <i>Table A6</i> below.
Nourish - A food system that supports healthy people, a healthy community and a healthy environment.	Green building policy can support or include provisions for food gardens in new development.
Manage* - Environmentally aware and engaged community working together to improve Burnaby's environmental performance.	Green building standards for new City buildings supports ESS Strategy 10.3: <i>Demonstrate leadership in sustainability through City facility and operations management by reducing energy and GHG emissions, conserving water, reducing and diverting waste and enhancing ecosystems.</i>

\* These ESS goals are also shared with the CEEP.



## ESS AND CEEP 'BIG MOVES'

Green building policy is also directly supported in two key ESS/CEEP strategies designated as 'Big Moves' (priority strategies), as described below.

**Table A5. Existing Code Compliance - Strategy and Suggested Actions in ESS and CEEP**

	ESS	CEEP
"Build" (Buildings and Energy) goal	Buildings and infrastructure that have a positive impact on the environment.	
Strategy No.	6.1 (Big Move)	C3.1 (Big Move)
Strategy	<b>Meet updated energy performance building code requirements for new buildings.</b>	
Key Suggested Action	a) Explore working with designers, builders, energy professionals, industry and the province to identify opportunities to optimize building code compliance.	a) Explore ways to improve the skills and knowledge of professionals about energy efficiency requirements in the BC Building Code, for example supporting and promoting programs through BCIT, the Province, BC Hydro and APEGBC.
Quick Start	<i>14. Review issues and possible opportunities to improve compliance, such as with requirements for review of development proposals by an energy professional.</i>	

**Table A6. Exceeding Code for Energy - Strategy and Suggested Actions in ESS and CEEP**

	ESS	CEEP
"Build" (Buildings and Energy) goal	Buildings and infrastructure that have a positive impact on the environment.	
Strategy No.	6.2 (Big Move)	C3.2 (Big Move)
Strategy	<b>Improve building design construction to meet higher standards of environmental performance.</b>	
Key Suggested Action	c) Explore developing 'green building' policies and programs for new developments, exceeding minimum regulatory requirements, including energy and emissions reduction, water conservation, waste reduction, ecosystem enhancement and occupant health.	a) Consider policy approaches to encourage higher levels of energy efficiency than required in the BC Building Code, and reduced GHG emissions, in new larger (Part 3 BCBC) buildings, including: <ul style="list-style-type: none"> <li>• alignment with the provincial Building Act and Step Code.</li> <li>• integration with existing City development application policy;</li> <li>• incentives such as grants for innovative projects.</li> </ul>
		b) Same wording as above for Part 9 buildings (BCBC)
Quick Start	<i>15. Develop policy recommendations for encouraging higher performing buildings through the City's development application process, based upon provincial Step Code or other appropriate performance-based criteria.</i>	

**BURNABY ENERGY EFFICIENT BUILDING EXAMPLES**



**Solo District:** achieved ~50% greenhouse gas reduction with a low carbon geothermal heating/cooling system shared between buildings; system owned/operated by Fortis.



**Discovery Green:** rainwater harvesting; high efficiency (variable flow refrigerant) HVAC system VRF HVAC system; 43% reduction in energy use, 45% water reduction in water use; LEED<sup>TM</sup> Platinum Core and Shell rating.





**UniverCity:** University Trust-administered green building requirements for energy efficiency, water conservation, stormwater management, sustainable materials, landscaping. Neighbourhood energy utility owned/operated by Corix will supply low-carbon biomass heating/cooling. *All buildings since 2012 performing at average equivalent to Step 3 of Energy Step Code, with some buildings at Step 4.*





**Strandberg-Legg Home** (6336 Burns Av. Burnaby): built on homeowner initiative; LEED™ Gold and Energuide 84, equivalent to *Step 4 of Energy Step Code*.  
<http://corostrandberg.com/about/coros-leed-gold-home/>



**Harmony House** (7990 Joffre Av. Burnaby): Net positive home, partially funded by CMHC Equilibrium program to demonstrate green approaches; grid-connected solar photovoltaic electricity, local materials, air source heat pumps. *Beyond Step 5 equivalent in Energy Step Code* <https://www.cmhc-schl.gc.ca/odpub/pdf/67567.pdf>



### TECHNICAL REQUIREMENTS OF ENERGY STEP CODE FOR CLIMATE ZONE 4

**Table C1.** ESC requirements for Part 9 (single and two-family homes and small apartment) residential buildings

Step	Air Tightness (ACH <sub>50</sub> )	% Below Ref. House* OR Mechanical Energy Use (kWh/m <sup>2</sup> /y)	Envelope Performance**	% better than BCBC
5	≤ 1.0	≤ 25 kWh/m <sup>2</sup> /y	TEDI ≤ 15 kWh/m <sup>2</sup> /y, or PTL ≤ 10 W/m <sup>2</sup>	> 50%
4	≤ 1.5	40% below Ref. Hs, or ≤ 35 kWh/m <sup>2</sup> /y	TEDI ≤ 25 kWh/m <sup>2</sup> /y, or PTL ≤ 25 W/m <sup>2</sup>	40%
3	≤ 2.5	20% below Ref. Hs, or ≤ 45 kWh/m <sup>2</sup> /y	TEDI ≤ 40 kWh/m <sup>2</sup> /y, or PTL ≤ 30 W/m <sup>2</sup>	20%
2	≤ 3.0	10% below Ref. Hs, or ≤ 60 kWh/m <sup>2</sup> /y	TEDI ≤ 45 kWh/m <sup>2</sup> /y, or PTL ≤ 35 W/m <sup>2</sup>	10%
1	testing req'd	Equal to Ref. Hs, or meet BCBC 9.26.5		0%

\* Reference House modeled based on EnerGuide for Homes methodology

\*\*TEDI: Thermal Demand Intensity; PTL: Peak Thermal Load

**Table C2.** ESC requirements for Part 3 (larger multi-family) residential buildings

Step	Energy Modeling & Air Tightness	Thermal E. Demand (KWh/m <sup>2</sup> /y)	Tot. Energy Demand (KWh/m <sup>2</sup> /y)
4	✓	15	100
3	✓	30	120
2	✓	45	130
1	✓	N/A	N/A

**Table C3.** ESC requirements for Part 3 Commercial/Office buildings

Step	Tot. Energy Demand (KWh/m <sup>2</sup> /y)	Thermal E. Demand (KWh/m <sup>2</sup> /y)
3	170	20
2	170	30
1	N/A	N/A

### SUMMARY OF LOCAL GOVERNMENT RESPONSES TO ENERGY STEP CODE TO DATE<sup>11</sup>

Municipality (Status Approved or Consulting)	Initial (or pre-existing) Steps	Subsequent Steps
City of Vancouver	2018 and prior (see notes <sup>12</sup> ): <ul style="list-style-type: none"> <li>Part 9 SF: Step 3+</li> <li>Part 9 MURB (TH, low-rise): Step 3+</li> <li>Part 3 woodframe: Step 3+</li> </ul> Rezoning policy <ul style="list-style-type: none"> <li>Part 9 MURB (TH, low-rise): Step 4</li> <li>Part 3 woodframe MURB: Step 4</li> <li>Part 3 concrete MURB: Step 3</li> <li>office/retail/hotel: Step 3</li> </ul>	2019: <ul style="list-style-type: none"> <li>Office/retail (without rez): Step 2</li> </ul> 2020: <ul style="list-style-type: none"> <li>Part 3 concrete MURB (without rez): Step 3</li> </ul>
City of North Vancouver	2018: <ul style="list-style-type: none"> <li>Part 9 &gt;1200 SF: Step 3</li> <li>Part 9 &lt;1200SF: Step 1</li> <li>Part 3 residential: Step 2 /Step 3 with rez</li> <li>Moodyville (all buildings): highest steps</li> </ul>	TBD
District of North Vancouver	2018: <ul style="list-style-type: none"> <li>Part 9 res: Step 3 (coach hs Step 3)</li> <li>Part 3 res: Step 2 / Step 3 with rez.</li> <li>Part 3 Commercial: Step 1</li> </ul>	TBD
District of West Vancouver	2018: <ul style="list-style-type: none"> <li>Part 9 res: Step 3 (coach hs Step 1)</li> <li>Part 3 SF: Step 3</li> <li>Part 3 MURB: Step 2</li> <li>Part 3 Commercial: Step 2</li> </ul>	TBD
City of Richmond	2018: <ul style="list-style-type: none"> <li>Part 9 SF: Step 1</li> <li>Part 9 Townhouse: Step 3</li> <li>Part 9 apt: Step 1</li> <li>Part 3 MURB: Step 3</li> <li>Part 3 commercial: Step 2</li> </ul>	2021: <ul style="list-style-type: none"> <li>Part 9 SF: Step 3</li> <li>Part 9 TH: Step 4</li> <li>Part 9 apt: Step 3</li> </ul> 2022: <ul style="list-style-type: none"> <li>Part 3 MURB (wood): Step 3 or 4</li> <li>Part 3 commercial: Step 3</li> </ul>
City of Victoria	2018: <ul style="list-style-type: none"> <li>Part 9 SF &lt;1200 SF: Step 1</li> <li>Part 9 (other): Step 1</li> <li>Part 3: Step 1</li> </ul>	2020: <ul style="list-style-type: none"> <li>Part 9 SF &lt;1200SF: Step 2</li> <li>Part 9 (other): Step 3</li> <li>Part 3: Step 3</li> </ul>
District of Saanich	2018: <ul style="list-style-type: none"> <li>Part 9 SF &lt;1200 SF: Step 1</li> <li>Part 9 (other): Step 1</li> <li>Part 3: Step 1</li> </ul>	2020: <ul style="list-style-type: none"> <li>Part 9 SF &lt;1200SF: Step 2</li> <li>Part 9 (other): Step 3</li> <li>Part 3: Step 3</li> </ul>

<sup>11</sup> This summary is based on publicly shared information but may contain errors in interpretation.

<sup>12</sup> City of Vancouver has had energy efficiency requirements for various types of new development for a number of years. Vancouver has is not required to follow BCBC/ESC, however has adopted a Building Bylaw and policies with particular performance targets, which are summarized here in terms of ESC equivalency. Similarly, building types (Part 9/Part 3) are stated in equivalent to BCBC. Vancouver also has additional requirements to some building types including including carbon targets and (for large site rezoning) other green building requirements.



Local Governments that have notified the Province they are consulting on ESC but have not yet publicly stated proposed Step framework to date include:

- City of Surrey
- City of New Westminster
- Township of Langley
- District of Squamish
- City of Campbell River
- Capital Regional District
- Comox Valley Regional District
- City of Duncan
- District of North Saanich
- Resort Municipality of Whistler