



## ADMINISTRATIVE REPORT

Report Date: June 2, 2014  
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Meeting Date: June 25, 2014

TO: Standing Committee on Planning, Transportation and Environment  
FROM: Director, Sustainability Group  
SUBJECT: Energy Retrofit Strategy for Existing Buildings

### **RECOMMENDATION**

- A. THAT Council approve the Energy Retrofit Strategy for Existing Buildings (the “Strategy”) as described in the Administrative Report dated June 2, 2014, entitled “Energy Retrofit Strategy for Existing Buildings” and direct staff to initiate its implementation.
- B. THAT Council direct staff to report back in 2016 on the Strategy implementation progress and make recommendations for changes in the Strategy as required.

### **REPORT SUMMARY**

This report describes an Energy Retrofit Strategy for Existing Buildings (the “Strategy”) to guide City efforts in reducing greenhouse gas emissions resulting from energy use in existing buildings throughout Vancouver by 20% from 2007 levels by 2020.

The Strategy is based upon research into market barriers and best practices as well as local experience with programs and policies to reduce energy use and emissions in existing buildings. It aims to:

- prioritize building sectors where additional City actions may have the greatest impact
- focus City efforts on the largest and least efficient buildings or portfolios of buildings within each priority sector
- tailor the application of City enabling tools to each sector
- recommend the role of the Vancouver Building Bylaw in achieving this target

Implementation of the Strategy will be initiated using existing staffing resources. Staff will perform further analysis and make recommendations for Council’s consideration as

part of the 2015 Budget Process if there are any immediately required City supported incentive program(s). Changes to City regulations which may be necessary will be brought forward for Council consideration at the appropriate time.

The implementation of this Strategy is a key element to achieving the Greenest City Action Plan overall GHG reduction target of reducing emission by 33% by 2020.

### ***COUNCIL AUTHORITY/PREVIOUS DECISIONS***

March 2005: Council endorsed the Community Climate Change Action Plan to reduce GHG emissions in the community to 6% below 1990 levels by 2012.

May 2011: Council approved the Home Energy Loan Program in partnership with Vancity and the Vancity Community Foundation to support loans to homeowners undertaking home retrofits.

July 2011: Council adopted the Greenest City 2020 Action Plan which included the target to reduce energy use and greenhouse gas emissions in existing buildings by 20% below 2007 levels by 2020 and emissions from all sources in Vancouver by 33% over the same time period.

July 2011: Council approved a \$25,000 grant to the BC Sustainable Energy Association (BCSEA) to launch a Condo Retrofit Pilot Program that leveraged BC Hydro and Fortis BC incentives with additional support from the Vancity Community Foundation.

September 2013: Council approved updates to the Vancouver Building By-Law which required energy efficiency improvements as a permit condition for building renovations and directed staff to develop recommendations for Council consideration on energy reporting requirements for larger buildings as part of a Building Retrofit Strategy.

December 2013: Council approves the Heritage Action Plan which identifies potential synergies between energy retrofits of existing buildings and the preservation of older homes with heritage value.

March 2014: Council resolved to seek amendments to the Vancouver Charter to empower the City to require annual reporting of building energy use data for the purpose of benchmarking energy performance.

### ***CITY MANAGER'S/GENERAL MANAGER'S COMMENTS***

The City Manager RECOMMENDS approval of recommendations A and B.

## REPORT

### Background/Context

One of the highest priority targets in Vancouver's Greenest City Action Plan is to reduce GHG emissions from all sources by a total of 33% below 2007 by 2020. In order to achieve this overall GHG emission reduction target, the Greenest City Action Plan anticipated reductions from new Provincial legislation (for vehicle efficiency standards, clean power, etc.) and identified key City interventions.

Given that approximately 55% of GHG emissions come from buildings and that the number of new buildings constructed each year is relatively small relative to the stock of existing buildings, decreasing emissions from existing buildings will be essential in meeting this overall GHG reduction target.

The GCAP targets a 20% reduction in emissions from existing building throughout the city, which would eliminate 160,000 tonnes of greenhouse gasses per year by 2020 and would be equivalent to removing 40,000 cars from the road.

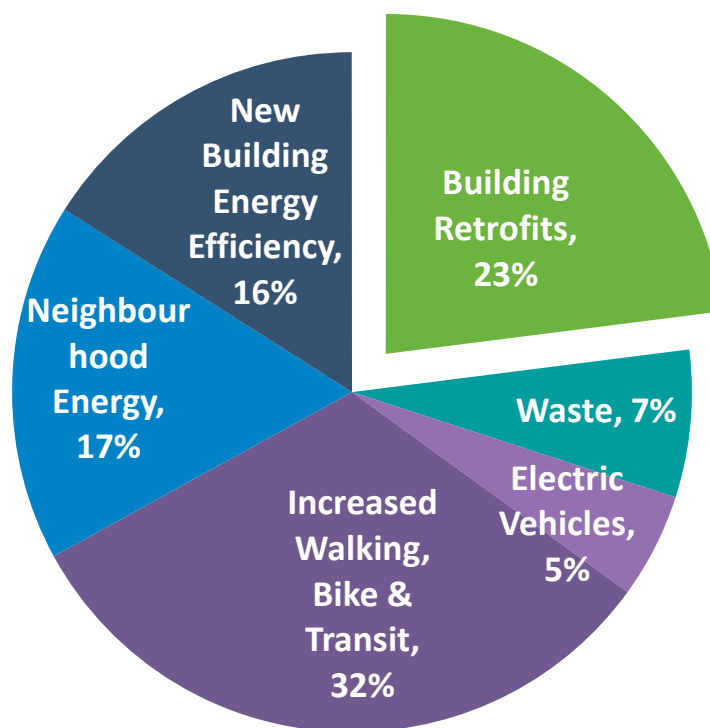


FIGURE 1: Breakdown of GCAP Targeted GHG Reductions from City Actions

There are approximately 90,000 buildings in Vancouver including:

- 77,000 detached houses, duplexes, etc. with 106,000 residential units
- 5,700 apartment and condominium properties with 174,000 residential units
- 5,200 commercial and institutional properties with an estimated 114 million square feet of floor area
- Within the 5,200 commercial and institutional properties, there are approximately 1,000 public sector buildings including schools, health facilities, colleges, recreation centres, libraries, and government offices
- 250 industrial facilities

Over the last several years, the City has been working on a number of pilot programs and initiatives to reduce GHG emissions from existing buildings. Some of the key insights from this work along with findings from of best practice research include:

- Energy use and costs are not primary concerns in most sectors; building owners and managers are generally not aware when their home or building is very inefficient and that there may be cost effective opportunities to reduce energy use, costs, and related GHG emissions;
- Even when owners are aware of opportunities, they typically have competing priorities for their time, attention and resources and/or they may lack of knowledge of how to implement changes to reduce energy use;
- Financial incentives, such as grants, can be very effective in motivating action, especially when supported by detailed information on cost-effective actions specific to an owner's building;
- Market interest in energy retrofit specific financing for *voluntary* building efficiency improvements is low; the Vancouver Home Energy Loan Program and Provincial utility on-bill financing both saw very low uptake rates (almost all similar approaches across Canada and the US have experienced the same low market response);
- BC Hydro and FortisBC have energy efficiency incentive funding and systems to manage voluntary energy efficiency programs effectively; partnering with these utilities is often key to the effective use of limited City resources
- Customized support for large numbers of small building (or unit) owners can require a significant investment of resources - in sectors where this is the situation (such as in condominium buildings), it will be important to focus on the largest and least efficient buildings
- BC Hydro and FortisBC are often not as familiar with Vancouver specific market needs and opportunities as the City is; small City led pilot programs in partnership with our local utilities to demonstrate effective new approaches have been effective in catalyzing the energy utilities to develop and resource a larger, on-going energy efficiency programs

## Strategic Analysis

This Energy Retrofit Strategy for Existing Buildings was developed in consultation with key local partners and stakeholders including building owner and management associations, energy utilities, other levels of government, technical experts, non-governmental organisations, and other local governments not only from the Lower Mainland but including leaders in this work from Austin, New York, Portland, Seattle, and San Francisco. Through this research and consultation it's clear that many cities

have adopted significant retrofit targets, but few have adopted a comprehensive energy retrofit strategy.

This Strategy is informed by best practices (as well as empirical evidence) from local as well as North America-wide experience and aims to:

- focus on specific building sectors where City actions will have the greatest impact in catalyzing voluntary GHG emission and energy use reductions
- tailor the application of City enabling tools for each priority sector
- identify opportunities for strategic use of City regulations to require low cost, high energy savings improvements in existing buildings

### Priority Building Sectors

The relative contribution of each building sector to Vancouver's existing building GHG emissions include:

Heat Utilities (Hospitals, Central Heat)	7%
Public Sector Buildings	7%
Small Commercial Buildings	10%
Large Commercial Buildings	7%
Industry	20%
Multi-Unit Residential Buildings	18%
Detached Houses	31%

Emissions from the heat utilities and public sector buildings are being addressed through other City, Provincial, or Federal Government initiatives and are not a focus of this Retrofit Strategy. These include:

**Heat Utilities:** The primary source of GHG emissions for Vancouver General Hospital, Children's and Women's Hospital, and Central Heat are from heat utilities these entities operate. Emissions reductions from these heat utilities are not addressed in this Strategy but are a primary focus of the Neighbour Energy Strategy.

**Public Sector Buildings** are under the control of the City, the Province of BC, or the Government of Canada. The City of Vancouver has undertaken comprehensive energy retrofits of 36 of its largest facilities to cost effectively reduce emissions from these buildings by 27%. The City is presently developing a Corporate Energy Strategy to further reduce emissions with a focus on building re-commissioning and continuous optimization of building energy operation.

The Province has passed legislation requiring all public sector buildings it controls to be carbon neutral (starting in 2010). The legislation is supported by capital funding for projects to reduce emissions from schools, health facilities, colleges etc. To drive further improvements, these institutions are required to purchase offsets to balance out any remaining operational emissions.

The Federal Buildings Initiative, managed by Natural Resources Canada's Office of Energy Efficiency, targets a 17% reduction in emissions from federal buildings by 2020. The OEE is entering into energy performance contracts, like the City did between 2007 and 2012, to implement energy retrofits in federal government buildings across the country.

In addition to these sectors which are already being addressed, there are some sectors which include large numbers of small buildings with relatively small GHG emissions and difficult to resolve market barriers. As a result, these sectors are not good candidates for initial City efforts and are not addressed in this Strategy. These include:

- small commercial and condominium buildings (initially any less than 50,000 square feet in size)
- small industrial facilities (initially any with less than 2,500t of GHG emissions per year)

This Strategy focuses on supporting voluntary emissions reductions in those sectors of privately owned building that offer the best opportunities to efficiently apply City tools for significant GHG reductions. These priority sectors include:

1. Large Industry
2. Large Commercial
3. Large Multi-unit Residential Buildings (MURBs)
4. Detached Houses

The next sections of this Strategy describe a tailored approach to focus City support for voluntary emissions reductions for each of these priority sectors.

### **1. Large Industry**

Industrial emissions from 250 facilities account for 20% of all building related GHG emissions in Vancouver. Given the diverse nature of the operations of these industries and the relatively small size of most of them, it is important to focus City effort on a limited number of larger industries to be effective.

Metro-Vancouver conducts an annual inventory of regional air-quality emissions sources that has identified five large industrial buildings in Vancouver that account for one fifth of Vancouver's industrial GHG emissions.

Historically, utility incentives from BC Hydro and FortisBC have focussed on specific equipment upgrades but few programs supported system and process changes that could offer significant emission reduction opportunities. The FortisBC Industrial Technology Retrofit Program was launched to address this gap. This new incentive, other utility programs with equipment specific incentives, and FortisBC and BC Hydro's funding for detailed industrial energy audits provide a great foundation to catalyze voluntary industrial efficiency improvements.

**City Action 1:** Directly engage the five largest industrial emitters in Vancouver to: encourage them to undertake a detailed energy audit of their facility in order to identify cost effective efficiency improvements; facilitate business case development for action and access to utility incentives; and assess opportunities for additional City support for voluntary implementation of efficiency improvements.

**City Action 2:** Develop and implement an engagement plan to regularly promote to Vancouver based industries the available BC Hydro and FortisBC incentives for energy efficiency upgrades upon equipment replacement.

Note that the engagement of these large Vancouver industries with FortisBC and BC Hydro should also include the City of Vancouver Water Utility to ensure that, along with energy efficiency, opportunities for water conservation are also identified and supported.

The total targeted GHG emission reduction from these actions is 27,000 tonnes/year.

## **2. Large Commercial**

There are an estimated 5,200 commercial and institutional properties in Vancouver but only 422 of these are over 50,000 square feet. This limited number of large commercial buildings account for 61% of the total commercial building floor space in the city.

The primary need for additional City action to support voluntary improvements in this sector is to ensure building owners and managers are aware of the relative energy performance of their building compared to similar buildings. A scan of North American city best practices indicated that energy benchmarking for buildings is an effective way to identify poorly performing buildings and catalyze voluntary improvements. A 2012 US Environmental Protection Agency (USEPA) building energy benchmarking study revealed that this approach led to voluntary actions which achieved a 7% reduction in energy use in participating buildings over 3 years.

### **Energy Benchmarking for Buildings**

Energy Benchmarking for Buildings is a mechanism to gather, assess, and compare the energy performance of similar buildings. It is based on actual energy use data for the entire building and normalized for variations in weather, building size, opening hours, occupancy, etc. Energy performance is characterized by energy use intensity (amount of energy used per unit of area) which can easily be converted to carbon emission intensity.

Benchmarking typically involves:

- compiling data on energy use, size, occupancy etc using a centrally managed on-line platform that normalizes data for changes in weather and other factors

- using the on-line platform to allow the comparison of performance against similar buildings to flag opportunities to optimize energy efficiency

The most widely used on-line platform for building energy benchmarking is the Energy Star<sup>®</sup> Portfolio Manager that was developed by the US Federal Government and is licensed and supported for free use in Canada by Natural Resources Canada (NRCan).

While benchmarking can be undertaken voluntarily, to date participants in such a program are usually the best managed (and likely the best performing) buildings. Low voluntary participation has led nine US cities to regulate energy benchmarking for large buildings in the commercial and, in most cases, the multi-unit residential building sectors.

Implementing an energy benchmarking program requires the resolution of many data issues such as aggregation of multiple accounts into a single building file, data access and sharing agreements and protocols, data management/analysis/quality control systems, etc.

In addition to catalyzing voluntary improvements by building managers, normalized whole building energy use data is critical to enable governments with legislated targets to:

- target outreach and support efforts on the worst performing buildings
- inform the development and critical evaluation of programs and policies

Experience has shown that the public availability of benchmarking data also catalyzes market demand for energy efficient buildings.

Large commercial buildings in Vancouver are within a competitive industry that has proactive industry association leadership, are typically professionally managed, and have dedicated operations staff with the capacity to manage the implementation of energy efficiency projects. The primary role for the City to support voluntary building energy efficiency in this sector is to increase participation in energy benchmarking, which will ensure that operators are aware of the opportunities to optimize the energy performance of their building.

Experience in other cities has demonstrated that building owners, once given the data and the ability to compare to other buildings, will aim to reduce operating costs and remain competitive in an increasingly energy and environmentally aware market.

**City Action 3:** Work with public sector, energy utility, and industry partners to develop and launch a Building Energy Benchmarking Program to support voluntary building energy benchmarking by large commercial buildings in Vancouver. The program must address data issues, training needs, implementation support mechanisms such as a call centre, and industry capacity development.

**City Action 4:** Undertake further best practice research, consult with industry, and make recommendations for Council consideration on the best approach to provide the City with access to the annual energy benchmarking data across



large commercial and institutional buildings in Vancouver to inform improved program and policy design.

Complementary programs to support voluntary action once building owners and operators are aware of opportunities to improve are critical to achieving our goals. Large commercial buildings typically have very complex heating, ventilation, and cooling systems that, over time, may not be operating in the manner in which they were designed leading to unnecessarily poor energy performance. Programs, such as BC Hydro and FortisBC's very successful Continuous Optimization Program, that encourage and support building energy operation "tune-ops" and ongoing optimization are very effective in at realising significant and cost effective energy efficiency improvements.

**City Action 5:** Work with the Building Owners and Managers Association, BC Hydro, and FortisBC to ensure effective support programs and incentives remain available to support voluntary energy efficiency improvements in the commercial building sector.

Energy benchmarking for large commercial and multi-unit residential buildings (as described below) in conjunction with energy utility incentives and programs for re-commissioning and continuous optimization could catalyze an estimated 19,000t of GHG reductions per year in Vancouver while also providing the City with key data to support improved program and policy development.

### **3. Multi-unit Residential Buildings**

#### Strata Condominiums

This sector will require significantly more support than Large Industry or Large Commercial as the majority of these buildings are stratified and to date energy performance is not the most significant priority for purchasers and owners. Furthermore, building energy use is often not professionally managed and strata councils' frequently lack capacity and expertise to independently assess and implement energy efficiency projects. In addition, existing incentive programs are disjointed and awareness of these programs is low amongst owners.

There are an estimated 5,700 multi-unit residential building (MURB) properties in Vancouver which are responsible for 18% of all building-related GHG emissions in Vancouver. Of these, 725 large (over 50,000 square feet) MURBs represent 64% of the total sector floor space. Within these, there are an estimated 466 large strata condominium properties, 157 large market rental apartment properties and 103 large non-market rental properties.

Under the Strata Property Act, condominium MURBs are governed by Strata Councils that typically lack energy use expertise and significant building improvements typically require approval by a majority of individual unit owners. Engaging and supporting voluntary efficiency improvements in this sector involves high transaction costs and, therefore, this Strategy will focus City efforts on the largest and least efficient condo buildings.

Under the provincial legislation, condominium MURBs are governed by Strata Councils that typically lack building management expertise and significant building improvements require approval by a large number of individual unit owners. Engaging and supporting voluntary efficiency improvements in this sector involves high transaction costs and, therefore, this Strategy will focus City efforts on the largest and least efficient condo buildings.

The 2012 “Energy Consumption and Conservation in Mid- and High-Rise Residential Buildings in British Columbia” study, that was conducted by RDH Engineering on behalf of the Homeowners Protection Office, CMHC, The City and others, revealed that the GHG emissions of large MURBs vary from 1.1 tonnes/unit/year to 4.7 tonnes/unit/year. An effective long-term, voluntary MURB energy retrofit program will clearly require a mechanism to identify the worst performing MURBs for focused engagement and support.

The Lower Mainland Local Government Association recently endorsed Vancouver’s motion to seek charter changes that would provide local governments with this authority to mandate energy benchmarking for MURBs.

**City Action 6:** Support voluntary building energy benchmarking by large MURBs in Vancouver by including these buildings in the Building Energy Benchmarking Program described in action LC.1 (above).

**City Action 7:** Continue to pursue provincial legislative change(s) to enable the City to require energy benchmarking for MURBs and if granted, undertake further best practice research, consult with industry, and make recommendations for Council consideration on the best approach for providing the City with access to the annual energy benchmarking data of large MURBs in Vancouver.

**City Action 8:** Partner with BC Hydro, FortisBC, and the Condominium Homeowners Association to take lessons from the Green Landlord pilot program (described below), Vancouver’s recent condo retrofit pilot program, and best practices from other jurisdictions to develop a new Condominium Retrofit Program focused on the largest and least efficient condo buildings in Vancouver.

### Rental Buildings

In the area of rental buildings, it is estimated that 46 owners control 60% of the market rental units in Vancouver. This allows the focus on energy efficiency to go beyond the largest buildings since decision making is more centralized and transaction costs are much lower. Instead, the strategy proposes to focus City efforts on the portfolio owners/operators that control the largest stock of buildings.

The City’s recent Green Landlord Pilot Program has shown early signs of promise and success. The City worked with Landlord BC, the energy utilities, and an energy consultant to undertake energy and water audits of 23 apartment buildings. The consultant developed retrofit business cases for relatively simple-to-implement improvements leveraging existing utility incentives that, if implemented, would

reduce GHG emissions by 16% and pay for themselves through energy savings in 2.5 years. 21 of the 23 landlords have committed to undertake the identified improvements.

Based on this success, BC Hydro and FortisBC have both launched limited scale Green Landlord Programs to provide support to landlords to audit their buildings, develop retrofit business cases, and provide support in managing the retrofit implementation. In part, the success of these Green Landlord Programs is due to the recent amalgamation of three rental housing industry associations into single entity, Landlord BC, that has shown a strong interest in partnering with the City and utilities to engage their members in an effort to provide new value to members by facilitating the rehabilitation of aging building stock and reducing operating costs.

**City Action 9:** Partner with BC Hydro, FortisBC, and Landlord BC to expand and enhance the Green Landlord programs in Vancouver. Continue to monitor incentive and support approach effectiveness as these programs evolve, and make recommendations to the utilities and/or Council for added incentives or support as required.

**City Action 10:** Engage other levels of government to undertake a strategic analysis of the non-market housing sector in Vancouver and develop partnerships and programs to catalyze energy efficiency retrofits for these buildings where these are not already being addressed.

These actions to support additional voluntary energy efficiency action in the multi-unit residential building sector could yield an estimated 13,000t of GHG emission reductions per year by 2020.

#### **4. Detached Houses**

Detached houses account for 31% of all building sectors' GHG emissions - significantly more than any other sector. In addition, the sector is fairly uniform in terms of building design and equipment, which makes larger scale "general" offer programs easier to deliver. On the other hand, low homeowner awareness of efficiency improvement opportunities and multiple competing interests for their personal time and attention create some significant challenges.

There are approximately 77,000 detached houses in Vancouver, of which an estimated 40,000 are pre-1960's homes. Most older homes have numerous cost effective opportunities to decrease energy use and GHG emissions such as weather sealing, wall and attic insulation, furnace/boiler/hot water heater replacements, and using efficient windows when these are being replaced. Investments in the energy efficiency of older homes can also extend the life of these structures by making them more comfortable and affordable to live in. The City's Heritage Action Plan identifies energy retrofits for existing homes as one tool to help retain character homes in Vancouver.

Aside from building age, which is only a rough predictor of energy efficiency, there are not currently any tools in the city to identify the least efficient homes. Recent research based out the University of Calgary has shown that thermal imaging of homes

at a neighbourhood scale can be a reasonably accurate tool for identifying poorly insulated and weather sealed homes. While thermal imaging alone is not accurate enough to use in planning a retrofit investment, visual evidence that a home is poorly insulated has been demonstrated in the UK as an effective tool in generating interest in energy efficiency audits and upgrades, especially if supported by incentive offers.

**City Action 11:** Partner with BC Hydro and/or FortisBC to research and pilot the effectiveness of using neighbourhood scale thermal imaging to identify poorly insulated homes and to promote home energy retrofit opportunities.

Energy retrofit incentives such as grants and equipment rebates have proven to be very effective in catalyzing voluntary homeowner efficiency improvements. Between 2007 and 2013, comprehensive home energy efficiency incentive programs based on the federally administered EnerGuide for Houses energy audit and rating program have been available with funding support from the Federal and Provincial governments as well as BC Hydro and FortisBC. Over this period, these incentives, augmented by simple but effective promotion programs by the City of Vancouver, led to over 10,000 home energy efficiency renovations in the city and over 13,000 tonnes of GHG emission reductions.

Unfortunately, Federal “ecoEnergy” incentives ended in 2012 and Provincial “LivesmartBC” incentives ended earlier this year. BC Hydro and FortisBC recently launched Home Energy Rebate Offer (HERO) incentive program. While HERO includes incentives for specific improvements, overall incentive funding has declined and there is less financial incentive for homeowners to undertake comprehensive improvements. In addition, the utilities have only committed funding to HERO until April, 2015 which is a short time horizon to enable program launch, build an effective marketing network, complete home assessments, and for retrofits to occur.

In addition to the HERO program, the utilities have home retrofit programs for low-income households that include, for qualifying homes, free home energy evaluations and installation of suitable energy saving devices, appliances, and possibly insulation by a qualified contractor.

**City Action 12:** Promote HERO to Vancouver homeowners, with a focus on older houses, while engaging BC Hydro and FortisBC to extend the program beyond March 2015.

**City Action 13:** Undertake detailed research into home energy efficiency incentive program structure and effectiveness and develop recommendations for utility, Vancouver Heritage Foundation, and/or City incentive changes or enhancements to better support the Vancouver market and to act as an additional tool to support the retention of older homes. This evaluation may result in staff recommending to Council that the City pilot new incentives to complement energy utility program offers.

**City Action 14:** Assess the number of homes in Vancouver that may qualify for BC Hydro and FortisBC low-income household energy efficiency programs and identify easy to implement City tools to promote these programs.

Finally, “smart” appliances and home energy control technologies are rapidly evolving. Recent improvements, in particular in the field of programmable and learning thermostats, have made these devices affordable, easy to install, and simple to use (even remotely using a smart phone). A \$250 - \$350 smart thermostat may reduce heating energy use, which typically represents just over a half of a house’s annual energy use, by a reported 20%.

**New City Action 15:** Partner with BC Hydro and/or FortisBC to pilot programs that leverage new smart technologies such as learning thermostats to reduce home energy use with the aim of catalyzing the utilities to offer new incentive program offers.

These actions to support voluntary energy efficiency action in the detached housing sector could yield an estimated 23,000t of GHG emission reductions per year.

### Other Tools

The Vancouver Building Bylaw (VBBL) has historically included energy efficiency improvement requirements for new or reconstruction projects but, until this year, the VBBL did not address energy use of existing building renovations. When the updated VBBL comes into effect, it will require energy upgrades to existing buildings as a condition of issuance of a renovation permit - required for a building repair, renovation, reconstruction, addition, or change of major occupancy. The energy requirements complement similar conditions pertaining to safety and to accessibility for persons with disabilities.

The energy requirements of 2014 VBBL for detached homes relate to the value of the permitted renovation. These requirements have been structured to be low cost relative to that of the permitted work for high energy savings. Renovations of:

- Greater than \$5,000 require a home energy audit be undertaken as a permit condition;
- Greater than \$25,000 or greater require the home to be weather sealed if the energy audit indicates the home has high air leakage;
- Greater than \$50,000 requires attic insulation to be installed if the energy audit indicates existing insulation levels are insufficient.

There are, on average, 1,600 residential (detached and multi-family) renovation permits issued in a given year. As a result, these requirements will impact an estimated maximum of 11% of the detached homes in Vancouver by 2020. This re-emphasizes the importance of programs to increase voluntary residential retrofits and indicates that additional regulatory triggers and mechanisms (such as retrofit requirements at time of resale) may be required.

The 2014 VBBL also includes energy efficiency retrofit requirements for multi-unit residential, industrial, commercial, and public sector buildings. These requirements are considerably more complex given the diverse nature of the buildings they impact but allow building owners (or tenants) applying for a renovation permit to select from a table of energy efficiency options. This menu approach enables owners and tenants

to align the requirements as closely as possible with the nature and scale of the other planned renovations.

Renovation permits for industrial, commercial and public sector buildings average just over 2,000 per year (of a total of 5,200 commercial and public sector properties in the city). While these regulations will clearly impact a significant portion of buildings in these sectors by 2020, it must be noted that many renovation permits are only for a limited portion of a large building. Therefore these regulations, where the scale of the energy efficiency requirement is proportional and related to the planned work, will have, on average, a more modest impact on whole building performance for a given permit.

**City Action 16:** Consult with industry on the effectiveness and challenges regarding the 2014 VBBL energy efficiency requirements and undertake research to identify additional or improved requirements for inclusion in VBBL updates in 2016 and beyond.

**City Action 17:** Monitor the effectiveness of using renovation permits under the VBBL as the sole approach for requiring cost effective energy efficiency improvements for existing buildings and develop recommendations for Council consideration on alternate or additional approaches if required.

Energy efficiency requirements for existing buildings in the Vancouver Building Bylaw are a key element of this Strategy and could yield an estimated 50,000t of GHG reduction per year by 2020.

#### Implications/Related Issues/Risk (if applicable)

##### ***Financial***

Implementation of the Strategy will be initiated using existing staffing resources. In addition, staff will complete a detailed assessment of gaps in existing utility incentives, the appropriate level of incentives for different building sectors, the size and term of any required additional offerings, and will explore potential partner contributions to address identified incentive gaps. If City supported incentives are required in the short-term, recommendations on the City's contribution will be presented to Council for consideration as part of the 2015 Budget Process.

##### ***Human Resources/Labour Relations***

Implementation of the Strategy will be initiated with existing staff. If it becomes evident that additional City staff is required, recommendations will be made to senior management in this regard.

##### ***Environmental***

The Existing Buildings Energy Retrofit Strategy establishes a targeted and flexible approach to voluntary and regulated energy efficiency improvements

to Vancouver's existing buildings stock. It aims to guide new City actions that, if implemented successfully, will reduce annual GHG emissions in Vancouver by 160,000 tonnes.

### ***Legal***

Council adoption of this Strategy may give rise to the need for new or changes to regulations that would be recommended for Council consideration on a case-by-case basis at a later date.

### ***CONCLUSION***

Achieving our Greenest City greenhouse gas reduction targets relies on accelerating emissions reductions and reducing energy use from existing buildings. Catalyzing energy retrofits of existing buildings will not be a simple or short-term effort or one that the City can undertake alone. This Strategy builds off local experience and North American best practice, identifies key partners, and focuses City efforts so as to leverage the resources and leadership of our energy utility partners and industry associations to the maximum possible extent.

The 17 actions identified in this Strategy provide a focus for initial City efforts towards reducing GHG emissions from existing buildings by 160,000 tonnes by 2020. These actions will also lead to increased housing and business affordability by catalyzing and in some cases, requiring, and improved energy efficiency. In addition, investments in our existing buildings enhance their comfort, performance, and longevity.

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