

## Appendix A: High Impact Initiatives

### HIGH IMPACT INITIATIVE 1: OIL TO HEAT PUMP INCENTIVE PROGRAM

#### Issue/Problem Statement:

Over 1500 oil furnaces heat homes in Victoria, most of which are in older single-family homes. Most households replacing their oil heating system are opting for fossil gas-powered furnaces, which 'locks' them into continued greenhouse gas emissions, instead of a low carbon heating system, such as an electric air source heat pump. In the year 2018 alone, 116 households switched from oil to gas whereas only 18 took advantage of existing incentives to upgrade to a heat pump. Without intervention, this trend is expected to continue, which is problematic as it ties households to continued fossil fuel reliance for likely more than a decade further.

#### Factors and Considerations:

- a. Affordability: (ownership and upgrades): Switching from oil heating to an air source heat pump can typically save 40-75% on annual heating bills according to the previous Oil to Heat Pump Incentive Program, which was funded by the BC Ministry of Energy, Mines & Petroleum Resources. When combined with other energy efficiency measures, switching to a heat pump can provide greater energy reduction and better business case over gas (Evins, 2018).
- b. Safety and Environmental Protection: Home heating oil tanks can fail, leading to oil spills into soil, ground water or nearby ecosystems, causing potential health and environmental risks that are costly to remediate. Once spilled, rain and irrigation water carry oil through the soil into residential perimeter drains and the surrounding environment. Perimeter drains can quickly carry oil into the storm drain systems, which empty directly into creeks, harbours or shorelines (CRD, 2016).

It is estimated that 1 litre of leaked oil can contaminate 1 million litres of water and the average cost of a cleanup for a homeowner is \$250,000 to more than \$500,000 (Insurance Bureau of Canada, 2017). The presence of gas lines as an alternative pose leakage risks during seismic events or during excavations / digging. Malfunctioning gas appliances, inadequate ventilation, and lack of monitoring may also put gas households at greater risk of carbon monoxide poisoning (Natural Gas Safety – FortisBC, 2019).

- c. Equity: Previous phone surveys to oil heated households in Victoria have revealed that many are owned or inhabited by elderly residents on lower or fixed incomes. Insufficient incentives, confusing selection and installation options and processes are a few of the noted barriers that some homeowners face when upgrading to heat pumps.

In addition to increased affordability for those who would benefit most, heat pumps provide key climate adaptation features. By also providing cooling, households are able to cope more effectively with the expected increase in heatwaves where daytime temperatures reach above 25°C. Cooling comfort is essential for our older population and other vulnerable groups who are more susceptible to health impacts from prolonged heat events. When compared to oil, heat pumps can also provide airflow, dehumidification with options to add an enhanced filtration system to improve indoor air quality.

- d. Related Programs: The CleanBC Better Homes fuel-switching incentive is currently offered to homeowners where they can receive up to \$4200 for switching from oil (or gas) to a heat

pump, which is made up of top-ups from the City of Victoria (\$350), the CRD (\$350), electrical panel upgrade (\$500) and base \$3000 incentive offered by the Province. For 2020, there is an opportunity for the City to increase the available top-up offering to \$2000 as well as the electrical panel upgrade incentive which would improve the business case for homeowners to switch to heat pumps instead of fossil gas.

The program will also be expanded to offer a zero-interest finance program, and may also introduce a corresponding equity-based program with an opportunity to partner with local governments. It is unclear if these programs will run past the fall 2022, which provides a 2-year window to leverage existing funds and provincial administration.

- e. T2050 Residential Retrofit Acceleration Program: The City is currently working with City Green Solutions (non-profit energy retrofit agency) and a cohort of eight other Vancouver Island municipalities through a FCM-funded program. This work aims to develop longer term strategies and solutions to accelerate the adoption of low-carbon retrofits, such as heat pumps. The project is coordinated by both City Green Solutions and the Home Performance Stakeholder Council, where engaging with industry and consumer engagement are key components to gain localized insights on barriers and opportunities. This is the first study of its kind in Vancouver Island, and is galvanizing support for increased investments and regional alignments in retrofit program development. To date, a draft strategy has been submitted and is in the process of being reviewed by the City. The work identifies heat pump adoption priorities and actions and program requirements related to local industry engagement, communications/ outreach plan development, target market analysis, consumer engagement strategies, and industry support. The study also highlights the need for longer-term market transformational approaches that include advocacy for greater municipal powers and funding, development of an equity program, industry support initiatives, home energy labelling, and broader consumer outreach strategies. For the remainder of 2019 and throughout 2020, these draft strategies will be finalized, and pilot programs will be discussed and initiated. The T2050 program will end in 2020 and it is yet unclear what steady-state actions will be implemented.

### Oil to Heat Pump Incentive Program - Program Overview

Target(s)	Advance and intensify the CLP targets by 5 years, so that <b>ALL remaining oil heating systems are replaced with heat pumps by 2025.</b>
GHG Benefit Potential	Removal of oil heating would result in the avoidance of an estimated 62,000tCO <sub>2</sub> e each year (15% overall GHG savings).
Program Objectives:	<ol style="list-style-type: none"> <li>1. Rapidly reduce the emissions burden of oil heating.</li> <li>2. Ensure a transition to renewable energy.</li> </ol>
Program Description	<p><b>The City will immediately increase its fuel-switching top-up offer from \$350 to \$2000. An additional \$500 top-up will be offered to the Province’s new electrical panel service upgrade incentive.</b></p> <p>This will be done to leverage the existing \$3000 fuel-switching rebate from the Province and \$350 top-up offered by the CRD. Topping up the new electrical panel upgrade rebate will bring the total available incentive amount to \$6350.</p> <p><b>The City will allocate additional funding to the forthcoming Provincial oil to heat pump equity incentive that is targeted towards lower income households in 2020.</b></p>

	In the longer-term, alternative equity programs will also be explored to ensure that funds are prioritized for those populations that need it most.
<b>Key Barriers</b>	<ol style="list-style-type: none"> <li>1. Artificially low price of gas energy costs</li> <li>2. Gas marketing effectiveness</li> <li>3. Split incentives for landlords</li> </ol>
<b>Strategies</b>	<ol style="list-style-type: none"> <li>1. Strong time-limited financial incentive from the Province (2020-2022 only).</li> <li>2. Integrated marketing campaign focussed on oil furnace replacement timings.</li> <li>3. Education and awareness materials/support.</li> </ol>
<b>Priority Actions</b>	<ol style="list-style-type: none"> <li>1. Immediately increase the City's top-up offer for the Province's CleanBC Better Homes fuel-switching rebate; including the electrical panel upgrade offer and forthcoming equity program.</li> <li>2. Accelerate proactive oil removals and heat pump uptake in the community by employing a variety of outreach strategies.</li> </ol>

## HIGH IMPACT INITIATIVE 2: BUILDING ENERGY & EFFICIENCY RETROFIT STRATEGY

### Problem Statement:

Victoria has an aging building stock, with 70% of existing units built prior to 1980. For many of these buildings, aging conditions make for poor energy performance where leaks allow heat to escape through windows, doors, external wall fixtures. Heat also passes through poorly insulated attics and walls.

Multiple barriers are currently preventing building owners and residents from adopting energy and GHG improvements. These include lack of energy-use data, planning obstacles, and competing costs and priorities.

### Factors and Considerations:

Residential Energy and GHG Reduction Retrofits require mobilization of asset management schemes, managers and different actors across institutional, public, government and marketplace. Energy and efficiency retrofits are **assessed as an important regional infrastructure priority** to meet climate action objectives. The scope and level of sustained effort also poses attractive benefits for job creation, household affordability inequities, and optimises utility and infrastructure investments by reducing the need for energy future generation expansion.

According to the Victoria's *Residential Retrofit Analysis* by the University of Victoria, there are many opportunities for cost, energy and GHG benefits from energy and efficiency upgrades. Efficient buildings reduce heating and cooling demand on HVAC systems, make the building more resilient, and provide co-benefits such as increased comfort and noise reduction. The data from several thousand Victoria home energy evaluations shows that combining multiple and the highest level retrofits (ex. highest level R-value insulation) can reduce energy demand by up to 41%. The study also notes that all building envelope retrofit measures are cost effective when accounting for energy bill reductions over the lifetime of the upgrade, with the exception of windows, which have a longer payback period, and should be considered for other benefits, besides energy and costs.

### Current Related Programs, Gaps and Considerations:

- a. Home Renovation Rebates and CleanBC Better Homes Program: Through the CleanBC Better Homes Program, homeowners can access up to \$5500 on insulation upgrades and up to \$2000 on windows and doors. These do not include the bonus offers for completing multiple upgrades, which are performance based. There are also rebates available for hot water heating systems and for EnerGuide Evaluations.
- b. CleanBC Energy Coach: The Energy Coach is a free coaching service for homeowners and commercial building owners and managers in British Columbia. Energy Coaches are trained energy efficiency specialists who provide building-science based information about the options and opportunities to improve the energy efficiency of a home or building. They are available to answer questions at all stages of an energy improvement project. Energy Coach services are available for homeowners and commercial building owners or managers. The CleanBC Better Homes Program is set to expire in Fall 2022. A key consideration is that the future of this program beyond this date is uncertain. A long term regional commitment with steady-state resources is needed.
- c. Barriers and Gaps: There are barriers in the retrofit planning and implementation process that are not adequately addressed through current programs. Although the energy coach

service provides valuable information on available incentives, effective retrofit measures, and where to start the process, it does not provide the level of support many require to navigate the complex and time consuming renovation project process. Many of these barriers are tied to multiple project decision points which many homeowners are not prepared to address. This may lead to reliance on incomplete/ inaccurate information on which upgrades are chosen.

Another issue to overcome is the general lack of homeowner / consumer awareness related to energy retrofits and energy considerations. Education and awareness building is a key component of any future program.

### Key Program Requirements:

#### **Streamlined Services**

Completing a whole-home retrofit project is a complex process to navigate for homeowners and can be financially costly. To get over these barriers, retrofits need to be bundled and the process needs to become much more efficient to save time and money for homeowners. On the City's end, permitting process incentives can be introduced to support households switching away from fossil fuels or wanting to improve energy efficiency. The current retrofit industry model is also highly siloed from one sub-sector to another and this will need to be transformed to meet the needs of the community. In the short-term, the City will investigate new models for encouraging whole-home retrofits in partnership with other levels of government and local industry. This will focus on addressing gaps in current programming while also establishing a service that can be sustained long-term. Streamlining the process through increasing homeowner support will be the key offering of a new program, rather than direct retrofit installations.

#### **Market Transformation**

Retrofit activity scaled to meet CLP targets is expected to increase the demand for all energy efficiency retrofit services, and drive higher standards across the existing local industry. There is a current gap in industry-government collaboration, cross-sector information sharing, and access to training which will be addressed through the development of a Centre of Excellence in partnership with local industry associations, academic institutions, and other regional governments. This Centre of Excellence also has the opportunity to offer resources directly to the public as well as delivery of retrofit programs such as financing.

#### **Access to Capital**

Completing whole building retrofit projects can be costly with high up-front investments and limited options for financing. In addition to improving current incentive offerings, new financing models may be needed in order to deploy building stock retrofits at scale and pace. A mix of strategies will be required and may include: partnerships with financial institutions, new utility financing programs, data platforms for targeted incentives, property assessed clean energy (PACE), or equity grants. The retrofit program must have the right financial tools and options in place to support customer financial needs, information and education.

#### **Equity**

Success for this program will be to ensure that all households have equal access to energy-efficiency and low carbon retrofits. Developing equity-based initiatives will provide vulnerable populations access to these upgrades and offer the maximum amount of co-benefits such as affordability and resilience to climate change. These initiatives will help reduce financial costs as well as steer clear from other process barriers by developing highly targeted incentives and coherent, easy to follow programs.

**Cross-sector Collaboration**

An effective home retrofit program will require the support and coordination with the region’s key stakeholders, including the CRD, neighbouring municipalities, utilities, local contractor networks, homeowner associations, and other groups. This will help ensure alignment on new initiatives as well as effective consumer and industry promotions. A collaborative approach will also help ensure that local industry has buy-in and are prepared to meet the increasing demands that will be required of them.

**Consumer Awareness**

To help compel building owners to complete retrofits, a concerted and sustained promotional effort will be required to build broader understanding of retrofit benefits within the community. This will include targeted strategies with tailored messaging to encourage proactive action on retrofits, rather than waiting until there is a dire need. For this to be successful, a broader climate communications strategy will be required so that the public understands the importance of retrofits to climate action, as well as more specific and targeted messaging through identification of suitable household candidates using online platforms/ databases, permit data, and available household information.

**Hazardous Material Remediation**

In many cases, renovations or upgrades to improve home energy have to carefully consider the costs and hazards required to remove and dispose harmful materials. These considerations should be a central planning theme in any retrofit program and may need dedicated financial supports or incentives of their own.

**Building Energy Efficiency Retrofit Strategy – Program Overview**

Target(s)	30% of existing single family homes are retrofitted by 2030
GHG Benefit Potential	Retrofitting the existing building sector to high energy efficiency and renewable power would avoid more than 120,000 tCO <sub>2</sub> e each year (28% overall GHG savings).
Program Objectives:	<ul style="list-style-type: none"> <li>• To establish a long-term, sustained community energy service that helps homeowners shift to zero emissions.</li> <li>• To transform the existing building stock to high energy efficiency</li> </ul>
Program Description	<p>A retrofit service provider is required to provide homeowners with a suite of capabilities to understand their home energy needs, and how to best invest in improvements, access rebates and funds, access high value market players, bundle and realize maximum benefits.</p> <p>The program should be provided by a regulated agency that can deliver high-value support across regional home and building owners. The services offered should be integrated with BC government and utility programs, and provide a consistently high level of service to regional customers, integrated with regional industry and agents.</p> <p>A service should include the following key elements:</p> <ol style="list-style-type: none"> <li>1. Regional model advantageous for economies of scale and market alignment</li> <li>2. Subscriptions for basic or enhanced retrofit services</li> <li>3. Fully impartial service, independent of market players</li> <li>4. Monitors and reports long-term energy use and GHGs</li> <li>5. Overseen by an effective governance model</li> <li>6. Critical service capabilities (6) include:</li> </ol>

	<ul style="list-style-type: none"> <li>i. Energy auditing / assessments</li> <li>ii. Energy advisor / coach</li> <li>iii. Energy efficiency performance and technology subject matter experts (windows, insulation, air-sealing, mechanical systems, operations, etc.)</li> <li>iv. Market Advisors</li> <li>v. Communications and Marketing team</li> <li>vi. Financial Support Programs (access to financing, funds, incentives)</li> </ul>
<b>Key Barriers</b>	<ul style="list-style-type: none"> <li>• No clear or long-term retrofit program owner</li> <li>• High start-up / resource requirements</li> <li>• Market transformation required</li> <li>• Financial investments may exceed subscription costs</li> </ul>
<b>Strategies</b>	<ul style="list-style-type: none"> <li>• Create a regional, non-profit service through the CRD</li> <li>• Seed initial service with government funding</li> <li>• Integrate with municipal programs and information campaigns</li> </ul>
<b>Priority Actions</b>	<ul style="list-style-type: none"> <li>• Council to advocate for CRD priority or regional partnership program</li> <li>• Leverage T2050 RRAP relationships and work to define program structure and core elements</li> <li>• Task a regional aggregator to engage across all stakeholders to create project team, business plan, service model, deliverables, accountabilities, metrics etc.</li> <li>• Promotion of low carbon, energy efficiency retrofits, and their benefits</li> </ul>

### HIGH IMPACT INITIATIVE 3: LOW CARBON STEP CODE

#### Problem / Issue Statement:

The BC Energy Step Code is a Building Code program for new buildings that defines mandatory energy efficiency targets that increase over time, towards maximum standards at or before 2032. The program does explicitly target GHG reductions, but instead, focusses on energy efficiency improvements.

In order to ensure that new builds at lower 'steps' avoid using fossil fuel heating systems the City is proposing the introduction of a 'Low Carbon Pathway' included in the tiered steps, as an alternative compliance path. This approach would present a more direct path toward addressing carbon reduction in new construction, and would incent builders to meet zero emissions targets, through a relaxation of Step Code Requirements in favour of zero-emissions heating systems. This gives the City more flexibility in simultaneously achieving lower carbon new builds, while still meeting BC Energy Step Code requirements, at or before 2032.

The Low Carbon Pathway would include a one Step relaxation for buildings that install a low carbon energy system (LCES). LCES include, but are not limited to, air-source and water-source electric heat pump systems, waste heat recovery systems, variable refrigerant flow systems, biomass heating and solar energy systems.

- a. Factors and Considerations: While energy efficiency measures that are addressed directly through the Step Code have carbon reduction benefits, one of the largest opportunities for carbon reduction is by fuel switching to low carbon energy sources.

One of the biggest challenges faced by the construction industry through Step Code compliance is meeting air-tightness requirements. The Low Carbon Pathway offers a one step relaxation related to air-tightness targets, which is easier to attain, so it is anticipated that many development applicants will opt into the Low Carbon Pathway and favour zero emissions heating systems, especially for the earlier steps in the process.

- b. Current Related Programs, Gaps and Considerations: The following local governments have adopted a Low Carbon Pathway for Step Code: City of New Westminster, City of Burnaby, City of Richmond, City of Surrey (note that the City of Vancouver has addressed carbon reduction more directly through their Vancouver Building Bylaw, and they are not subject to the same restrictions on building authority as other local governments).

The City of Victoria's current Step Code adoption timeline and trajectory generally aligns with other leading local governments in BC. However, the City has not indicated when the higher Steps of the code will be required. Staff recommend developing a strategy (and conducting supportive industry engagement) for introducing the highest Steps of the BC Energy Step Code by 2025 (2027 for large concrete residential buildings).

The table below summarizes:

- The current Step Code requirements outlined in the Building Bylaw and adopted by Council in April 2018 (table on the left)
- How the proposed Low Carbon Pathway alternative compliance Step Code requirements would work, layered onto the current Step Code requirements



- Subject to future Council decision following industry engagement, proposed timelines for meeting the Highest Steps of the Code by 2027 for all building types (table on the right, with Low Carbon Pathway alternative compliance timelines in brackets).

<b>CURRENT BUILDING BYLAW (with proposed Low Carbon Pathway in brackets)</b>			<b>SUBJECT TO FUTURE COUNCIL ADOPTION</b>	
Building Permit applications filed on or after (with exception for in-stream applications)			Building Permit applications filed on or after	
<b>Part 9 Residential</b>	<b>November 1, 2018</b>	<b>January 1, 2020</b>	<b>January 1, 2022</b>	<b>2025</b>
Single-Detached, Duplex, a Townhomes	Step 1	Step 3 OR (Step 2 with Low Carbon Energy System)	Step 4 OR (Step 3 with Low Carbon Energy System)	Step 5 OR (Step 4 with Low Carbon Energy System)
Garden Suite	Step 1	Step 2	Step 3 OR (Step 2 with Low Carbon Energy System)	Step 4 OR (Step 3 with Low Carbon Energy System)

### Low Carbon Step Code - Program Overview

Target(s)	Introduce a low-carbon pathway in the BC Energy Step Code
GHG Benefit Potential	Fully implemented, the BC Energy Step Code, with renewables, would result in the avoidance of over 17,000 tCO <sub>2</sub> e each year (4% overall GHG savings) <sup>6</sup> .
Program Objectives:	<ul style="list-style-type: none"> <li>• To incent zero-emissions heating and cooling systems in new construction</li> <li>• To avoid installation of new construction fossil fuel heating systems.</li> <li>• To align energy and efficiency upgrades to achieve maximum cost and performance benefits.</li> </ul>
Program Description	The introduction of a Low Carbon Pathway as an alternative compliance path to Step Code. The Low Carbon Pathway would include a one Step relaxation for buildings that install a Low Carbon Energy System (LCES) (e.g., Step 3 required <u>or</u> Step 2 for buildings with a LCES).

<sup>6</sup> Estimate based on modeling of the City's historical building replacement rate, GHG emission reduction potential and development following OCP growth management concept.

	<p>LCES systems include, but are not limited to, air/ground or water-source electric heat pump systems, electric resistance heat, waste heat recovery systems, variable refrigerant flow systems, biomass heating and solar energy systems.</p> <p>In addition to the Low Carbon Pathway, develop a strategy (and conduct supportive industry engagement) for requiring the highest Steps of the BC Energy Step Code by 2025 (and 2027 for large concrete residential buildings).</p>
<b>Key Barriers</b>	<ul style="list-style-type: none"> <li>• None</li> </ul>
<b>Strategies</b>	<ul style="list-style-type: none"> <li>• Adopt Low Carbon Pathway in 2020.</li> <li>• Engage with industry on a strategy for requiring the highest Steps of the Step Code by 2025 (and 2027 for large concrete residential buildings), earlier than the Province's mandate of 2032</li> </ul>
<b>Priority Actions</b>	<ul style="list-style-type: none"> <li>• Amend building bylaw to include low carbon pathway (including definitions of low carbon energy systems) and home energy labelling/energy benchmarking requirements.</li> <li>• Communicate new low carbon pathway option to building industry via industry organizations such as CHBA-Vancouver Island and UDI-Capital Region.</li> <li>• Engage with industry on strategy for requiring highest Steps of the Step Code by dates noted above.</li> </ul>

## HIGH IMPACT INITIATIVES 4-6 – LOW CARBON MOBILITY

The City's Sustainable Mobility Strategy (branded – "GOVictoria") has been under development since late 2018 and has been informed by the targets in the CLP to define new low-carbon mobility plans and strategies. The GOVictoria program has identified a number of strategic priorities that also share climate benefits for the community. These programs are being addressed, planned and actioned through Council's agreed implementation of that program. The following programs are proposed as part of the GoVictoria program and deliver on the Policy Directions 2 and 3 in this report:

1. **Accelerate Active Transportation Projects:** Continued priority investments in high quality cycling and pedestrian infrastructure
2. **Shift to Zero Emissions:** the allocation and management of the rights of way to incentivise clean/zero emissions vehicles.  
**Support for Zero Emissions Rapid and Frequent Transit:** Support a regional infrastructure priority for clean, rapid and frequent transit.