LOCAL GOVERNMENT POLICY AND OPPORTUNITY ANALYSIS FOR ACCELERATING RESIDENTIAL RETROFITS

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This report was produced as part of the UBC Sustainability Scholars Program, a partnership between the University of British Columbia and various local governments and organisations in support of providing graduate students with opportunities to do applied research on projects that advance sustainability across the region.

This project was conducted under the mentorship of Capital Regional District staff. The opinions and recommendations in this report and any errors are those of the author and do not necessarily reflect the views of Capital Regional District or the University of British Columbia.

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EXECUTIVE SUMMARY

This summary highlights key findings and recommendations from the Local Government Policy and Opportunity Analysis for Accelerating Residential Retrofits which was completed as a part of a UBC Sustainability project for the Transition 2050: Residential Retrofit Acceleration Project.

Residential retrofit programs designed to achieve residential emission reductions over the past 25+ years have not created the sustained market transformation needed to meet future targets. Currently, local governments in southern to mid Vancouver Island are committed to making deep reductions to green house gas (GHG) emissions in communities. Enabling industry-government collaboration is essential to accelerating residential retrofits. The goal of this project is to mobilize government and industry collaboration and accelerate energy and carbon reduction strategies and projects to double the emissions reduction achieved from residential (Part 9 building) retrofits in program communities by 2021 while establishing a clear path to achieving medium-term and 2050 targets.

This report contains information related to the context of the Transition 2050 project, an overview of current and past retrofit programs and initiatives, best practice and opportunity analysis for accelerating residential retrofits, and recommendations for local government and industry.

SUCCESSFUL RETROFIT PROGRAMS ARE COMPREHENSIVE AND SUSTAINED

Successful retrofit programs, with high numbers of overall retrofits and widespread community dissemination, feature multiple incentives and outreach tools, and ran for a minimum of 3 years.

Recommendation: A successful retrofit program will feature earned media, paid marketing, community based social marketing (CBSM), subsidised pre- and post-evaluations, a dedicated campaign coordinator, rebates and municipal top-ups, and financing, preferably from local governments, with interest rates lower than 2 per cent. While a limited time program creates community buzz and high initial uptake, a sustained program will further build community trust and knowledge around a program. Additionally, a sustained program will allow residents, who, initially were not in a position to perform a retrofit, the opportunity to do so at a later date.

RETROFIT PROGRAMS NEED AN OBJECTIVE SOURCE OF INFORMATION

People lack general knowledge around sustainability initiatives and programs, home energy systems and technology, and have trust issues around contractors and sources of information. Objective sources of information that educate residents on initiatives, technology, and retrofit processes is a necessary tool for any retrofit program.

Recommendation: Create a centralized information platform from an objective source. This could be a dedicated website from a local government, or trusted community organization, that gives information on the program, the technology, processes related to undertaking a retrofit, and application processes for rebates.

RETROFIT PROGRAMS NEED TO BE DESIGNED TO REDUCE COMPLEXITY

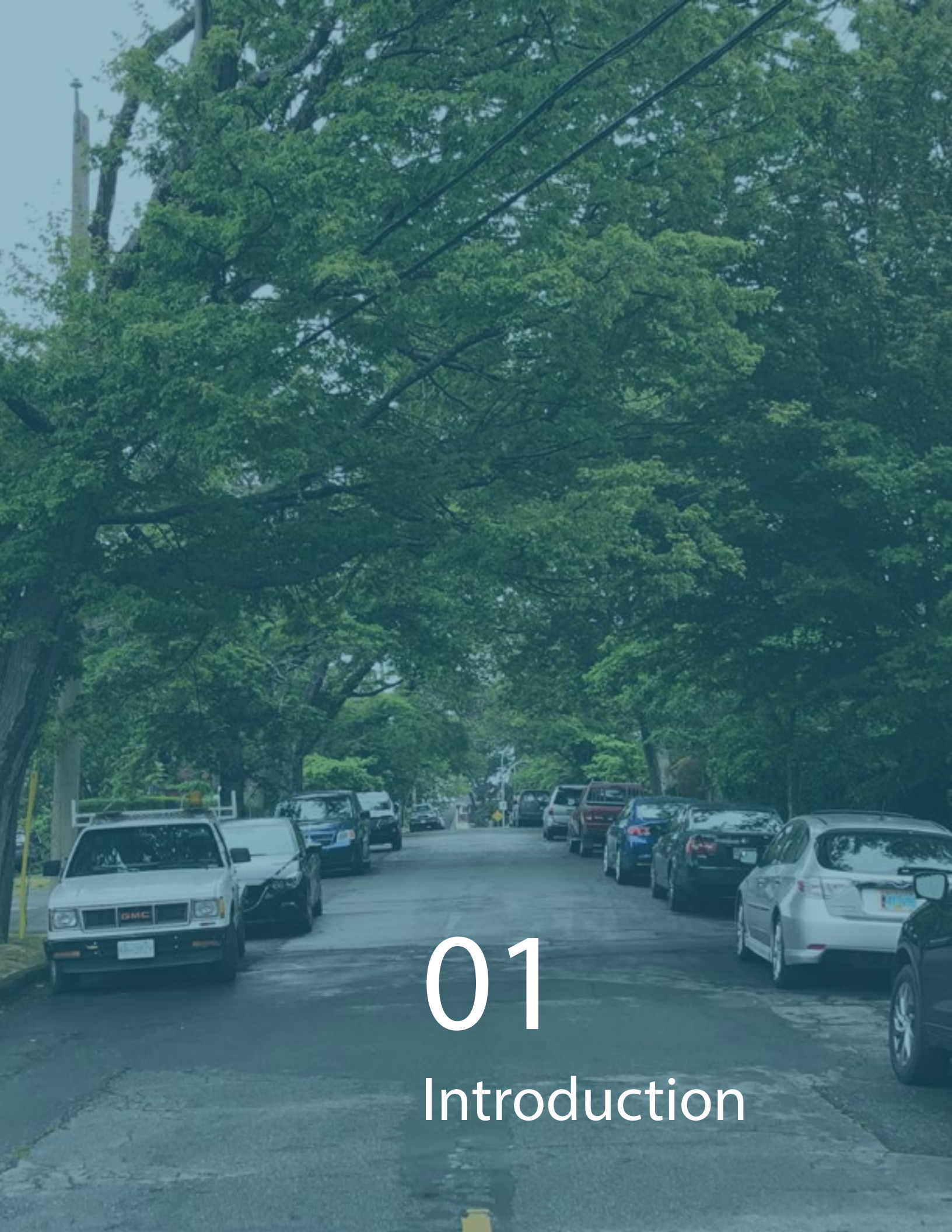
Creating a streamlined program that reduces the number of steps to completing retrofits will address barriers related to complexity and time commitments. Programs such as Energy Save New West (5 step) and Fort Collins Efficiency Works (3 step) should be considered as examples.

Recommendation: Create a retrofit program that contains as few steps as possible, from program registration to completed work and application of rebates. Consider working with industry to bundle retrofits and package them as 'good, better, best' to simplify the process and reduce the amount of contractor visits. Feasibility into contractor capacity to undertake whole home conversions would need to be undertaken.

RETROFIT PROGRAMS NEED TO PRIORITIZE GHG REDUCTION OVER COST SAVINGS

Natural gas furnace installations are on the rise. Given the price of natural gas, a new gas furnace can come with cost savings over technology such as heat pumps. However, heat pumps significantly lower GHG emissions. A sense of urgency needs to be primarily placed on GHG reduction with secondary benefits such as cost savings. Currently, many retrofit programs and initiatives are cost saving focussed. Creating sustained campaign dissemination and community conversation around sustainability initiatives will come from a prioritization of GHG reduction in a program. By shifting the conversation away from cost savings it can combat the rise in gas furnace installations.

Recommendation: Create a program that prioritizes the necessity for residents to undertake retrofits for GHG reduction. This focus will contribute to community wide dissemination of overall sustainability and climate change goals versus cost savings associated with technology and energy systems.



01

Introduction

CONTEXT

Transition 2050

Residential retrofit programs designed to achieve residential emission reductions over the past 25+ years have not created sustained market transformation needed to meet greenhouse gas (GHG) targets. Currently, BC governments are committed to making deep reductions to GHG emissions in communities and enabling industry-government collaboration is essential to accelerating residential retrofits.

The Transition 2050 Residential Retrofit Accelerating Project (hereinafter referred to as Transition 2050) is designed to have a broad local and national significance. Specifically, the program will help local governments understand their role in reducing emissions, develop implementation-focused strategies, inform policies and regulation, engage citizens and industry, implement actions, measure impact, and continuously improve strategies and projects.

Project Goals

Under the direction of Transition 2050 partners, City Green Solutions and the Capital Regional District, this research paper is a local government policy and opportunity analysis for accelerating residential retrofits. The goals of this research is to:

- To identify and research government building energy retrofit/GHG strategies policies and programs in areas and regions outside project partner location;

TRANSITION 2050 AT A GLANCE

Goal: Mobilize government and industry collaboration and accelerate energy and carbon reduction strategies and projects to double the emissions reduction achieved from residential (Part 9 building) retrofits in program communities by 2021 while establishing a clear path to achieving medium-term and 2050 targets on Vancouver Island, BC.

Specific Focus:

- Accelerating installations of air source heat pumps
- Accelerating deeper home energy retrofits

Funding: Federation of Canadian Municipalities

Non-profit Partners:

- City Green Solutions
- Home Performance Stakeholder Council

Local Government Partners:

- Capital Regional District (CRD)
- City of Victoria
- District of Saanich
- Township of Esquimalt
- District of Central Saanich
- City of Campbell River
- Regional District of Nanaimo
- Comox Valley Regional District
- Cowichan Valley Regional District

- To research industry activities, roles and opportunities for supporting local government strategies for accelerated building energy retrofits;
- To complete an opportunities analysis to inform local government building energy retrofit/GHG strategies for accelerating deep energy retrofits on Vancouver Island; and
- Provide recommendations.

METHODOLOGY

Workshops

In May and June of 2019, the Transition 2050 project team participated in a series of workshops to shape strategies to accelerate the adoption of residential retrofits on Vancouver Island. In attendance were project partners, energy retrofit contractors, industry organizations, and other stakeholders. These workshops addressed:

- Information on provincial and utility retrofit targets and discussed options to meet them;
- Consumer focussed solutions by providing input on consumer barriers for undertaking residential retrofits and identifying solutions to address them; and
- Input into future strategies by conversation and activities designed to identify and prioritize strategies for accelerating retrofits.

Attendance of these workshops contributed to the research and analysis presented in this report.

Background Research

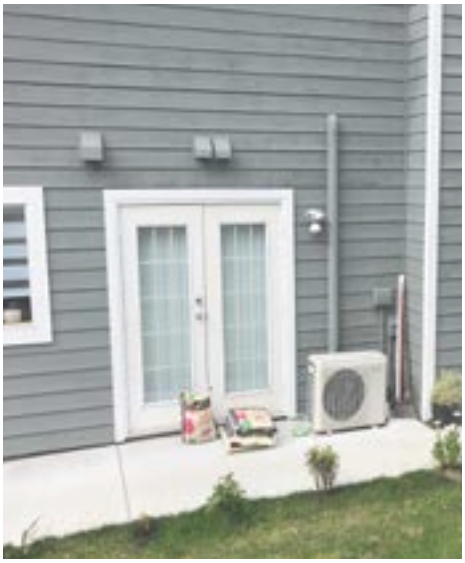
Research was conducted on residential retrofit programs in British Columbia, North America, and Internationally. Both current and expired retrofit programs were considered to gain insight on the success and challenges associated with any program. The focus of this research was into local government policy associated with any program. These programs were found through web searches and information gained from staff at the CRD or City Green Solutions. An overview of retrofit programs can be found in section 2.

Interviews

Interview guides were developed, administered, and conducted with stakeholders, and representatives from local governments and program managers for current and expired retrofit programs from:

- City of Victoria;
- District of Saanich;
- Solar Colwood;
- Oil to Heat Pump Incentive Program
- Regional Energy Efficiency Partnership
- Nelson Ecosave; and
- Save Energy New West

These interview guides were structured and designed to elicit responses about local government policy and pertinent successes and challenges with existing or past retrofit programs. Results of these interviews fed directly into the best practice and opportunity analysis and informed key findings and recommendations.



Analysis

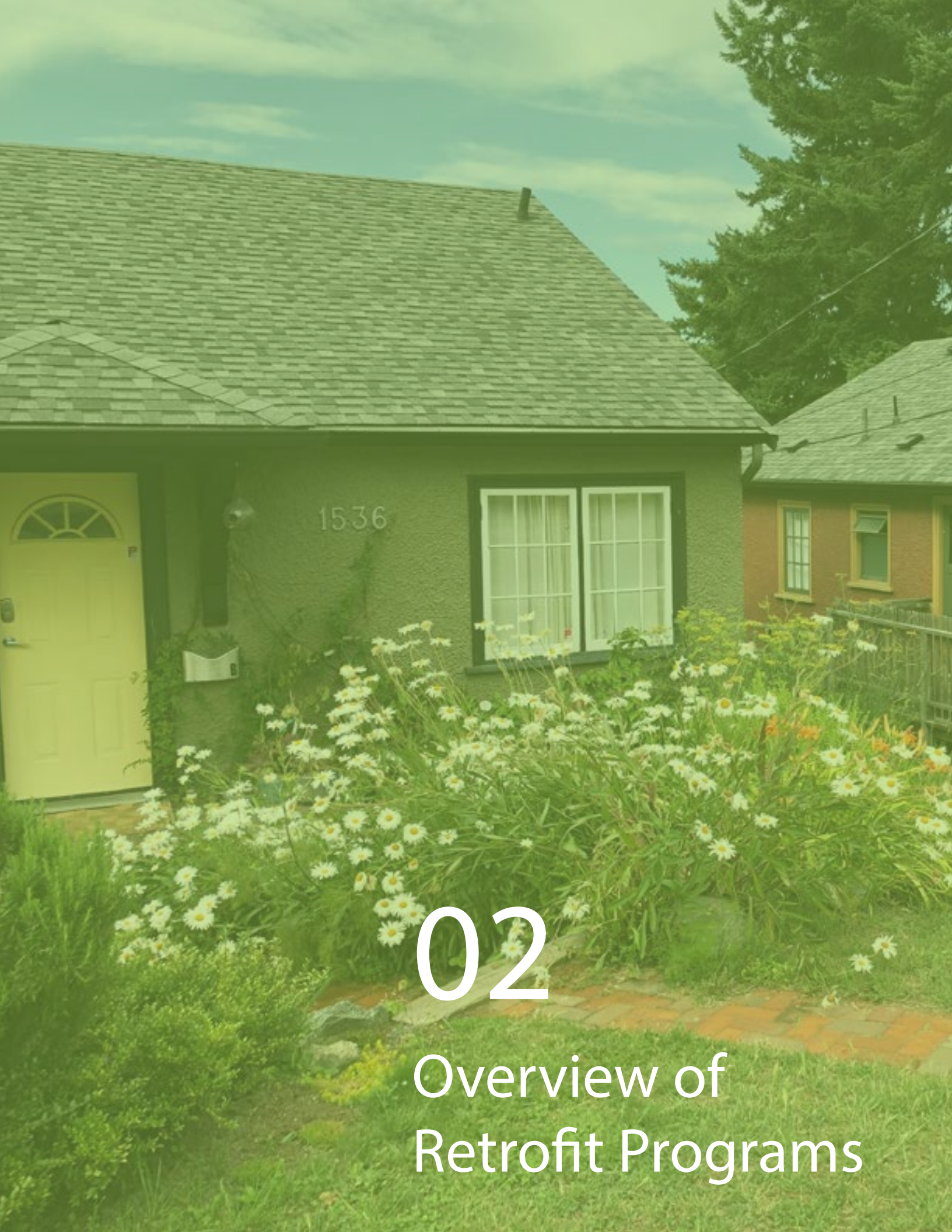
The Best Practice and Opportunity Analysis can be found in Section 3 and includes information on implementation, feasibility, and the role of stakeholders for each identified best practice and opportunity. The analysis was conducted from information gained in background research, workshops, and interviews. The analysis guide can be found on page 16.

Limitations

This research took place over a period of 3 months and was limited by the amount of time available to conduct interviews, availability of information into expired retrofit programs, difficulties into finding relevant local government policy in Europe, and limitations into the scope of the project.

Interviews were conducted with relevant current and expired retrofit programs, however, there were some difficulties in the availability of staff members of expired retrofit programs. Generally, information into expired retrofit programs were difficult to ascertain, especially those programs with no available final report. Retrofit programs in Europe were difficult to find as most programs were available on a federal level and not for a local government context.

Finally, this project was conducted within the scope of local government context. Leagal and costing analysis was not in scope and therefore futher analysis may be required to inform some of the best practices identified in Section 3.



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Overview of Retrofit Programs

Overview

There are numerous retrofit programs in operation around the world. Programs are offered through a local, regional, provincial, and federal governments, as well as government contractors and utilities. Each program or initiative share similar program features such as:

- Financial incentives such as rebates, grants, or tax credits;
- Earned or paid marketing of the program;
- Outreach such as dedicated websites, information sessions, and home tours;
- A dedicated Program Coordinator to answer questions;
- Retrofit financing from local government or private lenders; and
- Energy Coaches to guide residents through the process.

A complete list of programs can be found a the back of this section. This overview will look at programs in three geographical regions and summaries are presented below.

British Columbia

Retrofit programs in BC operate on a local, regional, and provincial scale. BC is currently struggling from high numbers of natural gas furnace installations due to the lower cost of technology and price of natural gas. Natural gas heating is on the rise across the province but in particular the Greater Vancouver Area and the Interior. Vancouver Island has seen higher rates of heat pump installations, compared to the rest of the province, due to a lower rates of natural gas connections and a climate better suited for heat pump use.

The LiveSmart BC Efficiency Incentive Program ("LiveSmart") was a partnership between the British Columbia Ministry of Energy, Mines and Natural Gas and the major provincial utilities: Fortis BC Gas, Fortis BC Electric, and BC Hydro. LiveSmart consisted of education and financial incentives for homeowners to make their homes more energy efficient. Following a comprehensive EnerGuide home energy assessment, homeowners were provided with a report that includes a list of recommended cost-effective energy-efficient upgrades to their home. Based on the advisor's recommendations, homeowners choose to complete one or more retrofits to improve their home's energy efficiency. LiveSmart participants received an average of approximately $1,250 in provincial incentives through the program, which for periods was complemented by federal incentives through the ecoEnergy Retrofit Program.

The overall goals of the LiveSmart program were to:

- Reduce GHG emissions;
- Provide a specific opportunity for residential customers to reduce their energy and water bills;
- Generate energy savings for utility program partners by improving the level of energy efficiency of BC.'s housing stock;
- Increase customer awareness of energy efficiency and home energy management by educating customers about the high consumption associated with inefficient homes; and
- Build industry delivery capacity to advance the whole home energy retrofit market in BC and enable future implementation of mandatory building labeling.

The LiveSmartBC Rebates 2008-2014 retrofitted, on average, 10,000 homes per year. At the LiveSmartBC and EcoEnergy Retrofit program peak, over 2500 homes per month were reached (3% of eligible housing stock in the province). Between march 2008 and April 2011, over 45,000 households purchase an air source heat pump, resulting in elctricficaiton of up to 2% of eligible households (Pembina, .

However, the LiveSmartBC program was challenged by fluctuations in available funding for incentives, which turned the program on-and-off multiple times which was confusing for consumers and challenging for industry. Utimatetly the LiveSmartBC program ended in 2014. Residential incentive programs in BC have not since achieve the peak uptake seen in the LiveSmartBC and EcoEnergy Retrofit homes program, even though current program rebate levels are equivalent or more than rebate levels available in the past . According to the Pembina Institute, BC needs to reduce carbon pollution from homes and buildings and estimates that BC needs to retrofit three per cent of its building stock (30,000 homes, 17,000 apartment units, and 3 million square metres of commercial space) every year until 2050 (Pembina Institute, 2016).

Local governments have seen both success and challenges with retrofit programs. Programs of note that are currently in operation and having continued success are the Nelson Ecosave Program and the Regional Energy Efficiency Partnership (NEEP), and Energy Save New West. Both programs have been in continuous operation for a number of years. It is interesting to note that both of these programs are in operation in municipalities that have their own electric utilities.

Other programs in BC have had limited success in achieving targets. Programs such as Solar Colwood and Oil to Heat Pump Incentive Program were successful in outreach and awareness (Community Energy Association, 2014). However, the Solar Colwood Program

struggled to achieve their ambitious targets. The Oil to Heat Pump Program exceeded its installation targets over 3 years of operation.

Vancouver's 'Big Moves' will be a new program in the coming years. In January 2019, Vancouver declared a Climate Emergency. As a result of the declaration, City staff prepared the Climate Emergency Response which details 6 'Big Moves' to combat climate change (City of Vancouver, 2019). Big Move #4 contains the goal that by 2025, all space and water heating in new buildings and those replaced in existing buildings would be zero emissions. It is expected that heat pumps will be a important solution in this transition. A Retrofit Strategy is currently in the works, but it is anticipated that the Strategy will include sustained incentives, and investments in industry capacity-building to support voluntary adoption of zero emission space and water heating.

Additionally, the District of Saanich is considering implementation of a retrofit financing program for residents (District of Saanich, 2019). the financing will feature low interest rates and will be provided directly from the District

North America

North America retrofit programs feature a few exciting programs to accelerate residential retrofits. These programs operate through different levels of governments, and partnerships.

Local government programs such as Fort Collins Efficiency Works employed community based social marketing (see definition on page 15) to identify barriers for consumers in their Neighbourhood Pilot Project. One barrier they identified was the time commitment it takes to meet with contractors (Better Buildings Residential Network, 2016). This program then designed a streamlined path where retrofits were bundled into standardized packages sold as 'good, better, best'. Once the package was chosen, the next contractor in rotation would carry out the installation. The program is an excellent example of local government and industry collaboration to reduce consumer barriers and accelerate residential retrofits.

Nova Scotia Power has employed the 'I Love My Heat Pump' campaign to educate consumers on the benefits of heat pumps (Heatpumpssetyoufree.ca, 2019). The campaign features a 'heat pump savings calculator' to help consumers understand the cost savings associated with heat pumps.

International

Europe was an early adopter of heat pump technology and countries such as Sweden and Switzerland have been leading the way with heat pump adoption (EHPA, 2019).

The Netherlands, a long-time major gas producer in which virtually all houses are connected to the gas grid, will remove gas for heating and cooking for all residential buildings (CityLab, 2019). The Netherlands 'Gas Less Neighbourhoods' is designed for local governments. The first steps are coming from 31 local governments including Amsterdam, Rotterdam, and Utrecht. From 2017 and on, 170,000 houses should be disconnected every year. Local authorities will play a key role in this process. They will decide for each neighbourhood, block, or even individual house what the best alternative heating source is. To incentivize energy efficiency, agreements have been made with the construction and engineering sector to see that 300,000 existing home and other buildings will be made more energy efficient each year. Additionally, The Energy Savings Fund for the Rental Sector (FEH) offers low-interest loans for landlords to make their rental properties more energy efficient. Other inventive schemes from local governments for homeowners are in the works.

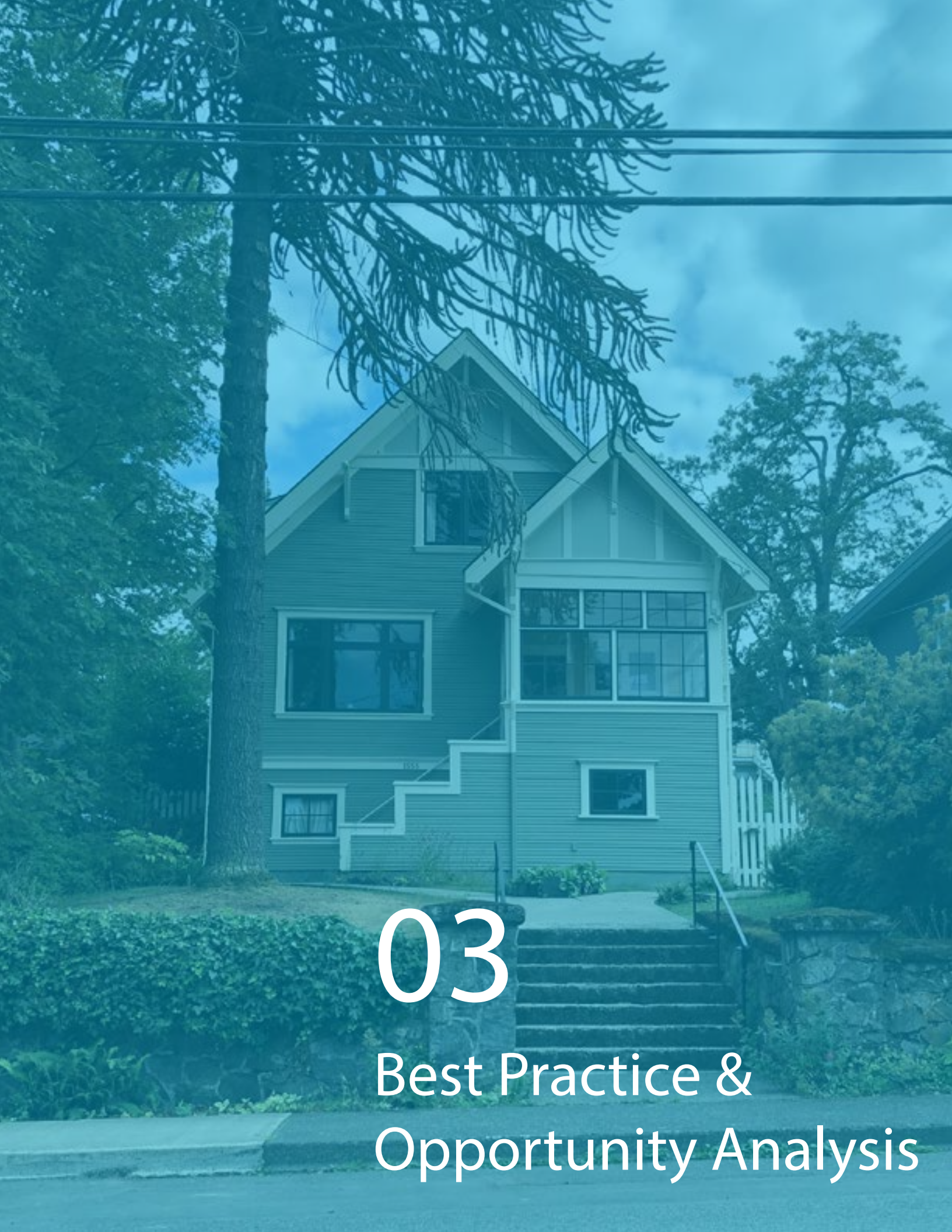
Heat pump associations also play a large role in Europe. Both the UK and Ireland have prominent associations that advocate for policy change and ensure the industry continue to uphold the quality that consumers expect. The associations also act as an education platform for consumers wishing to know more on heat pump technology.

In New Zealand, the Retrofit Your Home Program from the Auckland City Council gives financial assistance to homeowners wishing to undertake residential retrofits (Auckland Council, 2019). Funding for insulation and heat pumps are among other technologies allowed under the loan. Similar schemes from across New Zealand can be found in other eleven other Councils.

Retrofit Program Directory

For the background research of this project, a number of retrofit programs have been identified. A brief description of the programs can be found in the Appendix

Program/Initiative	Status	Region	Page #
Clean BC - Better Homes	Ongoing	BC	38
City of Vancouver Big Moves	Ongoing	BC	39
Cool North Shore	Ongoing	BC	39
Energy Conservation Program	Ongoing	BC	39
Energy Diet Programs	Expired	BC	39
Energy Save New West	Ongoing	BC	40
Metro Vancouver RateOurHome.ca	Ongoing	BC	40
Regional Energy Efficiency Program & Nelson Ecosave	Ongoing	BC	40
Oil to Heat Pump Incentive Program	Expired	BC	40
Solar Colwood	Expired	BC	41
Fort Collins Efficiency Works	Ongoing	North America	41
Greenovate Boston	Ongoing	North America	41
Northeast Energy Efficiency Partnership	Ongoing	North America	41
Nova Scotia Power	Ongoing	North America	41
Renovate America Home Efficiency Renovation Opportunity	Ongoing	North America	42
Belgium Wallonia Ecopack	Ongoing	International	42
Danish Energy Agency Subsidies	Expired	International	42
France Électricité de France (EDF) Subsidies	Ongoing	International	42
Japan's Eco-Cute	Ongoing	International	42
Netherlands Gas Less Neighbourhoods	Ongoing	International	43
New Zealand Retrofit Your Home & Warmer Kiwi Homes	Ongoing	International	43
Sustainable Energy Authority of Ireland & Heat Pump association of Ireland	Ongoing	International	44
Sweden's Energy Efficiency Tax Credits	Ongoing	International	44
Switzerland Heat Pump Tariffs	Ongoing	International	44
UK Renewable Heat Incentive & UK Heat Pump Associations	Ongoing	International	45
Viessman Training	Ongoing	International	45



03

Best Practice & Opportunity Analysis

Analysis

The best practice and opportunity analysis for accelerating residential retrofits are broken into different sections with corresponding best practices/opportunities (see table below). Each best practice has its own page and gives a brief description, a scalar rating of implementation and feasibility, and identifies the role of key stakeholders. At the bottom of the page is an example of the best practice and a list of consumer barriers that it overcomes.

Section Definitions

Local Government Policy and Permitting - includes best practices related to policy or bylaws that a local governments can enact to reduce GHG emissions in their communities.

Community Based Incentive Structure Options and Framing of Incentives - includes best practices related to the reduction of financial barriers related to undertaking retrofits and practices into the delivery of incentives.

Marketing Techniques and Approaches - includes best practices related to marketing efforts, behavioural based marketing, community based social marketing (CBSM), community energy coaching, and adaptive and targeted marketing approaches.

Industry Role in Local Government Models- includes best practices related to industry's role in influencing policy for local governments and ensuring quality in installation and retrofit work.

Community Based Social Marketing (CBSM)

Increasingly, those who develop and deliver programs to promote sustainability are turning to community-based social marketing for assistance.

According to the Government of Canada, community-based social marketing also uses tools that have been identified as being particularly effective in fostering change (Nrcan.gc.ca, 2019). Although each of these tools on its own is capable of promoting sustainable behaviour, the tools can often be particularly effective when used together. Key community-based social marketing tools include:

- prompts – remind people to engage in sustainable activities;
- commitments – have people commit or pledge to engage in sustainable activities;
- norms – develop community norms that a particular behaviour is the right thing to do; and
- vivid communications tools with engaging messaging and images.

Community-based social marketing is also pragmatic.

It involves:

- identifying the barriers to a behaviour;
- developing and piloting a program to overcome these barriers;
- implementing the program across a community; and
- evaluating the effectiveness of the program.

Sections and Best Practice/Opportunity for Analysis

Section	Best Practice/Opportunity
Local Government Policy and Permitting	Building Energy Reporting
	Reduction of Electrical Permits
Community Based Incentive Structure Options and Framing of Incentives	Bulk Buys
	Rebates and Top Ups
	Property Tax Credits For Retrofits
	Preferential Pricing
	Retrofit Financing
	Retrofit Packages
Marketing Techniques and Approaches	Heat Pump Demonstrations
	Energy Champions
	Energy Cost Comparisons
	Energy Coaches
	Heat Pump Information Sessions
	Targeting of Fossil Fuel Heated Homes
Industry Role in Local Government Models	Heat Pump Associations
	Manufacturer Training

Consumer Barriers for Retrofits

Residential retrofits face many barriers for implementation for a consumer. Addressing these barriers is an important step in using CBSM or designing an effective retrofit program for any community. These barriers include:

- Financial - lack of an easy and affordable way to pay for a retrofit;
- Trust - lack of trust in contractors, or information sources related to programs, retrofit, and technology;
- Complexity - lack of understanding of energy efficiency products and technology, scope of work related to retrofits, and application of rebates; and
- Time - lack of time to meet with contractors, apply for rebates, undertake work related to retrofits.

As part of the analysis, each best practice or opportunity will be evaluated for how many of these consumer barriers they overcome.

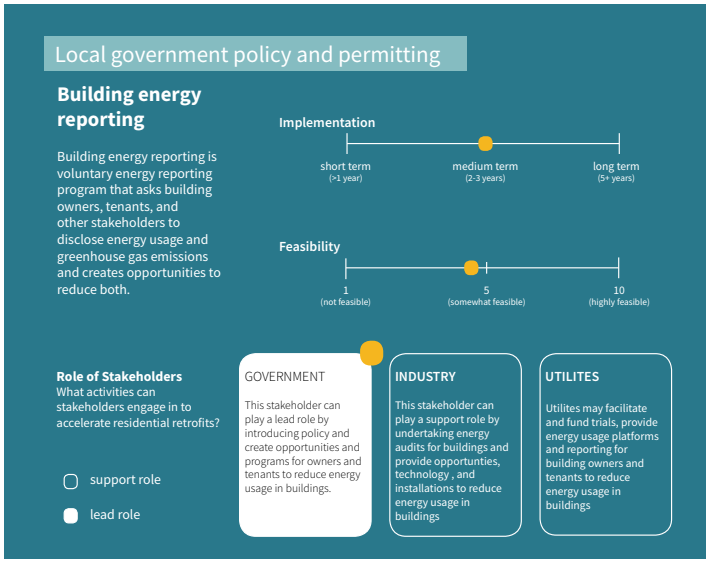
Analysis Guide

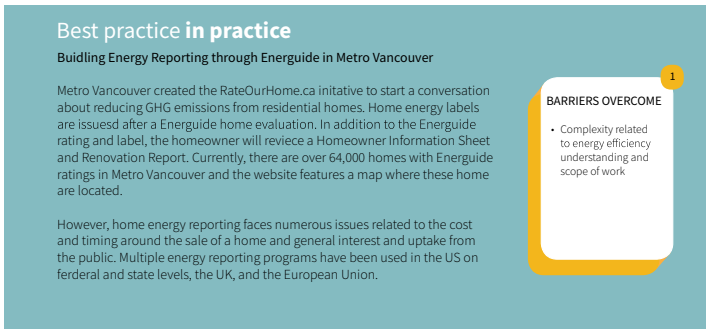
Section, by colour

Best Practice or Opportunity and its description

Role of Stakeholders and description of activities each stakeholder can engage in to accelerate residential retrofits

Best Practice in Practice gives an example of the best practice in use





Implementation scale from short-term to long-term. Feasibility scale from 1 to 10. Both implementation and feasibility are considered in study area and gained from interviews and workshop. Some feasibility scales are out of scope of the research and a dictated by 'more research needed'

Barriers Overcome box gives a list of consumer barriers that the best practice overcomes.

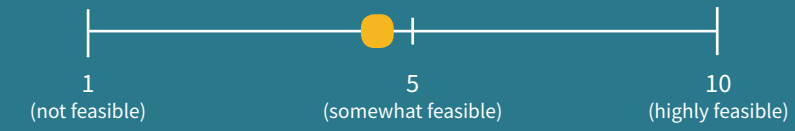
Local government policy and permitting

Building energy reporting

Building energy reporting is a mandatory energy reporting program that asks building owners, tenants, and other stakeholders to disclose energy usage and greenhouse gas emissions and creates opportunities to reduce both.

Implementation

Feasibility



Role of Stakeholders
What activities can stakeholders engage in to accelerate residential retrofits?

- ▢ support role
- ▢ lead role

GOVERNMENT

This stakeholder can play a lead role by introducing building energy reporting policy and programs and create opportunities for owners and tenants to reduce energy usage in buildings.

INDUSTRY

This stakeholder can play a support role by undertaking energy audits for buildings and provide opportunities, technology, and installations to reduce energy usage in buildings

UTILITIES

Utilities may facilitate and fund trials, provide energy usage platforms and reporting for building owners and tenants to reduce energy usage in buildings

Best practice **in practice**

Building Energy Reporting through Energuide in Metro Vancouver

Metro Vancouver created the RateOurHome.ca initiative to start a conversation about reducing GHG emissions from residential homes. Home energy labels are issued after a Energuide home evaluation. In addition to the Energuide rating and label, the homeowner will receive a Homeowner Information Sheet and Renovation Report. Currently, there are over 64,000 homes with Energuide ratings in Metro Vancouver and the website features a map where these home are located. RateOurHome.ca hasn't seen a large uptake in home energy labelling but has success in awareness of home labelling and education.

However, home energy reporting faces numerous issues related to the cost and timing around the sale of a home, general interest and uptake from the public, and whether it is mandatory or voluntary. Multiple energy reporting programs have been used in the US on federal and state levels, the UK, and the European Union.

1

BARRIERS OVERCOME

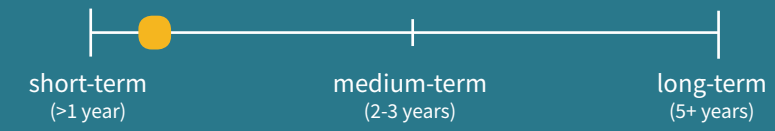
- Complexity related to energy efficiency understanding and scope of work

Local government policy and permitting

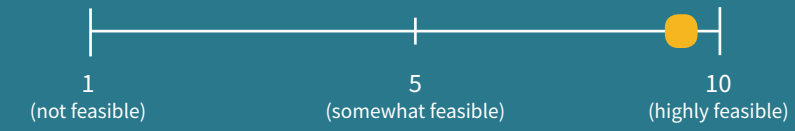
Reduction of electrical permits

Reducing electrical permit fees is a simple way to incentivize residential retrofits. By reducing fees, people are further incentivized to perform a residential retrofit through increased savings.

Implementation



Feasibility



Role of Stakeholders
What activities can stakeholders engage in to accelerate residential retrofits?

- ▢ support role
- ▢ lead role

GOVERNMENT

This stakeholder can play a lead role by introducing policy to reduce electrical permit fees.

INDUSTRY

This stakeholder can play a support role by educating customers on the reduction of electrical permit fees.

UTILITIES

Utilities may educate and promote the reduction of electrical permit fees in applicable areas where policies are in place.

Best practice **in practice**

Reduction of electrical permit fees from the City of Winnipeg

The City of Winnipeg has reduced electrical permit fees to streamline and incentivize users wishing to undertake retrofits. Under the electrical permit fees schedule for the City of Winnipeg, a reduction of 50% is applied when equipment is connected to existing wiring that has been previously inspected under another electrical permit (Winnipeg.ca, 2019). This reduction in fees can act as an additional incentive for heat pump adoption in municipalities. Reducing fees are tools that local governments have direct control over.

However, It has been noted that permits represent a small financial burden on retrofit projects. In particular, electrical panel upgrades related to retrofit work present significant financial costs and the creation of additional rebates for these works could have a larger impact. Reduction of permits is one practice that local government have direct control over.

1

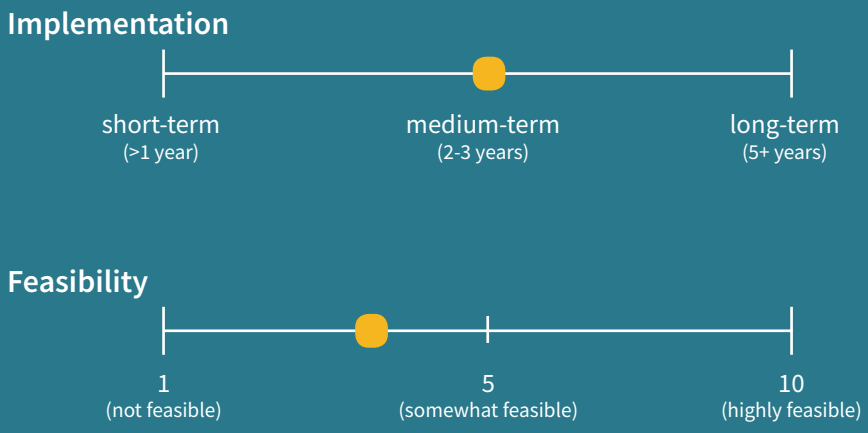
BARRIERS OVERCOME

- Financial barriers related to the cost of retrofits

Community based incentive structure options and framing of incentives

Bulk buys

Bulk buys are programs where a organization will pool the buying power of customers to buy technology and services in bulk, reducing the costs of undertaking retrofits.



Role of Stakeholders
What activities can stakeholders engage in to accelerate residential retrofits?

- ▢ support role
- ▢ lead role

GOVERNMENT

This stakeholder can play a lead role by introducing a energy bulk buy program for their community. Coupled with further incentives for heat pump users, this program can increase residential retrofits.

INDUSTRY

This stakeholder can play a support role by educating customers on bulk buying options in their community and cost savings from using high efficieny heat pumps.

UTILITIES

Utilities may facilitate programs by offering costs savings for bulk buying communties and promotion of these programs.

Best practice **in practice**

Pender Island Bulk Buys

In 2018, Pender island went through a series of bulk buys to encourage the use of heat pumps on the island (Pender Island, 2019). Bulk buys pool the buying power of communities to lower the cost of technology and installations. In addition to facilitating the bulk buys and installations, the bulk buy coordinators organized information for residents to educate them on the benefits of heat pumps and the processes of the bulk buys. Bulk buys reduce barriers around finances, trust, and time.

So far there have been two bulk buys on Pender and has resulted in hundreds of homes undertaking retrofits. The Transition 2050 Residential Retrofit Acceleration Project is exploring the design option for bulk purchase rebates for heat pumps.

3

BARRIERS OVERCOME

- Financial barriers related to the cost of retrofits
- Trust barriers related to contractors and sources of information
- Time barriers related to meeting with contractors

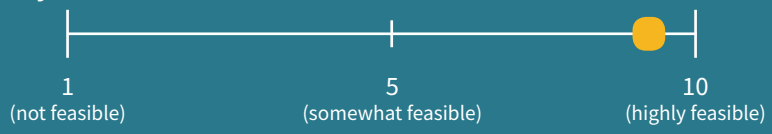
Community based incentive structure options and framing of incentives

Local government top-ups

Local government top-ups are rebates in addition to established rebates from other levels of government or utilities. Top-ups can further incentivize community members to perform residential retrofits through increased cost savings.

Implementation

Feasibility



Role of Stakeholders
What activities can stakeholders engage in to accelerate residential retrofits?

- ▢ support role
- ▢ lead role

GOVERNMENT

This stakeholder can play a lead role by introducing rebate top ups and promoting these top ups through availible platforms.

INDUSTRY

This stakeholder can play a support role by educating consumers on the top ups availible to them in their community

UTILITIES

Utilities may help promote rebate top ups in communities through differnet advertising platforms availible to them.

Best practice **in practice**

ClearnBC rebate top-ups from local governments in BC

Local governments in BC offer top-up rebates, called municipal top-ups, in additional to rebates from CleanBC Better Homes and Home Renovation Program. Two top-up options are available. One $150 top-up through a EnerGuide Home Evaluation if participants complete a pre and post-retrofit home evaluation. The second offer is for $350 or $2000 to convert to electrical heat pump from a fossil fuel heating system (Better Homes BC, 2019). Offered, sometimes in limited time, top-ups incentivize heat pump adoption through cost savings in select communities.

1

BARRIERS OVERCOME

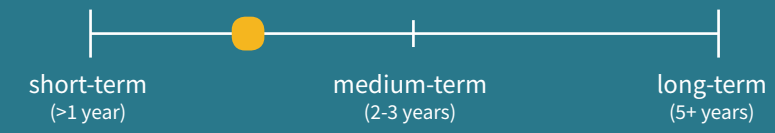
- Financial barriers related to the cost of retrofits

Community based incentive structure options and framing of incentives

Tax credits for retrofits

Tax credits for retrofits are programs where credits can be applied to municipal property tax when a resident undertakes a home retrofit. Tax credits can be in applied for the full or partial cost of retrofit equipment and work. Tax credits incentivize residents to perform retrofits through cost savings.

Implementation



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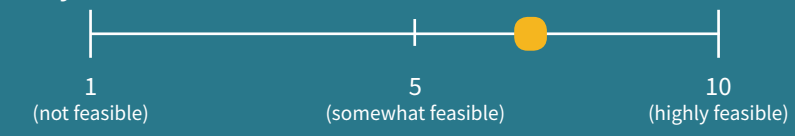


Role of Stakeholders
What activities can stakeholders engage in to accelerate residential retrofits?

- ▢ support role
- ▢ lead role

GOVERNMENT

This stakeholder can play a lead role by introducing a program for property tax credits for retrofits.

INDUSTRY

This stakeholder can play a support role by educating the consumer on property tax credit programs available in their community and the procedures necessary to apply for them.

UTILITIES

Utilities may help promote property tax credits for retrofits in communities through advertising platforms available to them.

Best practice **in practice**

France's Tax Credit for Energy Transition (CITE) & Canadian Home Renovation Tax Credit

Since 2005, France has been incentivizing heat pump adoption and other high efficiency energy technology through the CITE Program. The tax credit is available for the purchase of most efficient materials or equipment in terms of saving energy or generating renewable energy (CITE, 2019). Between 2005 and 2011, over 6 million of the 34 million primary residences in metropolitan France benefited from the CITE at least once. The French tax credit was partly responsible for the heat pump market boom they experienced in 2008.

The Canadian Home Renovation Tax Credit, which was available between 2009 and 2010, successfully stimulated the home renovation market in Canada, including the market for home energy improvements. A future federal tax credit only focused on home energy renovations or heat pumps could significantly accelerate the market.

3

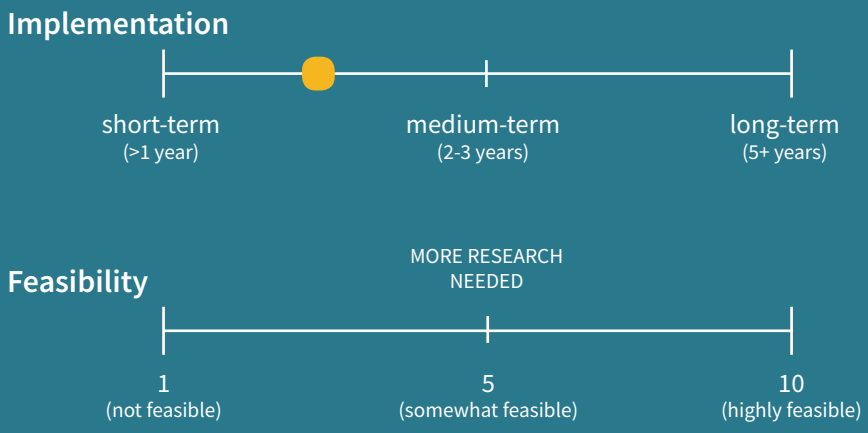
BARRIERS OVERCOME

- Financial barriers related to the cost of retrofits
- Trust barriers related to contractors and sources of information
- Time barriers related to meeting with contractors

Community based incentive structure options and framing of incentives

Preferential pricing for heat pumps

Preferential electricity pricing for heat pumps provide customers with a significantly cheaper electricity rate for heat pump users. Preferential pricing creates a strong customer proposition and benefit heat pump customers with increased cost savings, incentivizing heat pump adoption.



Role of Stakeholders
What activities can stakeholders engage in to accelerate residential retrofits?

- ▢ support role
- ▢ lead role

GOVERNMENT

This stakeholder can play a support role by advocating for policy on preferential pricing for heat pump users.

INDUSTRY

This stakeholder can play a support role by educating consumers on preferential pricing available to them in their community.

UTILITIES

Utilities can play a lead role by introducing preferential pricing for heat pump users.

Best practice **in practice**

Heat Pump Tariffs in Switzerland, Germany, and Japan

There are several examples of preferential tariffs being offered which create strong customer proposition and benefit heat pump customers. In Switzerland, 80% of the approximately 900 local network operators offer a heat pump tariff which provides the customer a significantly cheaper electricity rate, up to 40%. Since the early 1990s this has been in exchange for being able to control heat pumps and avoid grid congestion (Heat Pump Association Switzerland, 2016). In Germany, some utility providers offer heat pump tariffs which tie customers into long-term supply contracts. In Japan, electric utilities have long offered low nighttime tariffs to encourage the use of the Eco-Cute heat pump systems at night to avoid grid peaks.

However, legal considerations for preferential pricing for southern to mid Vancouver Island must be further explored.

1

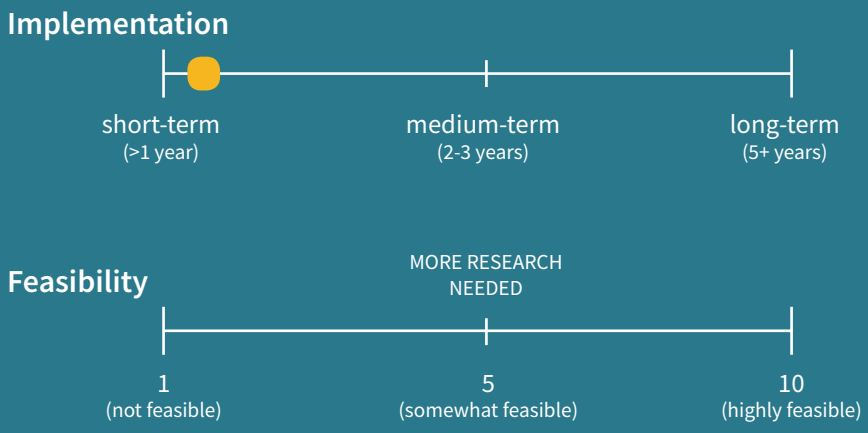
BARRIERS OVERCOME

- Financial barriers related to the cost of retrofits

Community based incentive structure options and framing of incentives

Retrofit financing

Retrofit financing offers loans for retrofit work. Loans can be provided from a local government, private lenders, or utilities. Retrofit financing can reduce the financial burden and incentivize retrofits.



Role of Stakeholders
What activities can stakeholders engage in to accelerate residential retrofits?

- ▢ support role
- ▢ lead role

GOVERNMENT

This stakeholder can play a lead role by creating retrofit financing programs and educating residents on their use.

INDUSTRY

This stakeholder can play a support role by educating and connecting customers with loan providers.

UTILITIES

Utilities may support customers by educating and connecting, or providing customers with loans.

Best practice **in practice**

Renovate America Home Energy Renovation Opportunity (HERO)

The HERO program is an energy efficient financing program in the US, currently available to residents in California, Missouri, and Florida. The HERO program is a Property Assessed Clean Energy (PACE) Program and provides financing for energy efficient, water efficient, and renewable energy products to homes and businesses. Financing provided by the program is repaid through annual property tax payments. Under this program, in the event of the home being sold, financing is passed on to the new owner. The HERO Program has funded work in over 100,000 homes (HERO, 2019).

Retrofit financing has been used extensively in countries with varying results. Much of the success of retrofit financing relies on low interest rates and low barriers for approved financing.

1

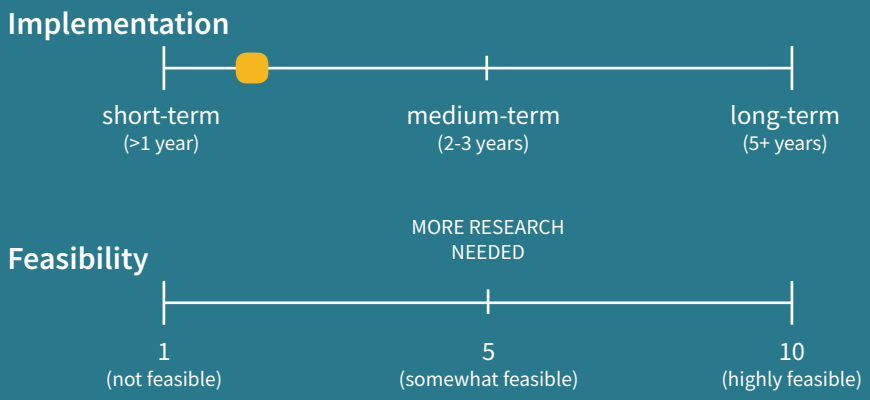
BARRIERS OVERCOME

- Financial barriers related to the operating cost of retrofit equipment

Community based incentive structure options and framing of incentives

Retrofit packages

Retrofit packaging are programs that bundle residential retrofits together. These packages can save time, standardize costs, and build trust between residents, contractors, and the community.



Role of Stakeholders
What activities can stakeholders engage in to accelerate residential retrofits?

- ▢ support role
- ▢ lead role

GOVERNMENT

This stakeholder can play a lead role by working with industry to create a retrofit package program.

INDUSTRY

This stakeholder can play a lead role by working with program providers to standardize retrofit packages and undertake installation of retrofits.

UTILITIES

Utilities may play a support role by educating customers on retrofit packages available.

Best practice **in practice**

Fort Collins Efficiency Works Neighborhood Pilot

The Efficiency Works Neighborhood Pilot Program tested a streamlined, turn-key energy efficient program designed to eliminate the problems associated with home performance contracting and barriers related to project implementation inherent to traditional energy audit programs. The process started with a free assessment performed by an impartial 3rd party home performance (HP) specialist instead of a contractor. The HP specialist lists opportunities to improve health, safety, comfort, value, and energy efficiency in the home. The opportunities were bundled into packages labeled as good, better, and best. Once the customer selects a package, an energy advisor creates a scope of work and sends it to the next trade person in rotation. The pilot increased participation, adoption, and savings of costs and GHG emissions across Fort Collins and was regarded as highly successful. Feasibility into this type of program in BC, in the absence of whole home contractors, would need to be undertaken.

4

BARRIERS OVERCOME

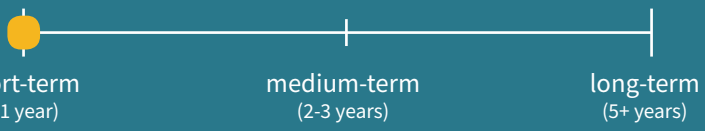
- Financial barriers related to the cost of retrofits
- Complexity barriers related to undertaking retrofits
- Trust barriers related to contractors and sources of information
- Time barriers related to meeting with contractors

Marketing Techniques and Approaches

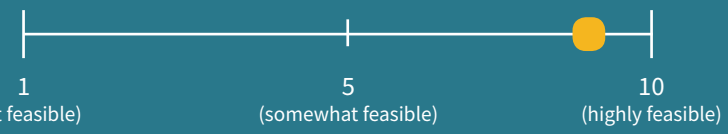
Retrofit demonstrations

Retrofit demonstrations are events that showcase the applicable retrofit technology and educate people on energy savings associated with retrofits. Demonstrations can educate residents and reduce barriers around misinformation.

Implementation



Feasibility



Role of Stakeholders
What activities can stakeholders engage in to accelerate residential retrofits?

- ▢ support role
- ▢ lead role

GOVERNMENT

This stakeholder can play a lead role by organizing retrofit demonstrations.

INDUSTRY

This stakeholder can play a support role by informing prospective customers on upcoming demonstrations in their communities.

UTILITIES

Utilities may educate customers on upcoming demonstrations in their communities.

Best practice **in practice**

Solar Colwood Solar Home Tours & Vancouver's City Hall Heat Pump

The Solar Colwood Program organized six solar home tours for neighbours of residents who had undertaken retrofits (The Solar Colwood Story, 2019). These home tours educated neighbours on the benefits of residential retrofits and encouraged them to perform their own retrofits. Information, disseminated from a trusted source such as a neighbour, reduced trust barriers around sources of information and increased retrofits in the program.

The City of Vancouver is 'leading by example' in heat pump adoption by converting to a heat pump at their City Hall. The installation of the heat pump was followed by a news conference and tour of the new facility in an attempt to raise awareness of the general public of heat pumps and their benefits.

1

BARRIERS OVERCOME

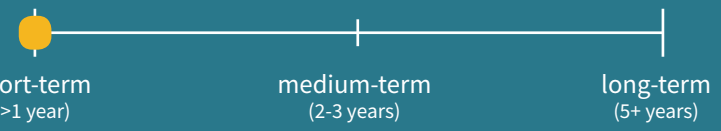
- Trust barriers related to contractors and sources of information

Marketing Techniques and Approaches

Energy Champions

Energy champions showcase local families or individuals in the community that have undertaken retrofits in their home. This marketing approach allows community members to learn about families who have undertaken retrofits, building consensus and reducing trust related barriers.

Implementation



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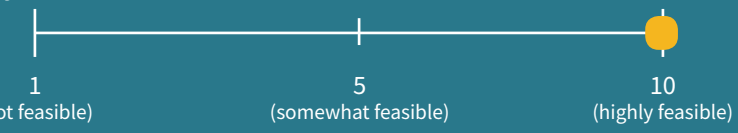


Role of Stakeholders
What activities can stakeholders engage in to accelerate residential retrofits?

- ▢ support role
- ▢ lead role

GOVERNMENT

This stakeholder can play a lead role by creating a program that showcases families or individuals who have undertaken retrofits.

INDUSTRY

Industry can play a support role by providing customers with marketing material on Energy Champions in their community.

UTILITIES

Utilities may play a support role by showcasing and promoting Energy Champions on their marketing platforms.

Best practice **in practice**

Transition Streets & Solar Colwood Energy Champions

Jack Meredith, a Victoria resident, participating in the Transition Street Program and other community engagement activities has been a proactive and successful Community Energy Champion to educate neighbors, REALTORS and other stakeholders about the opportunities to retrofit older homes to high levels of efficiency.

The Solar Colwood Program showcased Energy Champions in the community that had undertaken retrofits. These insights allowed other community members to learn about energy savings and encourage them to undertake similar works in their own home.

The Energy Champion concept has potential to be expanded and supported in communities across the province.

1

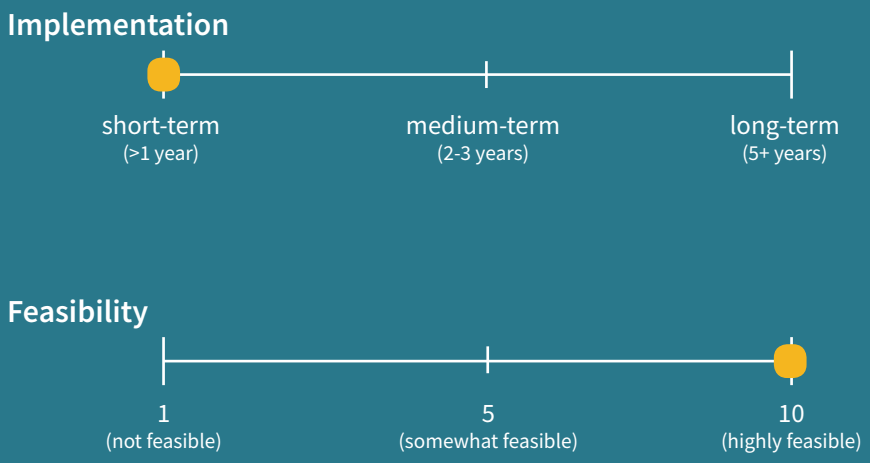
BARRIERS OVERCOME

- Trust barriers related to misinformation

Marketing Techniques and Approaches

Energy cost comparisons

Energy cost comparisons are public facing information tools that inform customers on the cost savings associated with energy sources and technology, and allow them to compare them with traditional sources of energy.



Role of Stakeholders
What activities can stakeholders engage in to accelerate residential retrofits?

- ▢ support role
- ▢ lead role

GOVERNMENT

This stakeholder can play a lead role by publishing energy cost comparisons and advertising cost savings associated with alternative energy sources and technology.

INDUSTRY

This stakeholder can play a support role by educating customers on objective sources of costs savings of with alternative energy sources and technology.

UTILITIES

Utilities may play a lead role by publishing energy cost comparisons and advertising cost savings associated with alternative energy sources and technology.

Best practice **in practice**

Sustainable Energy Authority of Ireland Fuel Cost Comparison Factsheet & Nova Scotia Power Heat Pump Calculator

The Sustainable Energy Authority of Ireland (SEAI) publishes a quarterly fuel cost comparison, which compared the costs and efficiencies of various space heating fuels (SEAI, 2019). The initiative followed lobbying by the Heat Pump Association of Ireland, to enable customers to be informed, from an objective source, of the cost advantages of heat pumps. This practice shows how an association had ensure that the national energy agency is focused on position heat pumps favorably as a viable alternative.

Nova Scotia Power has employed the 'I Love My Heat Pump' program to educate consumers on the benefits of heat pumps. The online site serves as a platform for a heat pump savings calculator, list of frequently asked question, list of certified contractors, heat pump operating tips, and maintenance instructions.

1

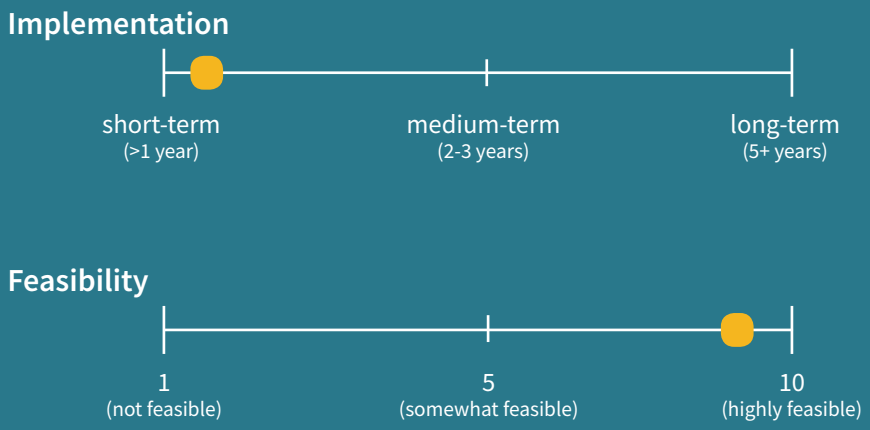
BARRIERS OVERCOME

- Trust barriers related and sources of information

Marketing Techniques and Approaches

Energy coaches

Energy coaches are dedicated, knowledgeable people who are available to educate customers on the benefits of heat pumps, processes of undertaking retrofits, and processes for applying for rebates.



Role of Stakeholders
What activities can stakeholders engage in to accelerate residential retrofits?

- ☐ support role
- ☐ lead role

GOVERNMENT

This stakeholder can play a lead role by creating a energy coach program.

INDUSTRY

Industry can play a support role by educating customers on the availability of energy coaches in their community.

UTILITIES

This stakeholder can play a lead role by creating a energy coach program and advertising their services on their platforms.

Best practice **in practice**

BetterHomesBC Energy Coaches Provided by City Green Solutions

The Energy Coach service provides easy to navigate self-serve website tools, including a home energy incentives and rebates search tool, resources to learn about energy efficiency products and services, and a regularly updated frequently asked questions series. Knowledgeable program staff are available by phone or email to answer consumer questions at all stages of their home energy improvement project (City Green Solutions, 2019).

The Energy Coach service is available to help homeowners improve the energy efficiency of their homes, reduce their home energy costs, improve home comfort, and reduce the environmental footprint of their home.

2

BARRIERS OVERCOME

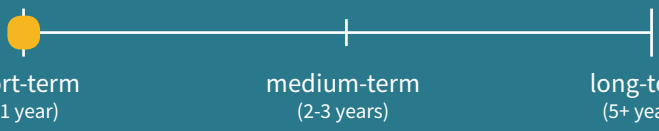
- Trust barriers related to misinformation
- Complexity barriers related to undertaking retrofits

Marketing Techniques and Approaches

Retrofit information sessions

Retrofit information sessions are public events that inform residents on retrofit benefits and educate people on energy savings associated with retrofits. Information sessions can educate residents and reduce barriers around misinformation and complexity or retrofits.

Implementation



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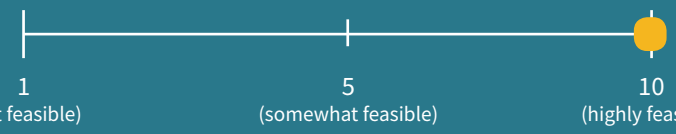


Role of Stakeholders
What activities can stakeholders engage in to accelerate residential retrofits?

- ▢ support role
- ▢ lead role

GOVERNMENT

This stakeholder can play a lead role by organizing retrofit information sessions and advertising them to residents.

INDUSTRY

This stakeholder can play a support role by informing prospective customers on upcoming retrofit information sessions in their community.

UTILITIES

Utilities may educate customers on upcoming retrofit information sessions in their community.

Best practice **in practice**

Nelson Ecosave & Pender Island Bulk Buys Information Sessions

The Nelson Ecosave program holds various information sessions across the region, and a yearly green home conference, to inform residents on the benefits of retrofits. Sessions include local government representatives, local contractors, and loan providers. Information sessions can overcome barriers related to trust and complexities of undertaking a retrofit (Regional Energy Efficiency Program, 2019).

Pender Island Bulk Buys also held information sessions. These sessions were well attended in by the local communities and gave information on clean energy heat pumps and details of upcoming bulk buys. As a result of this outreach, hundreds of heat pumps have been installed on Pender Island.

2

BARRIERS OVERCOME

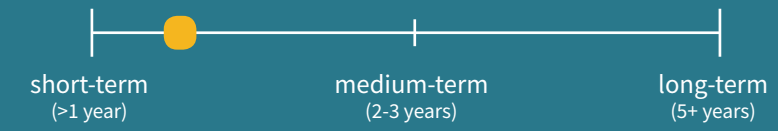
- Trust barriers related to contractors and sources of information
- Complexity barriers related to undertaking retrofits

Marketing Techniques and Approaches

Fossil fuel heated homes

Targeting of fossil fuel heated homes are campaigns specifically designed to retrofit fossil fuel heated homes to renewable sources. Targeting fossil fuel heating homes present the greatest opportunity to reduce GHG emissions.

Implementation



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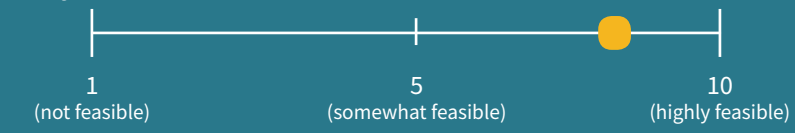


Role of Stakeholders
What activities can stakeholders engage in to accelerate residential retrofits?

- ▢ support role
- ▢ lead role

GOVERNMENT

This stakeholder can play a lead role by creating a retrofit program that target fossil fuel heated homes.

INDUSTRY

Industry can play a support role by educating customers of the program and its benefits.

UTILITIES

Utilities may play a support role by educating customers of the program and its benefits.

Best practice **in practice**

Oil to Heat Pump Incentive Program

The Oil to Heat Pump Incentive Program, administered by City Green Solutions in Victoria, with funding provided by the Innovative Clean (ICE) Fund, was a Provincial program designed to support the adoption of heat pumps from oil heating systems. The program ran 3 years from September 1, 2015 to September 18th, 2018, or until funding for the program ran out (Oil to Heat Pump Incentive Program, 2019). The program goals were to maximize GHG reductions per home and to support homeowners to do multiple home energy upgrades. Although the program has closed for the time being, it achieved 472 installations of heat pumps with $826,000 in rebates contributed by the province and another $92,550 in rebate top-ups from local governments. This program successfully combined provincial and local government funds to achieve heat pump adoption in communities across BC. The program resulted in average GHG reductions per home of 7.25 tonnes per year.

2

BARRIERS OVERCOME

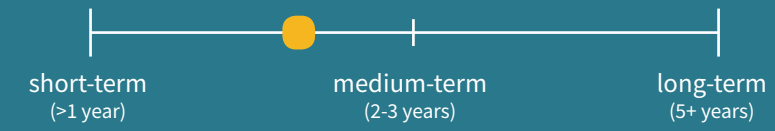
- Trust barriers related to misinformation
- Complexity barriers related to undertaking retrofits

Industry role in local government models

Manufacturers training contractors

Manufacturers training contractors are a industry led program where manufactures will train contractors on the installation of their products. This initiative builds trust between manufacturers, contractors, and customers around installation of retrofit technology.

Implementation



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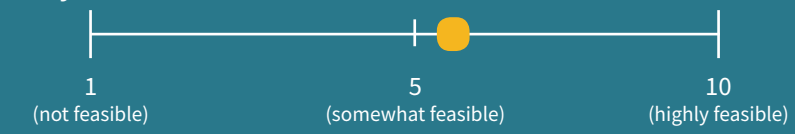


Role of Stakeholders
What activities can stakeholders engage in to accelerate residential retrofits?

- ☐ support role
- ☑ lead role

GOVERNMENT

This stakeholder can play a support role by informing residents of contractors who use the program.

INDUSTRY

This stakeholder can play a lead role by creating a training program that incorporates manufactures in training of contractors.

UTILITIES

Utilities may educate customers of contractors who use the program.

Best practice **in practice**

Viessman & Fujitsu On-site Training

In Germany, Viessman manufacturers require that installers are accompanied by a Viessman engineer on their first 6 installations (Viessman Academy, 2019). For Viessman, it ensures the quality of the installation and helps their product achieve a reputation as a high performing heat pump. For the installer, the additional cost is balanced by the increased confidence the end-user has in the performance of the heat pump and better prospects for future sales.

Similarly, Fujitsu provides product training through hands-on lessons with actual equipment (not simulations) in typical application scenarios in Canada and the US. Courses are delivered by certified instructors, and are available in-house. Product training classes focus on equipment planning and engineering, turn-up, test, and maintenance

1

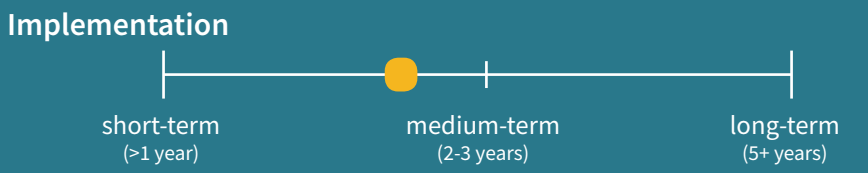
BARRIERS OVERCOME

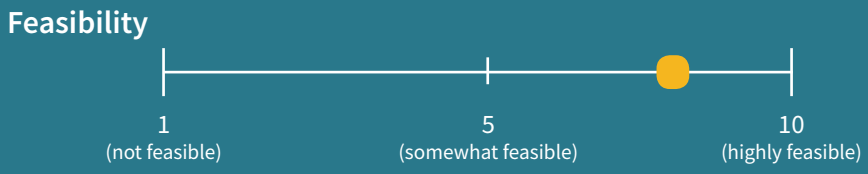
- Trust barriers related to contractors and sources of information

Industry role in local government models

Heat pump associations

Heat Pump Associations are important entities that advocate for the use of heat pumps and ensure their fair treatment in relation to other technologies. Additionally, they can be sources of information for residents wishing to use heat pumps.





Role of Stakeholders
What activities can stakeholders engage in to accelerate residential retrofits?

- ▢ support role
- ▢ lead role

GOVERNMENT

This stakeholder can play a lead role by advocating for the creation of the association and working with industry on policy.

INDUSTRY

This stakeholder can play a lead role by creating a heat pump association, advocating for policy, and educating consumers.

UTILITIES

Utilities may educate customers on heat pump associations in their communities.

Best practice **in practice**

UK Heat Pump Association advocating for Policy Change & BC Heat Pump Coalition

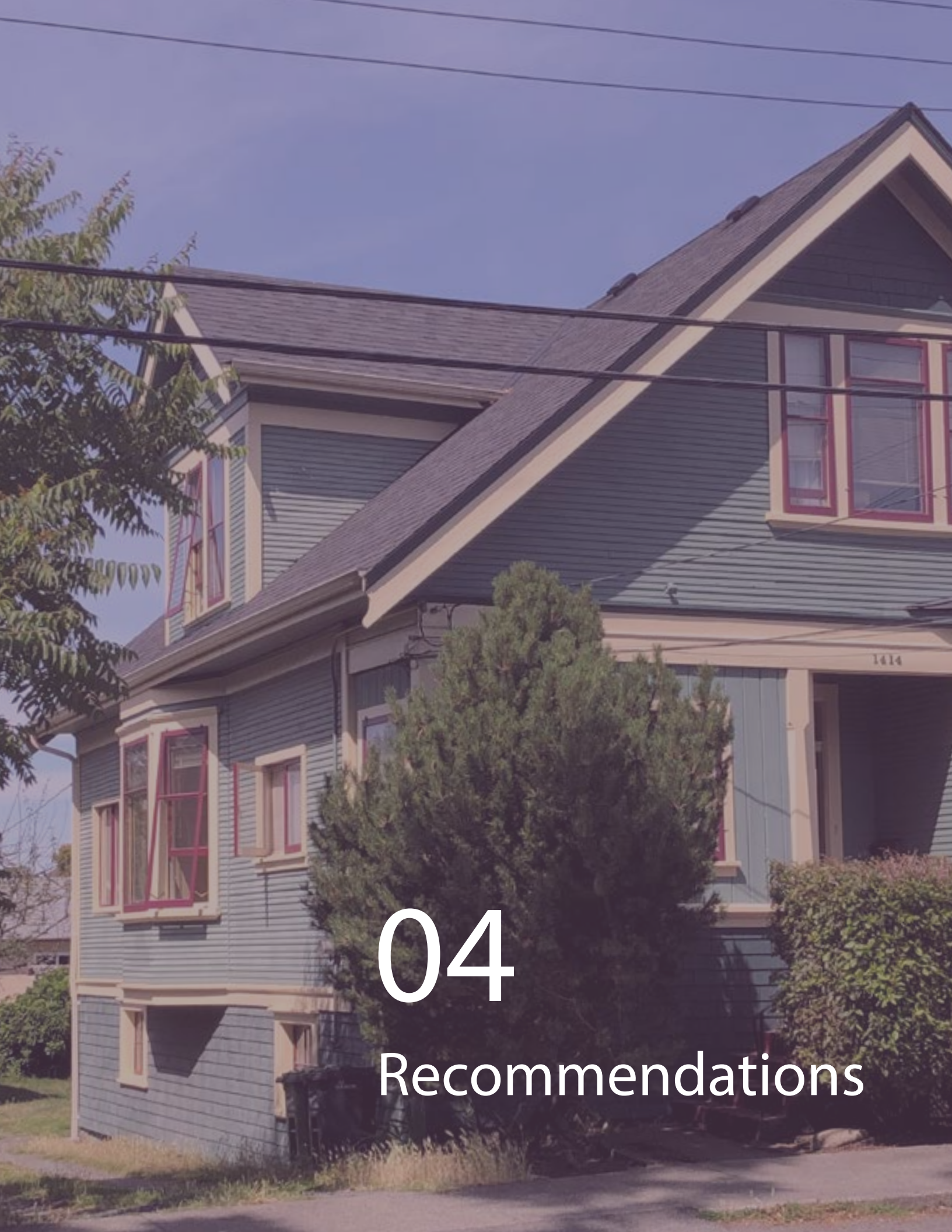
The UK Heat Pump Association (HPA) and British Electrotechnical and Allied Manufactures Associations (BEAMA) have been instrumental in the UK in shaping future regulations affecting heat pumps. This has been achieved through lobbying for changes to the Standard Assessment Procedure (SAP), UK's version for assessing the energy and environmental performance of buildings. The UK HPA and BEAMA campaigned for the inclusion of air source heat pumps in the UK governments renewable heat incentive scheme, the RHI, to ensure fair treatment in relation to other renewable technologies (UK Heat Pump Association, 2019).

In 2019, the BC Heat Pump Coalition was formed and has members from industry and government. The Coalition has the potential to undertake some of the advocacy and work to support the acceleration of heat pumps.

2

BARRIERS OVERCOME

- Trust barriers related to contractors and sources of information
- Complexity barriers related to undertaking retrofits



04
Recommendations

LOCAL GOVERNMENTS

Accelerating residential retrofits requires collaboration between multiple levels of government, industry, and utilities.

- Governments should continue to work with utilities and contractors to provide municipal top-ups and other financial incentives to create a strong financial proposition for undertaking retrofits;
- Work with governments, industry, and utilities to create an objective source of information and a campaign to inform residents on the technology and processes related to undertaking a retrofit to reduce barriers around trust and complexity; and
- Work with industry to package retrofits with good, better, best options to reduce barriers with complexity, trust, costs, and time.

Accelerating residential retrofits requires a campaign focused on GHG reduction and environmental stewardship.

- A campaign focused on GHG reduction will shift the conversation away from costs savings and competition with natural gas; and
- Focus any financial incentives on the upfront cost of the residential retrofit rather than the long-term cost savings.

Accelerating residential retrofits requires a marketing campaign and dissemination through community based social marketing

- Residents continue to hold their community members as a trusted source of information and activating community based social marketing is an important step to building trust with residents;
- Target neighbours of residents who have performed retrofits achieves higher uptake; and
- Communities and municipalities may have their own unique barriers to accelerating residential retrofits; understanding these barriers are important step for designing any retrofit program or marketing campaign.

INDUSTRY

Accelerating residential retrofits requires collaboration between multiple levels of government, industry, and utilities

- Work with governments, industry, and utilities to create an objective source of information and a campaign to inform residents on the technology and processes related to undertaking a retrofit to reduce barriers of trust and complexity;
- Work with government to package retrofits with good, better, best options to reduce barriers with complexity, trust, costs, and time;
- Work towards a certified list of contractors with government for undertaking retrofits to reduce trust barriers with customers; and
- Create a Heat Pump Association that will advocate for the industry, policy, and to ensure that industry is being considered in decision-making.

Accelerating residential retrofits requires consideration of the future market and capacity

- Any retrofit program or campaign with increase demand for services and ensuring their is proper capacity for contractors will be important for meeting future demand;
- Ensure education programs are in place for the training of labour and resources; and
- Continue to work on building trust within the community as trusted sources of information.

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Appendix - Current & Past Retrofit Programs

BRITISH COLUMBIA

CleanBC - Better Homes

Status: Ongoing

CleanBC- Better Homes (betterhomesbc.ca) is British Columbia's current online hub for homeowners and businesses wishing to access objective information, rebates, and support to reduce energy use in new and existing homes and buildings. The platform is funded by the Province of BC and Government of Canada under the Low Carbon Economy Leadership Fund and rebates that are administered by BC Hydro, Fortis BC, and BC Housing. The online platform features:

- A simple rebate search tool where you can find rebates specific to your area;
- A single rebate application for all available rebates;
- Information on energy efficient upgrades and accessing rebates;
- Free energy coaching services including phone and email hotline staffed by energy coaching specialists;
- Search tool for EnerGuide Rating System energy advisors for home renovations; and
- Contractor directories for registered contractors.

CleanBC offers users an easy to use information platform where consumers can learn about the benefits of different home energy systems and be connected directly to Energy Coaches to get the most of their residential retrofits.

Local governments in BC offer top-up rebates, called municipal top-ups, in additional to rebates from CleanBC Better Homes and Home Renovation Program. Two top-up options are available. One $150 top-up through a EnerGuide Home Evaluation if participants complete a pre- and post-retrofit home evaluation. The second offer is for $350 or $2000 to convert to electrical heat pump from a fossil fuel heating system. Offered, sometimes in limited time, top-ups incentivize heat pump adoption through cost savings in select communities.

Rebate Top-ups in Participating BC Communities (as of July, 2019)

Municipality	Energuide Home Evaluation Top-up	Fossil Fuel to Heat Pump Top-up
City of Vancouver	$150	$2,000
Capital Regional District		$350
City of Victoria*		$350
District of Saanich*		$350
City of Kamloops	$150	
City of Richmond	$150	
City of Campbell River	$150	$2,000
Comox Valley Regional District	$150	$350
City of North Vancouver	$150	$350
Resort Municipality of Whistler		$2,000
City of Powell River		$350

*Can be combined with the Capital Regional District top-ups

City of Vancouver Big Moves

Status: Ongoing

In January 2019, Vancouver declared a Climate Emergency. As a result of the declaration, City staff prepared the Climate Emergency Response which details 6 'Big Moves' to combat climate change. Big Move #4 contains the goal that by 2025, all space and water heating in new buildings and those replaced in existing buildings would be zero emissions. It is expected that heat pumps will be a important solution in this transition. A Retrofit Strategy is currently in the works, but it is anticipated that the Strategy will include sustained incentives, and investments in industry capacity-building to support voluntary adoption of zero emission space and water heating. The City also provides Green Home Remodelling Guides.

The City of Vancouver is leading by example in heat pump adoption by converting to a heat pump at their City Hall. Although a commercial heat pump, the installation of the heat pump was followed by a news conference and tour of the new facility in an attempt to raise awareness of heat pumps and their benefits. The air-source heat pump at City Hall will reduce carbon pollution from City Hall by 34 per cent, and save $20,000 in heating costs annually. Retrofits like the heat pump at Vancouver City Hall bring building energy and carbon performance up to the standards of construction under the 'Big Moves'.

Cool North Shore

Status: Ongoing

Cool Neighbourhoods is a grassroots, citizen-led campaign supported by the City of North Vancouver, and District of North Vancouver and West Vancouver. The campaign raises awareness on energy efficiency, and engages the local Fire Departments to do thermal imaging scans (Cool North Shore, 2019). Incentives included free thermal imaging visits, tubes of caulking, and free outlet insulation. The programs success comes from its high general awareness in the community. While the campaign is ongoing, there have been challenges in funding and has fallen short of its participation targets.

Energy Conservation Assistance Program (ECAP)

Status: Ongoing

The ECAP program from BC Hydro is available to low-income BC Hydro or City of New Westminster account holders living in a detached home, townhouse, duplex or manufactured/mobile home (BC Hydro, 2019). Under the program, households are entitled to a free home energy evaluation visit and installation of energy-saving products such as light bulbs, shower heads, and weatherstripping. Additionally, some participants qualify for a ENERGY STAR® refrigerator, and insulation in their walls, attic, and crawlspaces. The ECAP program continues to provide energy efficient solutions for low-income households.

Energy Diet Program

Status: Expired

Energy Diets were retrofit programs created by the Community Energy Association, and funded through various partners, to lower energy bills and address efficiency in the home. The programs featured subsidized pre- evaluations (sometimes free evaluations for low-income), provided energy efficient kits for homes that received evaluations, information sessions, financing through local credit

Vancouver City Hall heat pump, City of Vancouver

The Energy Diets were used in the following areas of the province:

- Rossland;
- Kootenay;
- Okanagan;
- East Kootenay.

Each Energy Diet program had different features and were tailored to meet the needs of the municipality or area. The program had success with uptake and overall retrofits, however, there were widespread confusion on the rebate process and overall financial incentives available. Additionally, there were some issues from residents about undertaking retrofits in the winter.

Energy Save New West

Status: Ongoing

Energy Save is New Westminster's community energy program designed to improve the energy efficiency and reduce GHG emissions in homes. The focus of the program is to deliver a better experience that makes it easier for residents to improve energy performance (EnergySaveNewWest, 2019).Energy Save takes residents through five steps in an attempt to reduce complexities surrounding retrofit and achieve higher rates of retrofits.

The program provides for existing homes, new homes, multi-unit residential units, and businesses. The program allows residents access to energy assessments, energy upgrades, and utility or government incentives. The program website features an online map to see which homes, units, and businesses have participated in the program. Energy Save was launched in 2013 and is one of the longest running programs. New Westminster has its own utility in New Westminster Electrical Utility which allows for close community collaboration. Energy Save continues to be a program to follow.

Metro Vancouver RateOurHome.ca

Status: Ongoing

Metro Vancouver understands that tacking GHG emissions from homes is a critical part of the fight against climate change and has created the RateOurHomes.ca pilot program to create awareness.. In Metro Vancouver, 40% of GHG emissions are from buildings. Their goal is to reduce emissions by 33% by 2020. The program uses EnerGuide ratings and volunteer home labelling for Metro Vancouver residents. After a visit from a Energy Advisor, a EnerGuide rating is issued along with recommendation for improvements that are customized to each home. The resident then has the option of having their home displayed on the mapping feature of RateOurHome.ca. The program has received limited requests for homes to be displayed on the website.

Oil to Heat Pump Incentive Program

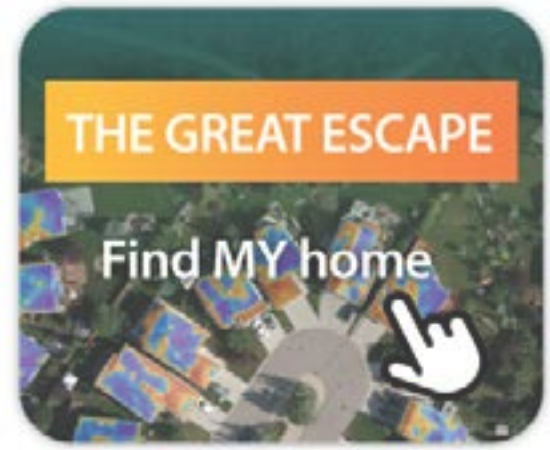
Status: Expired

The Oil to Heat Pump Incentive Program, administered by City Green Solutions in Victoria, with funding provided by the Innovative Clean (ICE) Fund, was a provincial program designed to support the adoption of heat pumps from oil heating systems. The program ran for 3 years from September 2015, to September 2018.. Although the program has closed for the time being, it achieved 472 installations of heat pumps with $826,000 in rebates contributed by the province and another $92,550 in rebate top ups from local governments.

Regional Energy Efficiency Program (REEP) & Nelson Ecosave

Status: Ongoing

The Regional District of Central Kootenay developed the REEP program to reduce greenhouse gas emissions in home retrofits and new builds. The Ecosave Program was designed specifically for retrofits and is available to any Nelson Hydro customer. The program provides a reduced home evaluation from a Certified Energy Advisor, rebates through CleanBC, and on-bill financing through the City of Nelson. Other program features include retrofit information sessions held across the region, and online tools such as 'the Great Escape' where residents can see how much heat is being lost through their home. As of this year, the Ecosave Program is expanding into the entire Kootenay region.



'The Great Escape', Nelson Ecosave Program

Solar Colwood

Status: Expired

The Solar Colwood Project was design to encourage entire community energy reduction and adoption of renewable energy. The program featured financial incentives, marketing and promotion, free water saving kits, information sessions and home tours, and financing. The technologies available under the program included solar hot water, ductless heat pumps, solar photo-voltaic, electric vehicle charging stations, and smart home systems to monitor real time energy consumption. The campaign was regarded as highly successful from an outreach standpoint and won several awards. However, the program largely failed to meet its targets around solar hot water conversions and is no longer being offered.

NORTH AMERICA

Fort Collins Efficiency Works

Status: Ongoing

The Efficiency Works Home Program offers a variety of options for homeowners to retrofit their residences. Consumers can choose from two different paths for retrofits; the Streamlined Path and Standard Path. In the Streamlined Path, homeowners are offered different package options (good, better, best) for efficiency improvements. Certain Efficiency Works service providers have agreed to standard rates and pricing for these improvements. In the Standard Path, homeowners review their assessment with a Home Efficiency Advisor, choose which improvements they want to complete, receive from Efficiency Works service providers, and select a provider after bids have been reviewed. Rebates are offered on:

- Air Sealing;
- Insulation;
- Windows;
- Heat Pumps; and
- Ductless mini-splits.

All rebates must be installed by a participating service provider. Homeowner installed improvements do not qualify for rebates.

Greenovate Boston

Status: Ongoing

Greenovate is the City of Boston's comprehensive energy efficiency and outreach program to implement the City's Climate Action Plan. The Greenovate program works with the broader community to reduce GHG emissions 25 per cent by 2020. For the residential sector, the Community Choice Energy Program, through municipal aggregation, combines the buying power of entire communities to buy cheaper electricity and larger amounts of renewable energy (Boston.gov, 2019).

North East Energy Partnership (NEEP)

Status: Ongoing

NEEP was founded in 1996 as a non-profit aimed at accelerating energy efficiency in the Northeast and Mid-Atlantic States (NEEP , 2019). It is one of the six Regional Energy Efficiency Organizations (REEOs) funded, in part, by the US Department of Energy to support state efficiency policies and programs. In 2019, NEEP is administering the Efficient, Resilient Buildings and Communities program which contains:

- Efficient, Resilient Community Pathways and Resources: Best practice guidance, peer information exchange, and technical assistance to support the rapid growth of community initiatives in Northeast states to advance resilient, energy efficient, low-carbon public buildings and communities;
- Building Energy Codes and Benchmarking: Best practice resources and technical assistance to states and communities to save energy, reduce costs, decrease emissions, improve resiliency, and strengthen workforce development through building energy code adoption, enforcement, compliance benchmarking, and home energy labeling; and
- Home Energy Labeling Information eXchange (HELIX): Final year of a three year US. DOE-funded initiative to automate the availability of home energy scores and ratings for use in residential real estate listings, and to educate real estate professionals and appraisers on the value proposition of home energy information that distinguish energy efficient, clean energy homes.

The Regional Energy Efficiency Organizations in the US play a vital role in accelerating residential retrofits in the US.

Nova Scotia Power

Status: Ongoing

Nova Scotia Power has employed the 'I Love My Heat Pump' program to educate consumers on the benefits of heat pumps. The online site serves as a platform for a heat pump savings calculator, list of frequently asked question, list of certified contractors, heat pump operating tips, and maintenance instructions. These functions

in addition to education, Nova Scotia Power offers promotions from Efficiency Nova Scotia and contractors around the province. Promotions can range from $300 to $1700 depending on the model of heat pump. Nova Scotia Power also offers on-bill financing and a lease to own program. The lease to own program can be for three to ten years at 7.0% interest. The lease is also transferable to an approved buyer in the event of the sale of the home. Financing is charged to individuals attached to the Nova Scotia Power account.

Renovate America Home Energy Renovation Opportunity (HERO)

Status: Ongoing

The HERO program is an energy efficient financing program in the US, currently available to residents in California, Missouri, and Florida. The HERO program is a Property Assessed Clean Energy (PACE) Program and provides financing for energy efficient, water efficient, and renewable energy products to homes and businesses. Financing provided by the program is repaid through annual property tax payments. Under this program, in the event of the home being sold, financing is passed on to the new owner. The HERO Program has funded work in over 100,000 homes.

INTERNATIONAL

Belgium Wallonia Ecopack

Status: Ongoing

Households willing to improve the energy performance of their homes in Wallonia can benefit from the Ecopack, which consists of a zero percent interest loan for retrofits (GmbH, 2019). The eligible retrofits include the installation of renewable energy device such as heat pumps. The zero per cent interest loan is granted for the construction of at least one energy-saving retrofit. The loanable amount lies between € 1,000 and € 30,000 and is repayable over up to 15 years. A credit committee determines the repayment term depending on the financial situation of the applicant. The Walloon Housing Fund for large families (FLW) and the Walloon Social Credit Corporation (SWCS) were administered by the Walloon Government to grant the zero percent loans. Having access to interest free loans for home retrofits reduces the financial burden of converting to a heat pump, incentivizing consumers to switch to heat pumps.

Danish Energy Agency Subsidies

Status: Expired, returning in 2020

The Danish Energy Agreement was introduced in 2012 and set the route for the Danish government to achieve 30 per cent of renewable energy into the mix of energy. As part of a long-term strategy to increase total heat pump installations from 25,000 in 2011 to 200,000 in 2020, the Danish Energy Agency is undertaking a wide-ranging promotional campaign (IEA, 2019). The overall program consists of a number of elements including:

- Subsidies;
- Heat pump trials;
- A Heat pump promotion and information dissemination campaign.

An important element of the program encompasses active marketing, awareness raising, and education initiatives for installers. This program demonstrated the important role for marketing and promotion from an objective source as part of a long-term integrated energy strategy. Under the District Heating Subsidies, the Danish market has become almost completely saturated with most installation already carried out. Currently, there are not subsides available for any district heating projects. However, it is expected by 2020 there will be additional funding available.

France Électricité de France (EDF) Subsidies

Status: Ongoing

Frances EDF offers subsidies to encourage residents to switch from oil heating to renewable sources. It is estimated that three million households in France are currently using oil heating. Currently, the French state offers 3,000 euros to low-income families and 2,000 euros for other families in addition to subsides already offered by the EDF for heat pump installations.

Japan's Eco-Cute

Status: Ongoing

The Japanese heat pump revolution came at the hand of the Eco-Cute hot water heat pump with over 4 million Eco-Cutes having been installed. The Eco-Cute branding is shared among different manufactures leading to a consensus among consumers that these products share energy efficiency. Although this initiative was manufacturer led, the Japanese government has stepped in the past decade and has started to introduce incentives to homeowners to purchase heat pump technology. Japan, unlike many of countries in the world, do not require new buildings to be built to any energy efficient standard. These incentives are hoped to achieve the market going toward more energy efficient homes in Japan.

Netherlands Gas-less Neighbourhoods

Status: Ongoing

The Netherlands, a long-time major gas producer in which virtually all houses are connected to the gas grid, will remove gas for heating and cooking for all residential buildings. The first steps are coming from 31 local governments including Amsterdam, Rotterdam, and Utrecht who have signed up for the Gas-less Neighbourhoods initiative. While currently every house or residence is legally entitled to a connection to the gas grid, the law will be annulled and replaced by a 'right to a heating connection'. New houses will not be connected to the gas grid in any case. The 7 million existing homes will be gradually disconnected from the gas grid.

From 2017 and on, 170,000 houses should be disconnected every year. Local authorities will play a key role in this process. They will decide for each neighbourhood, block, or even individual house what the best alternative heating source is. To incentivize energy efficiency, agreements have been made with the construction and engineering sector to see that 300,000 existing home and other buildings will be made more energy efficient each year. Additionally, The Energy Savings Fund for the Rental Sector (FEH) offers low-interest loans for landlords to make their rental properties more energy efficient. Other inventive schemes from local governments for homeowners are in the works.

The Netherlands also has a Heat Pump City. Etten Leur, located close to Breda in the southwest of the Netherlands, introduced their first policy on sustainable building and energy savings as far back as the 1980s, and commenced their first heat pump project in 2002. The initial demonstration project comprised 20 buildings and a school connected to ground source heat pump. Today, close to 1,000 dwellings have either already been constructed or are currently under construction, most of which are served with individual closed loop ground source heat pumps. In addition to residential buildings, they also include the new city hall, cultural centre. A large part of the system has been in operation now for five years and the system has performed well and stood the test of a prolonged cold winter. The success of Etten Leur illustrates the applicability of heat pumps in meeting the demanding heating and cooling needs of large urban centres and contributing to a greener, more energy efficient future.

New Zealand Retrofit Your Home & Warmer Kiwi Homes

Status: Ongoing

The Retrofit Your Home Program from the Auckland City Council gives financial assistance to homeowners wishing to undertake residential retrofits. Funding for insulation and heat pumps among other technologies are allowed under the loan. If the customer sells their house with outstanding amount owing on their retrofit, they must tell the buyer about the existence of the targeted rate, include a written provision in any sale agreement, and notify the Retrofit Your Home program.

Similar schemes from across New Zealand can be found in other Councils such as:

- Bay of Plenty Regional Council;
- Clutha District Council;
- Dunedin City Council;
- Environment Canterbury Regional Council;
- Greater Wellington Regional Council;
- Hawke's Bay Regional Council;
- Invercargill City Council;
- Marlborough District Council;
- New Plymouth District Council; and
- South Taranaki District Council.

Etten Leur, Netherlands (EHPA)

New Zealand also employs a nation-wide program called Warmer Kiwi Homes. This four-year Government program from the Energy Efficiency and Conservation Authority (EECA) offers grants to cover two-thirds of the cost of ceiling and underfloor installation. Additional contributions from community organization can make of the cost to homeowners as low as possible in many areas.

Sustainable Energy Authority of Ireland & Heat Pump Association of Ireland

Status: Ongoing

SEAI is Ireland's national sustainable energy authority. The Authority works with householders, businesses, communities, and government to create a cleaner energy future. By 2030 SEAI aims to cut 40% of GHGs (from 1990 levels), have a 27% share of renewable energy, and a 27% improvement in energy efficiency. These goals are in line with the Paris Agreement. The SEAI offers grants on insulation, heat pump systems, heating controls, solar water heating, solar electricity, and deep energy retrofits.

SEAI publishes a quarterly fuel cost comparison, which compares the costs and efficiencies of various space heating fuels. The initiative followed lobbying by the Heat Pump Association of Ireland, to enable customers to be informed, from an objective source, of the cost advantages of heat pumps. The Heat Pump Association of Ireland is the voice of the heat pump industry in Ireland and plays an important role of advocating for policy change that benefit the consumer and industry.

Sweden's Energy Efficient Tax Credits

Status: Ongoing

Sweden was an early adopter of heat pumps in Europe and the World. To encourage heat pump adoption, the federal tax authority of Sweden granted the installation or replacement of heat pumps a tax reduction. The maximum amount that would be reduced can either be the same amount the buyer has paid as it relates the retrofit, or three-sevenths of the amount the buyer has paid if it related to other domestic work. Tax reductions are the main mechanism that has led to early and prolonged adoption of heat pumps in Sweden.

Switzerland Heat Pump Tariffs

Status: Ongoing

In Switzerland, heat pumps make up 85% of the total installed thermal capacity. The main stimulus for renewable energy in Switzerland is the feed-in-tariff scheme by the Swiss Government. The tariff provides heat pump users with substantially less electricity costs compared to other sources of heating. This incentive, couple with a robust heat pump marketing and proportion in the 1980's, allowed Switzerland to become one of the world leaders in heat pump adoption.

UK Renewable Heat Incentive (RHI) & UK Heat Pump Association

Status: Ongoing

The Domestic RHI is the UK government financial incentive to promote the use of renewable heat to achieve the UK in reducing carbon emissions and meet its renewable energy targets. By joining the scheme and comply with the rules, participants will receive payments every three months for seven years to assist in reimbursing some of the cost of installation. The eligible renewable heating system types for the RHI are biomass only boilers and biomass pellet stoves, air source heat pumps, ground source heat pumps, and solar thermal panels. Additionally, the make and model of any heating system must meet specific technical requirements. Pre- and post assessment must also be completed, and the participant must obtain an energy performance certificate to accurately reflect information of their home. Payments to participants are based on their property's annual heat demand, or the relevant heat demand limits. In nearly 4 years, only 60,000 renewable appliances were installed compared to 6.2 million gas boilers. As a result, the Department has had to cut back its expectation of how much renewable heat will be produced by the scheme.

The UK Heat Pump Association (HPA) is the voice of the heat pump industry in the UK. They are responsible for lobbying for policy changes that have been instrumental in the UK in shaping future regulations affecting heat pumps. Heat pump associations, which are widespread in European markets, are important for shaping policy and advocating for industry and government collaboration.

Viessman Manufacturer Training

Status: Ongoing

In Germany, Viessman requires that installers are accompanied by a Viessman engineer on their first 6 installations. For Viessman, it ensures the quality of the installation and helps their product achieve a reputation as a high performing heat pump. For the installer, the additional cost is balanced by the increased confidence the end-user has in the performance of the heat pump and better prospects for future sales.