

GMF number	GMF17592
Name of lead applicant (municipality or other partner)	City of Burlington
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Date of the report	March 2022

1. Introduction

- a) **Who was involved in doing the Feasibility Study, and what are their affiliations? Please include name, title and contact information. Those involved could include municipal staff, engineers and other consultants, a representative from a non-governmental organization, and others.**

The Better Homes Burlington Feasibility Study and Program Design project was led by staff from the Centre for Climate Change Management at Mohawk College with support from the Bay Area Climate Change Council. The project was overseen by Lynn Robichaud, Manager of Environmental Sustainability, for the City of Burlington.

- b) Emily Vis, Project Lead, Centre for Climate Change Management. Email: Emily.vis2@mohawk.ca
- c) Adrienne Madden, Project Lead, Centre for Climate Change Management. Email: adrienne.madden@mohawkcollege.ca
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Guidance was provided by the following staff from the City:

- a) Allan Magi, Executive Director, Environment, Infrastructure and Community Services. Email: allan.magi@burlington.ca
- b) Ellen Chen, Financial Analyst, Finance Department. Email: ellen.chen@burlington.ca
- c) Reena Bajwa, Coordinator of Financial Strategies and Business Consulting, Finance Department. Email: reena.bajwa@burlington.ca

2. The Feasibility Study

a) Describe the process that you undertook to make this feasibility study a reality, from concept, to council approval, to RFP, to final deliverable.

Burlington City Council approved the community Climate Action Plan in 2020 which identified the development of a home energy efficiency retrofit program as a key program for Burlington to become a net carbon neutral community by 2050. Subsequently, city staff prepared two council reports; the first as an information report ([EICS-06-20](#)) to educate council on home energy efficiency retrofit (HERO) program measures and a second report ([EICS-18-20](#)) responding to a council direction to report back with a pilot program. In September 2020, staff recommended to work in partnership with the Centre for Climate Change Management at Mohawk College to develop a HERO program. Council approved a budget and strongly encouraged staff to apply for funding from the Federation of Canadian Municipalities' (FCM) Community Efficiency Fund (CEF) to support the project.

Staff worked with the Centre for Climate Change Management (CCCM) at Mohawk College on a partnership agreement outlining the deliverables and a budget for the project. CCCM staff assisted city staff in completing the initial Expression of Interest for the FCM CEF funding and the final application.

The study process involved a literature and best practices review; extensive stakeholder engagement; survey research with homeowners; analyses of energy and housing data; a cost benefit analysis and assessment of the local market context.

The final report ([EICS-01-22](#)) was presented to the Environment, Infrastructure and Community Services Committee on March 3rd, 2022 and Council on March 22nd, 2022.

b) What were the objectives of the Feasibility Study (what was it seeking to determine)?

The objectives of the study was to develop a HERO program that would:

- Identify and support upgrades with high emission reduction potential
- Manage (minimize) costs to reduce emissions
- Ensure equity to address energy poverty
- Promote transparency and consumer choice
- Create market confidence for home upgrades

c) What approach (or methodology) was used in the Feasibility Study to meet these objectives?

- Stakeholders were engaged to gather feedback from key organizations about how to develop programs, program feedback and lessons learned.
- Homeowner feedback to identify homeowner motivators, barriers and knowledge regarding home upgrades and climate change was completed through a telephone survey and an online survey on www.getinvolvedburlington.ca.
- Housing data was assessed to understand the city's hotspots regarding utility use, utility pricing, emissions, energy poverty, etc.

- Policy analyses was undertaken to assess best practices in other jurisdictions and completion of a cost benefit assessment.

d) Please describe any public consultations conducted as part of the Feasibility Study and their impact on the Study.

There was extensive stakeholder engagement undertaken and coordinated between the CCCM and BACCC (Bay Area Climate Change Council), working jointly and sharing information. Over 40 groups, experts, businesses, program delivery centres, utilities and other municipalities were interviewed. Key findings are summarized here:

1. A local municipal HERO program is feasible and desirable.
2. A municipal program should support a 'phased' approach to retrofits.
3. Education and outreach to homeowners and contractors is needed.
4. A HERO program can help homeowners future proof their homes.
5. A retrofit delivery centre will drive participation and positive outcomes for homeowners.

A total of 383 residents were surveyed (258 online on GetInvolvedBurlington.ca and 125 telesurveys), with approximately 78% of respondents living in a single detached home. The majority of respondents (98%) own their own home. Some key takeaways from the survey include:

- Home comfort is the most important decision-making factor, followed by cost saving on energy and utility bills.
- A large majority also say that being more eco-conscious is important.
- There was an even split between those comfortable spending less or more than \$15,000 – and 30% anticipating spending \$20,000 or more.
- It is most likely that those looking to upgrade their system will use incentive programs to finance this upgrade.
- Most will not require financing or a loan to do so, while one in five say they will very likely use a line of credit.
- Most importantly, respondents want to know their options and associated costs before upgrading.
- Understanding what incentives and rebates they may qualify for is second-most important, followed by understanding how much they will save on their utility bills.
- Environmental benefits are a secondary factor to cost /cost savings.

A social media campaign developed and delivered by BACCC engaged homeowners to help educate them on home energy efficiency measures, simple upgrades for homes, and how to understand a home energy audit. Monitoring and tracking the level of interest in these topics showed that there is a need to provide support and guidance to homeowners who are interested in improving home energy efficiency.

BACCC educational social media campaign results: (Table 8.2 in report, p 66)

	Reach*	Impressions**
Graphic Ads	62,092	175,008
Long Form Videos	38,276	46,767
Short Form Videos	43,900	74,990
TOTAL	121,314	296,765

*Reach is the number of people who saw the ad (unique view)

**Impressions are the number of total times that any ad content entered a person's screen (total views)

Although not specifically part of this project, three webinars were delivered by Humber College and sponsored by Enbridge Gas to engage homeowners on what is entailed in a home energy efficiency retrofit. The first two were open to both Hamilton and Burlington homeowners on November 30th, 2020 (am and pm) and the third was for Burlington homeowners (October 13th, 2021). Overall, a total of 79 Burlington residents participated in the webinars with positive feedback on the content.

3. Feasibility Study Findings and Recommendations

a) **What were the environmental findings related to the options explored in the Feasibility Study? Please provide quantitative results and summary tables of these results (or the page numbers from the Feasibility Study report).**

Home upgrade measures were assessed on the ability to reduce greenhouse gas emissions based on:

- Changes in energy sources before and after an upgrade.
- Useful years and cost of the upgrade.
- Emission changes and marginal abatement cost (i.e. the cost to reduce 1 kg of GHGs).
- Utility bill impacts.

The assessment was completed so as to ensure the resulting program did not result in supporting measures that would produce negligible GHG reductions. Table 5.2 in the document on pages 36/37 provides a breakdown of potential upgrades and CO₂e reduction potential:

Project CO ₂ e Reduction	
Upgrade Project	kg CO ₂ e
Fuel oil to heat pump full switch	-13,327
Gas furnace to heat pump full switch	-3,175
Fuel oil hybrid heat pump	-11,992
Gas furnace to hybrid heat pump	-2,857
Insulate exterior walls	-1,648
Heat pump water heater	-1,417
Electric water heater	-1,031
Upgrade furnace	-651

Tankless gas water heater	-541
Air sealing	-206
Insulate existing gas heater	-90
Insulate attic	-37
Upgrade window	-21
Replace door	-21

Table 5.4 on page 39 further summarizes the GHG savings through a heat pump replacement in a typical home (space heating only).

Heat Pump Type*	Heating Type	GHG reduced Annually (tCO ₂ e)
Full ASHP Conversion	Natural gas to electric	3.175 (77% total reduction)
Full ASHP Conversion	Heating oil to electric	4.775 (83% total reduction)
Hybrid ASHP	Natural gas to electric	2.8745 (69% reduction)
Hybrid ASHP	Heating oil to electric	4.306 (75% reduction) of household GHGs

- b) **What were the financial findings related to the options explored in the Feasibility Study (for example, results of a cost-benefit analysis, financial savings identified, and so on)? Please provide quantitative results and summary tables of these results (or the page numbers from the Feasibility Study report).**

An assessment was completed to determine whether those measures identified to provide meaningful GHG reductions for homeowners were already covered by other incentive programs. Refer to Table 5.3 on page 37 of the report.

Retrofit Project	Cost of Retrofit	Enbridge Home Efficiency Rebate Program		NRCAN Greener Homes Program*	
Heat pump for space heating	\$9,000	-	No	\$2,500 - 5,000	Yes
Insulate exterior walls	\$8,000	\$3,000	Yes	\$660 - 5,000	Yes
Heat pump water heater	\$2,500	-	No	\$1,000	Yes
Air sealing	\$1,000	\$100	Yes	\$550 - 1,000	Yes
Electric water heater	\$1,000	-	No	-	No
Energy audit	\$600	\$550	Yes	\$600	Yes
Energy audit	\$600	\$550	Yes	\$600	Yes

In reviewing other retrofit/financing programs, some lessons learned included:

- The City of Toronto program, that utilizes LICs, requires homeowners with a mortgage to acquire consent from their lender before participating in the program. This is a feature of the program because failing to obtain lender consent can be a breach of the covenants of a mortgage, which could result in a default or, at the very least, significant difficulty in renewing the mortgage. As a result of this program feature, about 50% of applicants to Toronto's LIC are rejected.

- The rejection largely rests on the lender's balance of equity. Many banks prefer to follow the 80/20 rule, meaning what the loan lenders are paying down is equivalent to 80% or less of the value of the home. If the LIC disturbs this equity ratio, banks are likely to reject the applicant.
- To avoid the 50% applicant rejection rate found in Toronto, lowering the cap on LIC loans per household is an option. A smaller LIC loan would have a smaller chance of disturbing the preferred equity balance of lenders, leading to a higher approval rate for applicants of varying wealth.
- Currently, the City of Toronto LIC funds retrofits up to \$75,000 in total. The average funding amount is \$26,000. Any cap placed on Burlington LICs should therefore be below this amount.
- The higher the cost of upgrades the lower expected participation. High upgrade costs, whether upfront or paid back through a loan are anticipated to be a deterrent as well as reducing interest from low- and moderate-income homeowners.

c) Based on the environmental and financial findings above, what does the Feasibility Study recommend?

The Feasibility report recommends that the Burlington program should initially cover air sealing services, the purchase and installation of heat pumps(s), and any electrical service upgrades required to install the technology. This combination should be required in tandem, unless proof of either can be provided. The city may want to allow air sealing to take place up to one month after the installation of a heat pump, as scheduling the two services may take time. Rationale for heat pumps include:

- The highest GHG reduction potential of any single upgrade project modelled, therefore reducing the number of upgrades required to see significant GHG reductions.
- Limited coverage by other incentive programs currently available.
- Low marginal abatement cost (i.e. high GHG reduction for the lowest cost).

When stacked with heat pump technology, air sealing bolsters heat pump performance further, and at minimal cost. Focusing on two cost effective upgrades makes the program more affordable, therefore supporting increased program uptake while keeping borrowing amounts low. Low upgrade amounts also stretch funding further to support a greater number of home upgrades.

Costs of Proposed Upgrades for Homeowners:

A significant driver for the recommendation of heat pumps and air sealing is the cost of both items compared to other home upgrade programs. The analysis points to an average cost for a heat pump installation of \$9,000, though costs can range between \$4,000 - \$20,000. The cost of heat pumps is dependent on:

- Manufacturer.
- Expected low temperatures for the area.
- Heat pump type, as air source heat pumps are more affordable versus ground source heat pumps.

- Any electrical updates required before installation.
- Home size.
- Ducted versus ductless options.
- Homes using heating oil require the oil tank to be removed.

Similarly, air sealing based on BACCC's estimation, is a low-cost upgrade at \$1,000, though pricing can range from between \$500 - \$1,500. Coupling air sealing with a heat pump will increase the heat pump's efficiency for a relatively low cost.

The final recommendations related to program financing included:

- Utilizing the local improvement charge (LIC) model as a financial incentive.
- Offering up to \$10,000 to cover air sealing services, the purchase and installation of heat pumps and any electrical service upgrades required to install the technology.
- Making the incentive available to those wishing to leverage more than one upgrade incentive program.
- A loan loss reserve with coverage of a minimum 5% of total loan base is recommended.

4. Lead Applicant's Next Steps

a) Taking the Feasibility Study's recommendations into account, what next steps do you as the municipality plan to take? What potential benefits or internal municipal improvements would result from these next steps?

Staff presented the final report to the Environment, Infrastructure and Community Services Committee (of Council) on March 3rd which included the following information:

A significant amount of work has been completed by the CCCM and BACCC to assess the feasibility and present program design elements for a home energy retrofit program in Burlington. These next steps outline the work necessary to develop the necessary measures and processes to support a small scale program providing a home energy efficiency interest-bearing loan and create a virtual delivery centre and education program to support Burlington residents. Many of these elements are available from those municipalities who have launched their programs and can share their lessons learned.

Delivering a small scale program will provide experience and lessons learned for city staff to assess and determine the necessary elements, resources, investment and partnership opportunities required to scale up the program which may involve a retrofit delivery centre.

2022

- Work with Finance and Legal staff to draft a by-law to support a home energy efficiency loan through the LIC mechanism. The offering of an LIC loan will require an online application, criteria for loans, a review and approval process and monitoring.
- Work with finance staff to develop and submit a business case for the 2023 budget to support:

- An FTE position to focus on delivering home energy efficiency loans to Burlington homeowners. This position would be responsible for the next steps to scale the program to be provided through a retrofit delivery centre, pursuing partnerships with other municipalities and 3rd party organizations;
- Funding to offer a limited number of energy efficiency loans to Burlington homeowners in 2023 and 2024 (maximum 50);
- Launch website and brand – market existing programs and opportunities to homeowners (one stop shop)
- Continue to run educational opportunities for residents (webinars, takeactionburlington.ca blog; special events, etc.) to engage them on options to improve energy efficiency and reduce the carbon footprint of their homes.

2023

Subject to budget approval (note that due to 2022 election, budget approval may be delayed which may push launch of program to mid 2023):

- Hire FTE position to administer a home energy efficiency loan for Burlington residents through the LIC mechanism, subject to approval of 2023 business case
- Report to council with recommended elements to support a LIC loan program for homeowners, including a by-law.
- Develop a communications strategy and update Better Homes Burlington webpage to announce home energy efficiency loan program
- Engage contracting community about setting up a list of qualified contractors as a resource for homeowners
- Submit business case to support LIC loans for 2024, based on experience in 2023 and potential base funding for an FCM application to support a scaled up program in Burlington.

A report to council is planned at the end of 2023 or early 2024 to provide an update on results of loan program, lessons learned and next steps for scaling up the program. Staff will include the status of programs by neighbouring municipalities and potential interest in partnering on a regional program and delivery centre.

The CCCM forecasts growth over a number of years in home energy efficiency, specifically related to the Burlington program air source heat pump conversions and leak sealing initiatives:

Program Year	Homes Upgraded per Year
1	20
2	40
3	100
4	150
5	200

Other residents may pursue other programs offered through Enbridge Gas and Natural Resources Canada for other energy efficiency measures. Participation data will be monitored for all programs to assess uptake and demand.

There are a number of variables that can impact the implementation of and scale of a program offered in Burlington that are unknown at the time of preparing this report, such as:

- Competing priorities to be assessed during the 2023 budget process and final outcome;
- Demand by residents for a city loan to finance their energy retrofit;
- Experience of residents participating in a financing program offered by the city;
- The extent of interest and commitment of other municipalities to partner with Burlington on a regional program;
- Changes in senior governments which can impact the type and range of energy efficiency programs offered at a federal and/or provincial level; and
- Interest by local contractor businesses to participate in and support the program.

The program to be developed in Burlington supporting the implementation of heat pumps and leak sealing is just one option available to residents, one of several tools in a toolbox. Through information on the Better Homes Burlington website and support from a program coordinator, assistance can be provided to local homeowners to understand options (retrofit measures and financing options including incentives) available to improve home energy efficiency.

5. Lessons Learned

In answering the questions in this section, please consider all aspects of undertaking the Study — from the initial planning through each essential task until the Final Study was prepared.

a) What would you recommend to other municipalities interested in doing a similar Feasibility Study? What would you do differently if you were to do this again?

- Touch base with municipalities/jurisdictions already delivering programs to learn about lessons learned and what to avoid.
- Engage the community and stakeholders as much as possible to understand local needs and appetite for a program.
- Work closely with finance staff as you need to have them on board to support the financing of a program, as well as senior management.

b) What barriers or challenges (if any) did you encounter in doing this Feasibility Study? How did you overcome them?

Likely the most significant challenge for us was responding to the concerns of some key members of our senior management team, questioning whether providing a loan for homeowners is a service that the municipality should be providing and how is it a priority? Staff attempted to address the concerns by providing information on how municipalities across Canada are working on similar initiatives, as well as highlighted the climate related policy directions set out by City Council in their Strategic Plan; Vision to Focus work plan; Climate Emergency Declaration; and the Climate Action Plan, including the target to become a net carbon neutral community by 2050. However, at the end of the day, Council is the final decision maker for the proposed program and were very supportive

when staff and representatives of the Centre for Climate Change Management presented the final Better Homes Burlington report.

6. Knowledge Sharing

- a) **Is there a website where more information about the Feasibility Study can be found? If so, please provide the relevant URL.**

A link to the report can be found here : www.burlington.ca/environment under Climate Change section. It is also posted on www.getinvolvedburlington.ca/climate-action-plan (under Document Library).

Direct URL link:

<https://burlingtonpublishing.escribemeetings.com/filestream.ashx?DocumentId=55278>

- b) **In addition to the Feasibility Study results, has your Feasibility Study led to other activities that could be of interest to another municipality (for example, a new policy for sustainable community development, a series of model by-laws, the design of a new operating practice, a manual on public consultation or a measurement tool to assess progress in moving toward greater sustainability)? If so, please list these outcomes, and include copies of the relevant documents (or website links).**

The Feasibility Report included recommendations to establish a Home Energy Efficiency Retrofit Delivery Centre which would assist homeowners and industry representatives in navigating requirements for home energy audits, available home energy efficiency measures and technologies, options for contractors, opportunities for incentives, and financing mechanisms. A business case to establish the Delivery Centre and to scale it up is available in the report. It is envisioned that in the future that other neighbouring municipalities could enter into partnerships for a regional Delivery Centre to share costs. As well, the Delivery Centre could expand its scope to offer advice and guidance related to resiliency measures, such as home flood management upgrades.

Initially the Delivery Centre will be offered as a virtual entity, but it is envisioned that a physical location will provide a demonstration centre for both residents and industry representatives, for both existing and new buildings.

The Feasibility study also entailed preliminary design of a one stop shop Better Homes Burlington website modelled on other municipal home energy efficiency programs which can be made available once the program is rolled out.

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